

Advances in Social Science, Education and Humanities Research, volume 412 International Conference on Modern Educational Technology and Innovation and Entrepreneurship (ICMETIE 2020)

# Construction of Active Learning Space: Starting from the Demand of Innovation and Entrepreneurship Education

# Weijian Ye<sup>1,\*</sup>

<sup>1</sup>Ningbo University of Finance & Economics, Ningbo, Zhejiang, 315000, China <sup>\*</sup>Corresponding author. Email: wueye0186@163.com

# Keywords: active learning space, innovation and entrepreneurship education, logical starting point

**ABSTRACT** The innovation and entrepreneurship education puts forward the internal requirements for the change of learning space, the research has put forward the trend of the change of learning space, and the practice has also shown the universality and trend of the change of learning space, but the change of learning space in the world is in the initial stage of exploration as a whole. Based on the correlation analysis of the core elements such as space, technology, teaching method and learning resources, this paper puts forward the design framework of active learning space, and presents different forms of space cases based on the demand of innovation and entrepreneurship education, which can provide practical reference for the construction of active learning space in similar universities. In the future, it is also necessary to explore the internal mechanism and manifestation of the influence of learning space for innovation and entrepreneurship education, and promote the continuous deepening of innovation and entrepreneurship education.

# **1. INTRODUCTION**

Innovation and entrepreneurship education is not only the trend of education reform and development in the world, but also the national policy of our country. At present, innovation and entrepreneurship education has been included in the running schedule of higher education institutions in many countries and regions in the world. At the level of the State Council and the Ministry of education of China, three programmatic documents on innovation and entrepreneurship education have been issued successively to gradually define the value orientation of innovation and Entrepreneurship education, and the policy support system of each region is also increasing, highlighting the importance of innovation and entrepreneurship education, and establishing The core concepts of "facing all students", "combining professional education" and "integrating into the whole process of talent training" have constructed a full coverage, hierarchical and differentiated innovation and entrepreneurship education policy framework.

Among the existing reflections, analyses and debates on the cultivation of innovative talents, there are those who seek the reasons from the system and mechanism, those who seek the conclusion from the social employment and examination evaluation, those who actively explore the cultivation mode and curriculum, and those who seek the influence from the cultural tradition, but most of them focus on the concept and mode, and those who consider the integration from the practical operation level and change based on the space The research on the cultivation of innovative talents in the revolution is relatively few, ignoring the influence of learning environment and culture on the cultivation of innovative talents.

In order to explore new perspectives and new ideas for the cultivation of innovative talents, it is urgent to focus on the target matching degree, analyze the practical characteristics of innovative entrepreneurship education and its demand for learning space, find out the practical basis for the change of learning space and its impact on innovative personnel training, build a learning space design framework for innovative entrepreneurship education, explore the internal mechanism and manifestation of learning space affecting the cultivation of innovative talents, Summarize the



application mode of learning space for innovation and entrepreneurship education, and promoting innovation and entrepreneurship education.

# 2. Research Summary

The disadvantages of traditional learning space, such as fixed place and unchanged layout, neglect the process of students' knowledge change from absorption to construction. With the development of new technology represented by information technology, there has been a change of learning space aiming at stimulating students' interest in learning, enhancing students' participation, promoting social interaction, supporting collaborative learning and improving learning experience.

## 2.1. Research on the relationship between innovative talents training and learning space

In terms of the demand for space change, some researches have considered that the characteristics of innovative talents, the change of learning style of the new generation of students, and their attention to the practical application, innovative thinking, information literacy and learning experience of students give birth to the demand for learning space change. On the one hand, the classroom more and more includes group cooperation, achievement sharing, theme discussion and other forms of activities, with data showing that nearly three quarters of the classes include class discussion, and nearly 60% of the classes include group activities; on the other hand, the traditional teaching place is fixed, the front and back are clear, the layout is unified and other characteristics, focusing on better presentation of content, meeting the needs of teachers' organization Activity demand characterized by "giving guidance" [1,2].

In terms of the value of space transformation, it has been explored that the new space plays a positive role in the cultivation of innovative talents. First, active learning space has a positive effect on improving students' positive emotions. Students show stronger creativity and higher problemsolving ability and efficiency[3]; the classroom shows greater freedom and more active learning emotions; second, rich media technology, virtual reality technology, big data, learning and analysis technology, etc. to think about students' abilities, innovative thinking, personalized needs and diagnosis Third, it can promote the implementation of flipped classroom, Maker Teaching and other new models, and improve students' ability and creative thinking[4].

