

The Application of 3D Rapid Prototyping Technology in Improving the Innovation and Entrepreneurship Ability of College Students

Fengjuan Wang^{1,a*}, Shufeng Jiang^{1,b}, Rui Fan^{1,c},

Fusheng Gao^{1,d}, and Youzheng Cui¹

¹Qiqihar University, No.42 Wenhua Ave, Qiqihar Jianhua district, Heilongjiang

^a 657678158@qq.com; ^b 474118867@qq.com; ^c 364859445@qq.com;

^d 285913928@qq.com; 634123048@qq.com

Keywords: 3D Rapid Prototyping Technology; Innovation and Entrepreneurship; University Student

Abstract. In the information age of rapid development, innovation has become the driving force of social development, and the cultivation of innovative talents has become the core goal of China's college personnel training. With the deepening of national innovation and the entrepreneurial concept of college students, it is a developing trend to introduce 3D rapid prototyping technology in order to make college students more visually see the innovative results. In this paper, application of 3 d rapid prototyping technology to expand the students' creative thinking ability and the team cooperation spirit, and utilizes 3D technology to print samples and part to support the production of real objects so as to change the teaching ways of the traditional teaching demonstration. the appearance of 3D quick forming technology makes students explore the main body of the research, and gives the students a good condition for cultivating innovative thinking.

Introduction

This paper takes college students' innovation and entrepreneurship training program as the carrier and 3D rapid prototyping technology as the means to strengthen the cultivation of students' innovation and entrepreneurship ability. As a new visualization technology, the application of 3D rapid prototyping technology in the field of education has attracted the attention of researchers and is bringing innovation in teaching, learning and research. In this paper, 3D rapid prototyping technology is introduced into the training process of college students' innovation and entrepreneurship ability, and it is transformed into a mutually beneficial training mode. The combination of both will enable students to see the innovation results more directly and effectively, and play an important role in the training of college students' innovation and entrepreneurship ability.

The Current Situation of College Students' Ability of Innovation and Entrepreneurship Training

With the development of 3D shaping technology, the application of 3D shaping in education has attracted the attention of researchers, which is bringing innovation in teaching, learning and research. College students' innovation is the soul of a nation, is the driving force of social development, However, manufacturing industry is the foundation of national economy, is the guarantee of national security, and an important embodiment of national competitiveness, the level of modern manufacturing technology has become a major symbol of a country's economic development. 3D printing technology will have a profound impact on modern manufacturing technology. In recent years, as an emerging visualization technology, 3D rapid prototyping technology has made certain achievements in the fields of medicine, industrial design, architecture, aerospace and other fields, the 3D rapid prototyping technology is introduced into the field of university education to college students' innovative entrepreneurial ability play an important role.

In our country, there is a problem that the utilization rate of innovation and entrepreneurial practice base is not high, the establishment of innovative entrepreneurial practice base is in order to make students the classroom to the innovation entrepreneurship theory is applied to the practice; In addition, there is also the problem of education innovation and entrepreneurship being carried out in

more forms than contents. Education has experienced more than 10 years of development since its inception. During this period, from top to top key universities, to various local universities, all of them actively responded to the call of the ministry of education, and in the course of the university course, there's a course in the course of innovation and entrepreneurship education. However, as far as the whole education is concerned, the innovation and entrepreneurship education discipline has not really been established so far, and its existence is separated from the professional education. At the same time, the corresponding education resources are also lacking, the qualifications of teaching teachers are not clearly defined, and the teaching methods are relatively simple. According to the current situation of colleges and universities, researches on innovation and entrepreneurship education mainly focus on qualitative theoretical analysis and countermeasures and Suggestions, and lack of empirical research based on extensive research.

It is need to improve that curriculum system of innovation and entrepreneurship education. Most of the local colleges and universities of college students' innovative undertaking education curriculum is messy, often with a course is given priority to, some schools will be set as public basic course, some schools will be set as general courses, and school will be set to elective courses, fragmented in severe cases, there is no uniform curriculum system, it is to carry out innovative entrepreneurship education of college students brought a lot of limitations and popularization. In terms of the selection of teaching materials, only just according to the teacher's own understanding of the course, selected some teaching materials of simulation companies' innovation and entrepreneurship training, such as the international labor organization's SYB, etc. Although these materials is based on the college students' innovative entrepreneurial education development of the developed countries to write, has certain value of reading, but with China's specific national conditions still have certain differences. The project will be a study of the development of innovative entrepreneurial skills of college students and the development of 3D rapid prototyping technology, turning it into a mutually beneficial pattern of cultivation.

The Role of 3D Rapid Prototyping Technology in Cultivating the Innovation and Entrepreneurship Ability of College Students

The Application of 3D Rapid Prototyping Technology to Expand the Innovative Thinking Ability and Team Spirit of College Students, and the 3D Rapid Prototyping Technology has Set a New Set of Conditions for College Students to Create Innovative Thinking. In the ability of innovation and entrepreneurship, theoretical knowledge and technical level are the preconditions for college students to cultivate the ability of innovation and entrepreneurship. The consciousness of innovation and entrepreneurship is the driving force for college students to cultivate their innovation and entrepreneurship ability. Innovative thinking is that core of the innovation and entrepreneurial ability of university students [4].

