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Interactive Media Engineering Talents Training Model of Studio System from the Perspective of University-enterprise Collaboration*

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Abstract—**The introduction and training of talents are the most important invisible resources and the weapon to win in today's enterprises. The output of suitable talents has become the focus of attention in colleges and universities. Therefore, how to effectively link the needs of talents in enterprises with the training of talents in universities in teaching has become the research topic of the project. Based on the premise of joint training of universities and enterprises, this paper explores the output of studio-based interactive media application-oriented personnel training. The talent training mode of studio system is an educational system that integrates professional education with enterprise education. Focusing on the effectiveness, particularity and innovation of the interactive media talent training mode, this paper studies the interactive media talent training mode from the perspective of practical knowledge, explores the connotation of the interactive media talent training mode, so as to find a more reasonable path of teaching reform, and provide a real explanatory theory for the educational practice of the interactive media talent training mode in higher education.**

Keywords—interactive media; studios; university-enterprise cooperation; order-based projects

I. INTRODUCTION

Since its establishment in 2004, the School of Digital Art and Design of Dalian Neusoft University of Information has been emphasizing the organic integration of digital technology and art, the deep integration of production and study, and devoting itself to cultivating urgently needed digital art applied talents for the digital content industry. Studio-based talent training model can better adapt to the training of digital talents. In order to meet the development needs of digital content industry, the studio-based talent training model has become a brand-new cultural form of interactive media art in the School of Digital Art and Design. It is a typical combination of technology and art. It can fully reflect the value of art by using audio-visual devices and other devices. Interactive media studio trains students in the field of interactive media, devotes themselves to interactive media art design and development. Products can be widely used in exhibition industry, interactive advertising, stage art and performance industry, interactive games and other fields. At present, there is no general interactive media design system, which is not only a problem to be solved in the development of interactive media studio in Dalian Neusoft University of Information, but also a bottleneck in the development and application of interactive media in China.

A. Analysis on the Connotation and Function of "Interactive Media Studio"

The interactive media studio undertakes the teaching and scientific research activities of the School of Digital Art and Design. The professional experimental settings focus on embodying the times, advancement, typicality, comprehensiveness and practicability. The experimental contents cover the advanced technology of the subject, and closely integrate with the excellent scientific research achievements and advanced engineering practice. Through the design-oriented, comprehensive and research-oriented experiment cultivates students' scientific research quality, innovative ability and innovative spirit. The studio makes

full use of the support of school funds, is equipped with a good teaching experimental environment and advanced teaching experimental equipment, and constantly creates favorable conditions to improve the teaching effect. The all-round reform has brought about an all-round improvement in the teaching and research level of interactive media studio system, as well as the continuous improvement of students' independent innovation ability. Through the sustained support, key construction of the state and schools, and the unremitting efforts of teachers and central staff, the personnel training level of studio system will be constantly improved, so as to cultivate high-quality application-oriented senior specialized talents with social responsibility, innovative spirit, international vision and strong practical ability for the society, and move forward for the goal of building universities with the characteristics and high-level entrepreneurial applied technology.

The interactive media studio implements the management system of professional leaders. The leading teacher presides over the overall work of the studio. He is responsible for formulating the overall planning, reform and development objectives of the studio, and organizing the implementation; is responsible for organizing the implementation of experimental teaching system, studio projects/courses, experimental teaching resources and other construction work; and is responsible for the construction of the studio staff. The specific responsibilities include:

- Presiding over the formulation of the studio's development plan and implementation plan; perfecting and optimizing the rules and regulations and operation mechanism of the center; rationally utilizing and coordinating the experimental teaching funds and special construction funds of the center;

- Organizing and carrying out the reform of studio teaching; presiding over the construction of practical teaching system, studio projects/courses, and experimental teaching resources; organizing and formulating the experimental teaching syllabus adapted to the TOPCARES-CDIO mode of production-study cooperation and the requirements of OBE teaching concept, and being responsible for organizing the implementation and periodic inspection;

- Presiding over the environment construction of the studio; being responsible for creating a series of real interactive media project practice environment; achieving effective cooperation among industry, university and research;

- Presiding over the human resources construction of the studio teaching center; being responsible for formulating the development plan for the construction of the central teachers; improving the management mechanism of "introduction, employment, training and evaluation"; and continuously improving the engineering practice ability of the central teachers;

- Organizing and carrying out teaching research and achievement transformation of experimental teaching center; promoting academic exchange of the center; organizing and popularizing experimental teaching technology and experimental platform which is beneficial to students' ability training and the improvement of teaching quality;

- Actively carrying out external services; further deepening university-enterprise cooperation; strengthening the sharing and co-construction of experimental teaching resources; and constantly improving the level of studio construction.