In the aspect of spatial layout characteristics, some researches have demonstrated the relationship between space and knowledge creation, dissemination and application, and pointed out the internal relationship between spatial characteristics and teaching. Dr. Ken Fisher's research on "connecting learning method and learning space" is very representative. He believes that the application-oriented classroom is suitable for "symmetrical" layout, the creative classroom is suitable for "multi group round table" layout, and the interactive classroom is suitable for "round table" layout. According to the research, "classroom" should follow the development of the times and turn to the whole, gradually out of the uniform layout, towards personalized and diversified development.

## 2.2. Research on the current situation of learning space reform at home and Abroad

Influenced by the development of learning theory and technological progress, the reconstruction of traditional teaching places has become a research hotspot in the world. "Reconstructing teaching space" appears repeatedly in NMC horizon report in recent three years. "Education informatization 2.0" proposes to promote "the construction of intelligent learning environment, the transformation of education mode and ecological reconstruction with the support of new technology". With the United States, Britain, Canada, Australia and other developed countries led by the rapid growth of University space transformation. ALCS project, scale-up project and teal project are representative space practices[5,6]. For example, the future classroom of China Normal University, the interdisciplinary innovation learning space of Tongji, the future learning experience center of Beijing Normal University, Tsinghua smart classroom, etc., the large-scale space transformation and classroom teaching reform of Sichuan University are in the forefront of the reform.

In terms of the characteristics of spatial change, the era of "enabling" of information technology is emphasized. The unique advantages of information technology in the creation of learning environment and learning process interaction lay an environmental foundation for autonomous learning and ubiquitous learning. Its features of recording learning process, identifying scenarios, connecting communities and so on make learning more intelligent. The teaching of technology enabling Space pays more attention to active learning, collaborative learning and efficient interaction, pays more attention to the cultivation of students' development ability, research ability and innovation ability, and is suitable for the cultivation of innovative talents. In promoting the development of students, it also gives positive conclusions such as improving practical ability, stimulating positive emotions, cultivating critical thinking and promoting social interaction[7].

In the framework of space design, technology, space and teaching method are generally emphasized as an organic whole. At present, PST framework, PST framework and learning space design framework are widely used. Most of the practices emphasize the concepts of initiative, cooperation, interaction and learner centered, and the integration of formal, informal and virtual learning spaces has achieved results in ease of use, flexibility, compatibility, reliability and comfort.

Under the effect of space transformation, the new space application redefines the classroom and learning form. The transformation of spatial paradigm from stereotype to pluralism, from closeness to openness and continuity, from emphasizing order to focusing on user experience, from clear front and back to flexible layout, from single screen to multi-screen, accompanied by the transformation of students' independent learning to emphasizing collaboration and dialogue, from book learning to digital learning, and from teachers' classroom guidance to online and offline guidance real time interaction, teachers teaching students knowledge to teachers and students to become a learning community and other changes in teaching patterns[8].

## 2.3. Review of research

On the whole, the era characteristics of innovation and entrepreneurship education and the development of learning science constantly put forward new requirements for learning space. The arrival of the era of artificial intelligence and the development of emerging technology represented by information technology provide the possibility for space innovation, but the research in this field is still in the early stage.

It has been pointed out that most of the existing teaching space in colleges and universities is built on the traditional teaching mode, and the internal demand for space for innovative personnel training has been put forward. However, there are still some problems in the reform practice, such as insufficient attention, target deviation and so on. It is urgent to excavate the value of space change based on the demand of innovation and entrepreneurship education, and enhance the adaptability of space design. The existing research also shows the extensive practice of space change in the world, and puts forward the proper trend of space change. However, it is still in the initial stage of exploration, lacking the demand and characteristic analysis of teaching and learning. It is urgent to broaden the research perspective and methods, build a systematic framework of space change, and enhance the scientific research of space construction.