In the Course of Practice, Students should be Trained to be Good at using Various Technologies, learn to Apply some Advanced Technologies to Practice, so as to Make Teaching Activities more Specific, some Advanced Technologies to Make up for the Deficiency of Various Direct Experience, and lay a Foundation for Abstract Experience. In essence, 3d printing technology is an extension of multimedia technology and virtual reality technology. It expands people's perception and feeling and promotes the further development of thinking ability[2].

The 3D Technology is used to Print Samples and Parts to Support Physical Production. As a rapid forming technology, 3d printing can print products of various complex shapes. The introduction of 3d printing into practical teaching can create a good teaching situation for students' innovation ability training. By bold design and establishment of 3D models, 3D printers can print 3D models into touchable and displayable entities.

It Change that Teaching Way of the Traditional Teach Demonstration, and the Appearance of 3D Rapid Prototyping Technology has Made Students Become the Subject of Exploration and Practice. Visualization 3d printing technology can print students' design models into three-dimensional objects, creating a more realistic learning environment, giving students a

strong sense of reality, to dramatically improve student interest and innovation awareness. 3D rapid prototyping technology has inspired the creative minds and creative minds of students in the process of converting the model into physical objects.

Measures to Improve College Students' Ability of Innovation and Entrepreneur-ship

Motivate Students to Innovate. The motivation for innovation is to promote people to the internal dynamics of innovation, which is the start of innovation, Interest is one of the internal factors of study motive[1], 3D rapid prototyping technology can present the designed model into a three-dimensional and intuitive object. This rapid prototyping technology can fully mobilize students' learning enthusiasm and stimulate their innovation motivation. For example, in the normal teaching practice, teachers usually use multimedia pictures, animations and video to create an information learning environment for learners, but this kind of teaching lacks the opportunity to explore and practice real things. The emergence of 3D rapid prototyping technology has revolutionized the traditional teaching and demonstration teaching method, making students become the subject of exploration and practice.

Improve Students' Practical Ability and Stimulate the Potential of Innovation and Entrepreneurship. The process of 3D printing in 3D rapid prototyping technology is divided into three steps: proposing creative design, establishing 3D model and printing[2]. Students participate in each stage, through a series of activities, to improve student observation, coordination, and practical ability. Practice is the main way to improve the internalization and mastery of knowledge. Meanwhile, practical ability is also the cornerstone for learners to develop their research ability and innovation ability.

Mobilize the Students to Participate in Innovation and Entrepreneurship Competitions at National, Provincial Level and School Level. The various innovation and entrepreneurship competitions have provided a wide space for the promotion of 3D rapid prototyping technology. From design to printing, assembly and debugging, students are required to participate in the completion of products, which will promote the development of learners' operational ability, production ability and team cooperation and innovation ability. learners can from the aspects of design, production, exhibition, participation in the learning process, effectively arouse the enthusiasm of students' innovation, improve their enthusiasm for learning, and cultivate their innovation and creativity[3].

The Innovation of Combination of 3D Rapid Prototyping Technology and “Great Innovation”

Change the Traditional Model of the Implementation Process of Big Innovation Project for Science and Technology Students. for all the majors in engineering, excellent students with strong interest in 3D rapid prototyping technology and innovation and entrepreneurship and who have the ability to learn, are selected from these students to conduct comprehensive training in innovation and entrepreneurship ability and 3D rapid prototyping technology for these college students, and students are encouraged to actively apply for the training program of innovation and entrepreneurship of college students.

To Accelerate the Penetration of Pdvanced Technologies into the General Teaching Field. The application of 3D rapid prototyping technology in the general teaching process will promote the understanding and application ability of teachers and students in our school, to adapt to the economic development in the 21st century, high-tech, diversified and wisdom of the patterns and specifications applied talented person training mode innovation and system, enhance surface engineering student employment rate and employment[5].

Change the Traditional Teaching Management Model. 3D rapid prototyping technology the abstract concept and design into the real world, or the process of teaching content of some scientific abstract concept of visual display, make the learners get more cognitive experience, can be viewed, digital model can be converted to tangible entity model, and improve the ability of thinking, to promote learners' three-dimensional access to knowledge and understanding. change the traditional

“teaching” into “doing”, then “using”, which is a complete chain teaching management mode.

Summary

At present, the creative education has been aimed at all college students ,it has been integrated into the whole process of talent training. In order to improve the innovation and entrepreneurial ability of the university, it is necessary to transform education concept and education concept. This paper introduces 3D rapid prototyping technology, so that students can see the innovation results more directly and effectively, which plays a good role in improving students' enthusiasm for innovation and entrepreneur- ship.

Acknowledgements

Educational science research project of Qiqihar University, youth important items(2017092).
Qiqihar Science and Technology Bureau Project, Industrial issues (GYGG-201616)
Heilongjiang university education reform project (SJGY20180565) Research and Practice on the Application of Member Echelon Construction in College Students' Innovation and Entrepreneurship Projects (GBD1317145).

References

- [1] X.Y. Jiang and X.L. Ma: Journal of Higher Education,(2018) No.2,p.24.
- [2] X.M. Ai,S.P. Chen and Y.Y. Li: Learning Weekly, (2016) No.34, p.230.
- [3] D. Zhou and B.B. Huang: Science and Technology Innovation Herald, (2017) No.35, p.243.
- [4] Q.Deng and Z.Q. Zhu: Yinshan Academic Journal(Natural Science Edition),Vol. 32 (2008) No.1, p.102.
- [5] M.Wang,J. Li and X.S. Yang: Journal of Mianyang Teachers' College, Vol. 36 (2017) No.5, p.40.