B. Analysis on Construction Characteristics and Innovative Ideas

1) Establishing a sustainable studio teaching management system: It is necessary to adapt to the school orientation of characteristic and high-level entrepreneurial applied technology universities and the training objectives of high-quality applied talents with social responsibility, innovative spirit, international vision and strong practical ability, explores the establishment of sustainable development of studio management mode, operation mechanism and evaluation system, and improves the construction of teaching staff related to practice/studio teaching, and rules and regulations such as teaching operation, student management, safety guarantee, resource construction, financial management, quality control and guarantee, intellectual property protection, etc. It shall systematically guarantee the level and quality of base construction and protect the legitimate rights and interests of teachers and students from the perspective of system.

2) Studio teaching environment with advanced planning and construction facilities, leading technology, first-class scale and excellent environment: According to the advanced enterprise management mode and operation mechanism, it is necessary to standardize the construction of university student entrepreneurship center of interactive media, including four virtual entrepreneurship companies, such as design, visual culture research institute and IF Studio. According to the characteristics and development trend of digital art industry and subject specialty, the software and hardware environment of experimental teaching center is further improved, and relevant training equipment is added to make it fully meet the teaching requirements of interactive media practice/studio for college students.

3) Exploring the construction of an integrated practical teaching system adapted to TOPCARES-CDIO education and teaching reform : It is necessary to follow the law of digital art education and the law of the growth of applied digital art talents, use the advanced TOPCARES-CDIO engineering education concept, innovate the talent training mechanism of digital art industry-university cooperation, face the relevant industries and professional posts of interactive media, carefully design a series of comprehensive practical links from shallow to deep, coherent and successive, and establish TOPCARES-CDIO

integrated studio teaching system in stages, levels and progressive stages. The system emphasizes the implementation of the "task-driven, project-oriented" teaching model, and advocates the cooperation between universitys and enterprises to formulate the teaching objectives and outlines of experimental courses, jointly plan and construct experimental teaching content, jointly organize and implement experimental teaching process, and jointly evaluate the quality of experimental teaching, so as to achieve a high degree of integration of professional skills training and professional post training.

4) Building a high-level teaching team composed of full-time instructors, professional backbone teachers and enterprise experts: It is necessary to focus on the training objectives of the studio teaching center, adopt the methods of "introduction, employment, training and evaluation" to improve the engineering practice ability of the instructors, establish and innovate the team cooperation mechanism, and establish a "double-teacher", "double-salary" and "double-post" high-level teaching team composed of enterprise experts and backbone teachers. Among them, "introduction" refers to increasing the introduction of high-level talents, actively introducing enterprise engineers with high academic attainments and rich practical experience to implement practical teaching; "employment" refers to increasing the employment of high-level instructors, actively employing high-level technical experts with enterprise practical experience and teaching ability as part-time or full-time teachers; "training" refers to strengthening the training of young backbone teachers and improving their ability of technological innovation and product research and development in an all-round way; and "evaluation" refers to reforming the evaluation system of instructors, and taking practical ability as an important assessment and evaluation index for teachers.

5) Constructing and optimizing characteristic experimental teaching resources with project orientation: Aiming at the frontier of digital art development, combining closely with the needs of digital content industry and economic and social development, and the actual situation of digital art studio teaching center, it is necessary to update and improve the project-oriented practice/experimental teaching content, compile school-based characteristic teaching materials, and build high-quality experimental teaching resources suitable for TOPCARES-CDIO talent training mode.