# **3.** The Overall Framework of Active Learning Space for the Needs of Innovation and Entrepreneurship Education

Based on the characteristics of innovative talents and the characteristics of the times, this paper studies the influence of pedagogy, computer science, environmental psychology, ergonomics, educational technology and other fields on the change of learning space, demonstrates the influence of four dimensions of space, technology, teaching method and resources on the realization of innovative talents' training objectives, and combs the key influencing factors; then, based on the spatial construction multimedia case study, drawing on PST, learning space in the 21st century and other typical frameworks, and based on the target needs, the core elements of space, technology,



teaching methods and learning resources are analyzed, and the design framework and implementation scheme of active learning space are proposed, as shown in Fig. 1.



Figure 1 The framework of active learning space for innovation and Entrepreneurship Education

The first layer: Based on the cultivation of innovative thinking in classroom teaching, it is the basis of the implementation of innovative entrepreneurship education. For all students, space design is supported by information technology. Around the learning activities such as group learning, team cooperation, achievement sharing, real-time interaction, it aims to cultivate people who are willing to learn independently, are good at information search, can communicate and express, understand team cooperation, and have innovative consciousness.

The second layer: Based on the innovation practice training in the second classroom, for some students with potential for innovation and entrepreneurship, space design is supported by new formats, new materials and new technologies, comprehensively considering the functions of professional laboratories, highlighting the integration of professional innovation and interdisciplinary cooperation, carrying out interdisciplinary project practice, discipline competition, technology development and other integrated and applied innovation practice activities, training A person who can analyze, ask, and think creatively.

The third layer: Based on the incubation platform, for practitioners with entrepreneurial intention, the space design mainly refers to the realization of minimally invasive technology, providing resource docking platform and business model verification for entrepreneurial practice, focusing on value creation activities such as achievement transformation and roadshow.

# **4.** Practice of Active Learning Space Construction Based on the Demand of Iinnovation and Entrepreneurship Education

Facing the needs of innovation and entrepreneurship education, Ningbo University of Finance & Economics has systematically carried out the practical exploration of learning space reform on the basis of constructing the overall framework of learning space.

## 4.1. New form classroom with technical support

#### 4.1.1. Construction concept

In the construction of the new classroom, based on the theories and methods of learning science, ergonomics and environmental behavior, supported by the internet, we integrate key elements such as method reform, technology application and site requirements, and consider how the space design can adapt to the nature of students, promote students to take the initiative in learning, and carry out a beneficial extension of learning, which is no longer limited by time and space? Consider how to get rid of the traditional "box" mode, so that learning space can easily switch between different modes to better adapt to teaching? Consider how to use teaching methods, technology and space as effective tools to enrich teaching activities and make the classroom a real place for teachers and students to interact, exchange, discuss and improve? Consider how to connect technology and physical space seamlessly, better support teaching activities, and make teachers and students more comfortable in class?



## 4.1.2. Construction type and characteristics

Such key elements as the reform of classroom integration methods, technology application, site requirements, etc.: Gigabyte network bandwidth, full coverage of wireless hot spots, wireless control system, video matrix technology to support the real-time interconnection of mobile phones, computers and display terminals, so as to meet the real-time interaction between students and teachers in online learning and the demand of efficient screen casting and sharing; multi shape, free combination table and chair guarantee that each seat is the best it is convenient for group cooperative learning, theme discussion, achievement demonstration, project practice, multi place interaction and other learning activities. Through focusing on the cultivation of key abilities of innovative and entrepreneurial talents, such as active learning, information acquisition, exploration and innovation, team cooperation, reflection and improvement, the school has broken the bottleneck of traditional classroom teaching on the stimulation of students' innovation awareness and the cultivation of innovation ability.

# 4.1.2.1. Fixed group classroom

This kind of classroom adopts fixed tables and chairs, which are combined by six people. Each group provides large screen display equipment for projection, and can connect mobile devices such as notebook computers at will. When the group shares the discussion results, it can be displayed through the display device of the group. When the whole class shares, all display devices display the content of the speaker at the same time. It is suitable for computer, mechanical and electrical, art and other majors to use computer as the main learning tool for course teaching.

# 4.1.2.2. Free combination classroom

The free combination classroom is equipped with all kinds of movable desks and chairs which can be assembled at will to meet the needs of the discussion group with random number and shape. The projector with multiple positions can meet the requirements of multi angle display during group discussion, so that students at any position can get real-time information at any time. A small movable white board with one hand is used for various formulas, drawings and corresponding writing during group discussion. It is put on the screen in time with the aid of the physical projector to avoid the complicated input of the computer, and make the classroom discussion, interaction and communication simple.