II. Analysis on the Connotation of University-enterprise Collaboration

A. Win-win Cooperation Is the Prerequisite

Traditionally, university-industry cooperation is dominated by the universities. With the rapid upgrading of technology and the increasingly demanding requirements of customers, students and their skills that were "customized" at that time have certain "time lag" with the current technical

standards and employment requirements, and can't directly meet the needs of enterprises. Through the pilot of the new apprenticeship system, university-enterprise cooperation has become closer. Both sides have jointly explored the reform and innovation of the training mode of skilled talents, jointly studied and formulated the training plan, constructed the curriculum system and developed training materials, and jointly trained the skilled talents that enterprises really need, so as to achieve win-win cooperation.

B. Diversified Cooperation Mechanism

The biggest advantage of studio system is that it can concentrate superior resources. Especially, for the development of interactive media project knowledge, the individualized demand is more obvious; the content of science and technology is higher; and the characteristics of art design are prominent. Therefore, the mode of studio is the cradle of cultivating interactive media talents. In view of the diversified characteristics of interactive media development, only by establishing diversified cooperation mechanisms with enterprises can the needs of both sides be met. It is necessary to construct a "three-in-one combination, three-mentor" practice teaching mode, in which universities and enterprises cooperate to implement students' practice teaching. According to the characteristics of enterprise production operation and the law of school teaching operation, the practice arrangement of the school combines "post requirements with curriculum content, production operation and teaching cycle, combines post practice with pre-employment" (three-in-one combination), which not only solves the urgent need of enterprises, but also achieves the purpose of students' skill training in real production environment. The universities follow the three basic principles of "standardizing practice management, strengthening practice teaching function and safeguarding the legitimate rights and interests of all parties", and perfect the practice management mechanism of "four cycles and five subjects". The university takes the government, enterprises, universities, majors and students as the main body of responsibility, internalizes the key responsibilities and powers of government policy guidance, enterprise collaborative education, guarantee of school mechanism, implementation of professional norms and achievement of students' skills into corresponding school systems such as Guiding Opinions on Developing Student Internship Work and Credit System Management Measures. Using the theory of cycle model for reference, the university has designed the practice management mechanism and strengthened the system guarantee of practice management according to the four-step cycle criterion of policy standard — organization operation — quality evaluation — research practice.

III. TALENT TRAINING MODEL OF UNIVERSITY-ENTERPRISE COOPERATIVE INTERACTIVE MEDIA STUDIO

A. *Exploring the University-enterprise Cooperative Development and Training Standards and the Cooperative Mechanism of Production and Education*

Firstly, it is necessary to fully understand the characteristics of interactive media, which has the following connotations. Firstly, interactive media is based on computer and network technology, and digitalization is the basis of information storage and dissemination. Secondly, interactive media refers to the overall combination of various forms of information content system and systematic materialized digital equipment. Digitized information forms are different, as are digital communication devices, which are integrated in

the process of communication. Thirdly, interactive media emphasizes the collaboration and deep interaction with individual characteristics between users and content or environment, and emphasizes mutual feedback and influence. User's operation will change the service mode of content or environment, and the service provided by content and environment can also affect users at a deep level. On this basis, as shown in the "Fig. 1", from the perspective of university-enterprise collaboration, interactive media studio should output interactive, research-oriented and practical personnel training, but these needs come from the needs of enterprises. With the help of enterprises, universities will have more perfect teachers, teaching management, interactive software and hardware support and other resources.
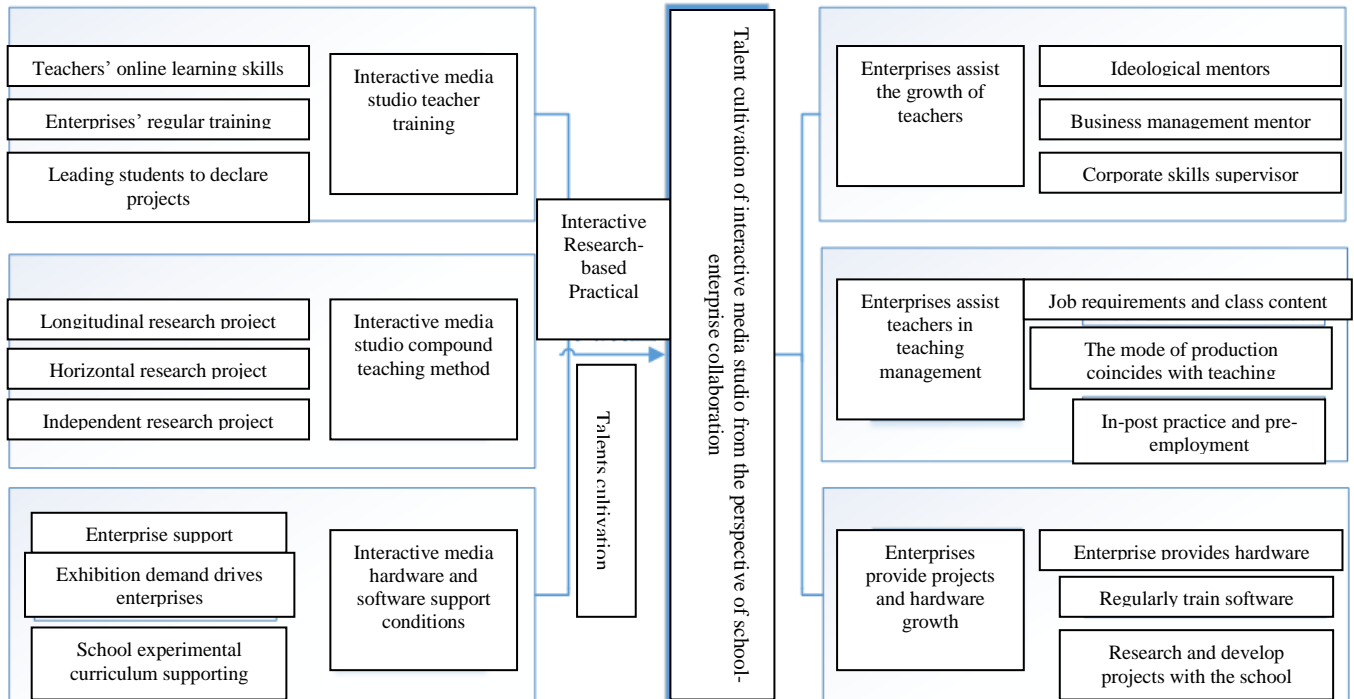

Fig. 1. Studio-based interactive media talents training model from the perspective of university-enterprise collaboration.

B. *University-enterprise Collaboration Promotes Technological and Artistic Innovation*

University-enterprise collaborative construction of interactive media talent training mode is mainly reflected in the following aspects. First, through providing expensive experimental equipment by the enterprises, it will ensure that studio projects can be incubated on the ground. The transformation from "student classroom" to "social needs" is very important. From the perspective of cultural inheritance, the development of interactive media needs the continuous updating of project content, and technology and art complement each other to reflect social values and phenomena, so as to serve the society. Secondly, university-enterprise collaboration can promote better cross-integration of technology and art. Without the participation of enterprises, project design of interactive media can't go out of the classroom, and the value of interactive media lies in

the combination of the latest intelligent equipment, sound and photoelectric display form for the best information transmission. Therefore, without the participation of enterprises, interactive media teaching is tantamount to the paramount talk. Interactive media studios are built to solve such problems.

IV. "ORDER-BASED" ENGINEERING TALENTS TRAINING PATH OF INTERACTIVE MEDIA STUDIO

A. *According to the Demand of Art Exhibition, Interactive Media Studio Carries out Order-based Talent Training of "Dazzling Star"*

TABLE I.   ORDER-BASED FUNCTIONAL REQUIREMENTS

Function number	Function name	Function description
1	Viewing help	Users can view the introduction and get started quickly before and after the interactive wall operation.
2	Live interaction	Users can see the flowing stars when they enter the interactive area.
3	Various forms	Various forms embody the starry sky
4	Acousto-optoelectronic coordination	Users can interact in front of starry works

The above "Table I" is a list of demand orders for exhibitions. Faced with the real market demand, interactive media relies on the needs and services of enterprises, and can continuously conduct in-depth research and practice based on the solid theoretical foundation of universities and studios. The research content of Interactive Media Studio is to integrate visual, tactile and auditory perception in multi dimensions. The combination of art and technology embodies the visual form of human-computer interaction, popular derivative paper art and oil painting, which makes every frame of animation have the flavor of fireworks. Through pigments and animation, people can feel the charm of Vincent van Gogh's Starry Sky. Interaction is the exchange of information and emotion among people. Visual effects can not eliminate users' sense of distance and strangeness to products. By adding dynamic effects to static pictures, and adding details and enriching pictures, people can attract people's attention. At the same time, it can guide people to achieve focus and increase interest. Integrating interactive elements and dynamic effects into static pictures highlights the interactive features of the current new media, so that the planar things can attract more attention and facilitate people's understanding of the things.