## 4.1.2.3. Video classroom

The recording and broadcasting classroom is equipped with integrated desks and chairs, one button automatic recording and broadcasting system, electronic whiteboard, handwritten whiteboard and central control computer. In the process of classroom teaching, teachers provide automatic one key recording of the course teaching process to help teachers to construct the after-school curriculum teaching resources and self-reflection on teaching.

## 4.1.2.4. Remote live interactive classroom

In order to meet the school's needs of using high-quality curriculum resources outside the school to carry out classroom teaching for students in the school, fixed group tables and chairs are used in the remote live interactive classroom, with 6 people in each group; each group is equipped with large screen display, providing network cable, video cable and power socket; equipped with remote teaching system, central control computer and high-definition camera. In the process of teaching, teachers and students' images, teaching courseware and voice can be collected and formed into a digital code stream, which can be sent out in real time through the network. Teachers can see the students' images in remote viewing classrooms, and can also interact with students remotely.

## 4.1.2.5. Large, medium and small workshops

Small and medium workshops are equipped with free combination and splicing tables and chairs, large screen display, wireless screen projector, writing glass wall, etc., which are used for group discussion before or after class. Large seminar room is equipped with large splicing screen, touch screen, remote interactive conference teaching system, etc., which is used for high-quality classroom HD live broadcast, academic report, remote teaching and other activities, and can realize cross school and cross campus course sharing and teaching live broadcast.



## 4.2. Innovation space for new formats, new materials and new technologies

#### 4.2.1. Construction concept

The innovation space for new business forms, new materials and new technologies can not only provide a platform for smart communication for maker students, but also provide a practice space for entrepreneurial teams to integrate communication, discussion, research, practice and display, stimulate students' experience and application of new materials, new technologies, new processes and new equipment, and promote students to invest more in practice, to improve the effect of learning.

In the independent and open atmosphere of collision and sharing, students can put creative innovation into practice through various model building, virtual scene demonstration and other means; They can also learn by doing to improve practical application ability; They can also stimulate imagination through cooperative learning and interdisciplinary learning.

4.2.2. Construction type and characteristics

#### 4.2.2.1. Creative space

For creative sharing and exchange, model design and production, open-source hardware and software design and development, intelligent hardware design and development, students' scientific and technological achievements display and other activities, the space is equipped with various electronic components, IOT equipment, textile, computer, 3D printer, laser cutting machine and other small hardware and software facilities, as well as large-scale processing equipment such as CNC wire cutting machine tools It is not only used as a place for maker learning and exchange, but also for displaying and publishing creative design works. It can also hold various kinds of maker activities, docking business plan incubation, etc.

## 4.2.2.2. E-commerce maker space

With the characteristics of the operation of cross-border e-commerce and the management experience of warehousing and logistics center, a 3D interactive cross-border e-commerce demonstration sandbox, big data analysis system, online marketing training system, port container simulation system, logistics management simulation system, and multi-functional combination of tables and chairs are configured to enable students to understand cross-border e-commerce in the experience, be familiar with the operation and operation of cross-border e-commerce in all aspects, and realize e-commerce , o2o entrepreneurial experience, exploration, practical training, practice, practical combat as one of the e-commerce maker experience.

#### 4.2.2.3. Art maker space

In the form of animation studio, advertising planning studio, environmental art design studio, Visual Communication Studio, product creative design studio, digital media art studio, etc., it is equipped with graphic workstation, graphic printing center, model production equipment, which gathers excellent students of different majors in art design, breaks through a single professional thinking boundary and makes full use of new cross-border thinking mode, share professional knowledge, carry forward the spirit of innovation and practice, and jointly complete creative design.

## 4.2.2.4. 3D printing center

For the needs of industrial manufacturing, cultural creativity and artistic expression of digital entertainment, personalized print customization service and parts manufacturing with special performance of mold prototype production, four eye scanner, photogrammetric system, 3D scanner, desktop 3D printer and 3D design software are configured, 3D modeling software and design, robot programming and creation are provided, and 3D models of various shapes are compiled, exercise students' creativity and imagination.

#### 4.2.2.5. VR Technology Center

For VR film and television post production, VR scene interface design, VR interactive display design, integrating VR virtual reality technology and graphic art design, animation design, film and television post and other needs, configure VR editor, panoramic shooting components, VR glasses, VR head display equipment package, VR experience equipment, UAV, workstation, etc., visualize abstract concepts, and train students to innovate in professional cross integration ability.