In this project, university teachers can analyze the works of The Starry Night to students in detail, which is one of the representative works of Vincent van Gogh, a post-Impressionist painter. In this painting, Vincent van Gogh uses exaggeration to vividly depict the stars full of motion and change. The sky at night is high and far. Big stars and small stars circle in the sky. The golden full moon forms a huge whirlpool. The short lines of the nebula twist and circle as if to let people see the passage of time. Dark green-brown cypress trees, like huge flames, are responders to starry night revelations. Under the sky, the sleeping village is so quiet and peaceful. Pale blue tone and dynamic lines give people a sense of freedom of time and space. Detailed interpretation of works of art is the advantage of universities. The individualized training of studio can train students' practical ability and promote their practical ability. For example, the derivative paper technology in the "order" project has always been considered as the edge art in paper art. It is to transform the carrier of sculpture and painting skills into paper. However, it does not lag behind other art forms in terms of artistic expression. The interactive device "Starry Sky" is an interactive artistic device which combines derivative paper and painting. The main way of interaction is that people can play special effects animation and switch different music when they are close to the device. It combines traditional paper art with interaction. Van Gogh's Starry Sky, which is made of derivative paper, is placed in the middle of the whole interactive device and extends the whole interactive wall into a more complete interactive work in the form of oil painting. Teachers in university, as well as the technical foundation and artistic accomplishment of interactive media studios, can best interpret the work as shown in "Fig. 2".
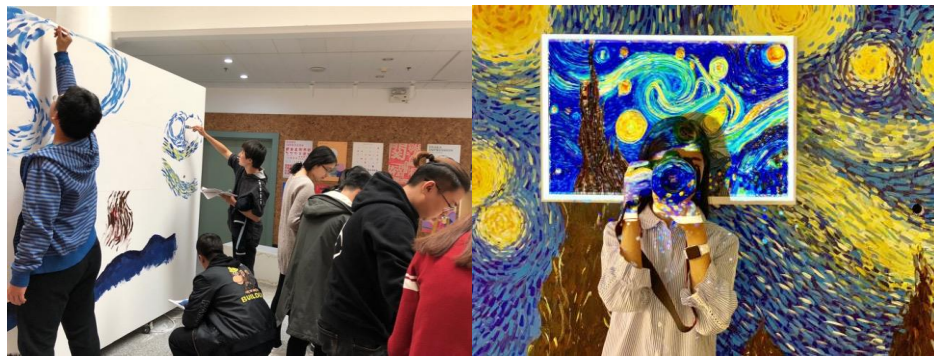

Fig. 2.   Interactive Wall Display effect picture.

In the whole work, the enterprise has three advantages: production, experts and capital. Enterprises can assign enterprise tutors to build interactive hardware environment, and introduce relevant interest carriers after the exhibition, so as to provide certain opportunities for studio students' employment and practice. There is a carrier similar to virtual enterprise in university-enterprise cooperation, which has the form of virtual operation. The two sides of the university and enterprise make use of their own special resources, share resources, complement each other's advantages, cooperate mutually, develop hand in hand, save a lot of time, manpower, funds and venues, achieve unilateral things that are difficult to achieve or do well, and achieve a win-win situation.

B. According to the Needs of Enterprises, Interactive Media Studio Carries out the Order-based Talent Training of "Dance with Enjoyment"

TABLE II.   ORDER-BASED FUNCTIONAL REQUIREMENTS

Function number	Function name	Function description
1	viewing help	Users can view the introduction and get started quickly before and after the operation.
2	Live interaction	Users enter the interactive interface.
3	Adding roles	Users can add multiple roles.
4	Role selection	Users can choose roles with different images.

According to the requirements of the above "Table II", the interactive device of "Dance with enjoyment" is mainly designed for children with autism, which has strong particularity, so there are certain special requirements for the design of the interactive device. In the process of content expression and form creation of interactive devices, autistic children's aesthetic needs should be met. Symbolic methods can be used to display them. In addition, while interacting, it should be noted that the body and mind of the experiencer can influence each other, and the subtle movements of the body can reflect the personality and mental state of the person. On the premise that the enterprise provides equipment, interactive media studio can connect the power supply, and link the adapter. Intelligent hardware configuration prompts the successful connection. At this time, the experiencer can make some movement changes in the range of interactive device recognition. The use case description is shown in "Table III".

TABLE III.   USER INTERACTION BEHAVIOR

Case Name	Viewing Help	
Case number	1	
participator	Users, Systems	
Pre-condition	Connecting power supply	
Post-condition	Users' Successful Participation	
case survey	User Experience in Interactive Interface	
Basic Event Flow	User action	Systematic Judgment Action
	1. Debugging Interactive Device 3. Participants have the experience in front of the device	2. Responding and displaying the start interface
Alternative Event Flow	nothing	
Remarks	nothing	

The interactive device is designed for children with social, emotional, cognitive and physical disorders. The requirement of system interface is simple and clear. Different from the complex operation interface of computer, it should have relative pertinence. Their interests are very transferable, and the long-term use of interactive and device equipment is not suitable for the physical condition of such children. Therefore, it is necessary to control the use time reasonably, and then children can use it in an acceptable and pleasant

way. All along, the interaction among human bodies is a very effective way to express each other's feelings. This combination of physical action and art can promote people to arouse their cells and inner emotions in casual dancing, especially autistic children with sensitive and delicate natures. This way is especially conducive to regulating their body and mind and releasing a lot of pressure. On the other hand, such interactive media can also be used to entertain children who are difficult to intervene in or access to mechanical therapy. Ordinary movements of limbs can break their precautionary mentality towards doctors. The requirements are as follows (shown in "Fig. 3"):
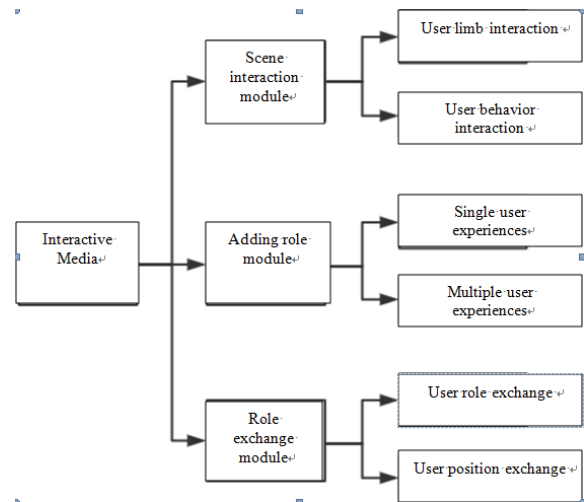

Fig. 3.   Interactive Device Requirement Framework.

1) Interaction requirements: In the interactive device of "Dance with enjoyment", children should face a simple visual effect of visualization. The most shocking visual picture can be obtained through uncomplicated limb movements. Through the medium of body and action, the therapeutic relationship can be established very effectively and quickly. In addition, this kind of interactive experience is not only one-to-one, but also can be treated in groups, and the applicants are also very wide.

2) Layout and structural design of interactive devices: In the design of the interaction device for autistic children, besides defining the main functions of the interaction device, it should give full consideration to the content and how it should be displayed. The design of interactive devices should focus on the interaction mode and experience between the interactors and children, so as to promote children's active exploration of interactive behavior and make the interactive devices play a real role.

3) Interestingness and practicability: Simple patterns and shapes can't bring strong attraction to autistic children, and more interesting factors need to be added to the design. Intelligent hardware is combined with the whole scene in interactive media design to improve the cognitive ability of autistic children in the process of entertainment, and at the

same time, the interactive form of products is no longer single.