## **4.3.** Business incubation space

#### 4.3.1. Construction concept

According to the current mainstream office environment of domestic enterprises, we will design and build an intensive business scenario space, supporting the incubation service chain from project primary selection to industrialization, which will be used as the actual incubation area of student start-ups and the real office simulation site of enterprises, and provide the entrepreneurial team with a series of services such as project guidance, office site support, enterprise registration and establishment, patent application, investment and financing.

## 4.3.2. Space case

The business model laboratory focuses on "business model verification and improvement", through business model perception and stimulation, business model verification and modification, business model implementation and support, helps entrepreneurial teams improve business models, enables college students' entrepreneurial projects to get scientific and accurate judgment and verification in the laboratory, helps them from entrepreneurial ideas to entrepreneurial implementation, grow stronger, and build Become a test center for the verification of college students' creative ideas and entrepreneurship projects.

#### 4.4. Informal learning space

Any space on campus can be activated and transformed into an ecological space for students to learn actively. According to the personalized learning and cooperative sharing needs of students, the school aims to promote more active interaction between teachers and students, follows the design concept of "group, interaction and sharing", coordinates elements such as network coverage, spatial layout, comfort needs and atmosphere creation, transforms libraries, laboratories, canteens, promenades, etc., and creates flexible, open and comfortable " informal learning space creates a good environment of "learning everywhere, learning from time to time".

## 5. Conclusion

In terms of academic value, the reconstruction of learning space based on the demand of innovation and entrepreneurship education is not only helpful to promote the modern evolution of teaching and learning methods, constantly enrich teaching theories, but also to systematically grasp the practical state of space teaching application and the teaching reform caused by it, promote the integration and iterative innovation of space elements, and provide the corresponding empirical basis for improving the theory of learning space design; In terms of practical value, it can not only provide a new strategic framework for systematically promoting the education and teaching reform oriented to the cultivation of innovative talents, promote the use of new forms of modern education technology in colleges and universities to innovate learning methods and teaching models, but also help to further clarify the goal orientation of learning space construction, evaluate the value of teaching space reform, and realize the development and application of new space practice to provide empirical basis and targeted recommendations.

The existing research and practice have emphasized the positive effect of spatial change on the implementation of innovation and entrepreneurship education, but there are still some problems such as insufficient integration of spatial elements and delayed teaching applications. In the future, it is necessary to excavate the key influencing factors of innovative talents training, build an overall support platform on the basis of spatial change, and build a new spatial operation management oriented to innovation and entrepreneurship education the path promotes the paradigm change from teaching space to learning space.



#### Acknowledgment

This work was supported by Zhejiang philosophy and social science planning project(Grant NO. 20NDJC206YB) and Teaching reform project of Zhejiang Province (Grant NO. Y201636757) and Key issues of educational technology planning in Zhejiang Province (Grant NO. JA030).

#### References

- [1] C Strange, J Banning. Educating by Design: Creating Campus Learning Environments That Work, San Francisco: Jossey-Bass, 2002.
- [2] N Chism, D Bickford. The Importance of Physical Space in Creating Supportive Learning Environments: New Directions in Teaching and Learning, San Francisco: Jossey-Bass, 2003.
- [3] Wei Jing.A study on the construction of positive emotions in the future classroom -- Based on the perspective of environmental psychology, E-education Research, vol. 35, 2014, pp. 59-63+70.
- [4] Xu Yafeng, Wang zhouxiu, Ma Jian.Design and application of future classroom based on experience learning. E-education Research, vol. 34, 2013, pp. 73-79.
- [5] Whiteside, A., Brooks, D.C., & Walker, J.D.. Making the case for space: three years of empirical research on formal and informal learning environments [J/OL]. EDUCAUSE Quarterly, 2010, 33(3).
- [6] Beichner, R.J. et al. The Student-Centered Activities for Large Enrollment Undergraduate Programs (SCALE-UP) Project[DB/OL].
- [7] Xu Yafeng, Ta Weigang. Study on the influence of learning space on students' learning, Journal of Distance Education, vol. 32, 2014, pp. 82-89.
- [8] Xu Yafeng, Chen Weidong, Li Jinchang. On the change of spatial paradigm: from teaching space to learning space, E-education Research, vol. 36, 2015, pp. 20-25+32.