The user controls the projection on the projection cloth through the induction device, and the images on the projection cloth and the user correspond to each other. Two or more participants can be integrated into the scene at the same time. Let the user feel in it can be more real, so that the experience effect is better. In order to give users a better experience, the scenario is roughly as shown in the scenario design diagram (as shown in "Fig. 4").
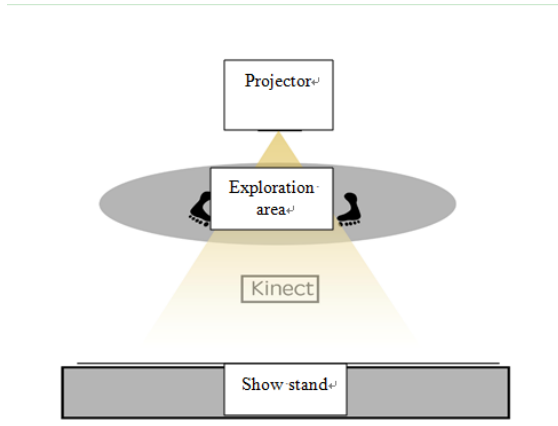

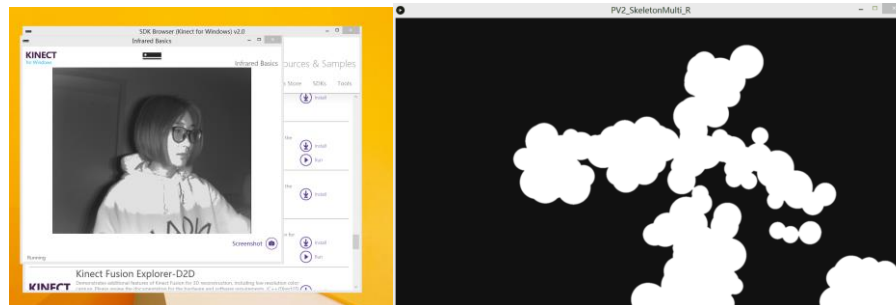Fig. 4.　Interactive Experience Display.

Processing and Kinect are used to develop the "Dance with enjoyment" interactive device, which enables people to absorb the information it brings from sight, hearing and even touch. In the design and implementation of children's programming system, the standard design method of mobile application industry is applied. In the process of developing the interactive device of "Dance with Enjoyment", a lot of user experience analysis and design have been carried out. It is necessary to make the structure of the interactive device, color matching, and the size and shape of the icon more appropriate to children's psychological characteristics. After the final test, "Dance with Enjoyment" interactive media is a useful interactive device. The operation effect is shown as follows in "Fig. 5":

Fig. 5.　Interactive Contents.

V.　Conclusion

Colleges and universities cooperate deeply with enterprises and societies, complement each other's advantages, share resources, and bring economic benefits to enterprises by using the advantages of "low cost" of their own operation. The introduction of high-quality talents and management mode in enterprises can improve the quality of personnel training in colleges and universities and help college students incubate and transform scientific and technological entrepreneurship projects. The demand of enterprises promotes the training of interactive media talents under the studio system. Interactive media emphasizes interaction. In the past media information dissemination process, the audience only receives information, which is one-way dissemination. However, the interactive media emphasizes the interactive information dissemination. The audience has more autonomy and choice, and the audience can also become the information publisher. There is diversity in interactive media. Interactive media has changed the disadvantage of single information type in the past, providing multimedia information content. Moreover, interactive media adapts to the diversification of audience needs, faces the audience and the minority, and provides information needs with personality characteristics, so that it can obtain information through diversified terminals at any time and place. Interactive media is integrated. The use of digitization technology makes the former independent single media tend to be integrated, and changes the information collection, storage, processing, transmission and other links. Promoting the connotative development of higher education and improving the quality of personnel training in an all-round way has become the main goal of the development of education in China. To achieve this goal, it is necessary to not only rely on schools, and scientific research institutes, but also rely on enterprises and other social forces, that is, to build a university-enterprise collaborative talent training model. This paper constructs the interactive media engineering talents training of studio system in the perspective of university-enterprise collaboration, which is

verified through the order demand of "Starry Sky" and "Dance with Enjoyment". Interactive media studio students can be well trained according to the collaborative traction between teachers and enterprises, and they can better meet the needs of society.

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