

# Learning Community Construction of Higher Vocational Colleges Based on the Teaching Time and Space Construction

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**Abstract.** In view of the Chinese education informationization 2.0 action, this paper developed a kind of class learning community of the Chinese higher vocational education by teaching time and space integrating construction. Namely, in the limited class teaching time and space, this paper designed the teaching orderly activities for teaching helpers, learners and sustainer based on the internet and information technology in higher vocational education class, constructed the class learning community in the actual way of teaching activities, active content and active order, moreover, built learning resources carriers of activity information and interactive way that aimed the concept of all for learners in space and time. At last, this paper analyzed the openness, interactivity, transcendence and efficiency of designed class learning community in the teaching practice, furthermore, presented the idea of the future application.

## Introduction

With the big data of artificial intelligence field gradually applies in the education, the global higher education enters a new developing stage, depending on the internet digital innovating education has become the new ecological model, promoting students development is the center of education, that is the requests of the talents training goal and education reform, also is to develop talent innovative and entrepreneurship abilities important ways [1]. In 2018 year, the Chinese education ministry issued the acting plan for education informationization 2.0, it points out speeding up the modernization of education, constructing the new journey of education power, in the new historical starting point, it must focus on the new demand for talents cultivation, strengthen the ability first concept of talent training, support leading the education modernization development, promote the idea renewal, mode change, system reconstruction, make the education informatization level led the world, provide wisdom and plan of Chinese education informatization development .

According to the 19th national congress report, it pointed out to build the new worker force with knowledge, skilled, innovative spirit and etc., the higher vocational colleges and universities as the cradle of cultivating future industrial workers, the mission is entrusted to each vocational educators, the class teaching is the key for worker achievement the knowledge, ability and quality of industrial in the future. At present, the higher vocational students quality is poor for learning interest, independent learning ability, knowledge and skill migrating ability and etc., based on the characteristic of higher vocational students learning and demand, the information age requires that the teaching can inspire interest, breakthrough the time and space constraints, rapid replication transmission and richly present method features, all these demand the teaching activities of the organizers, learners, supporters, learning resources and information to establish a new relationship between the teaching time and space, it is necessary to build a newly class learning community is to achieve effective classroom teaching and students development.

## Learning Community

As a new teaching and learning idea, the traditional “learning community” [2-6], pay attention to the practical research in classroom teaching, emphasizes the teacher-student relationship, provides students with good learning experience, pay attention to the diversity of teaching methods. As the

internet and information technology applied in the teaching, in recent years, relying on internet technology learning community has been paid much attention to researching jinni xuan etc. [7] analyzed the current teaching situation, established efficient learning community, reference [8] discussed the learning community which built in the internet environment, helped students to understand the real social demand based on the educational reform and teaching in the view of integration of the learning community construction has been pointed in[9]. In the process of teaching and learning what the researched learning community pointed out: inside and outside classroom the learners, help scholars (teachers, experts, mentors, etc.) and learning resources of community members used computer or mobile phone through communication cooperation and sharing to complete the specific learning tasks and promote each other, these learning community have certain characteristics of openness, interactivity and transcendence.

### **Space-time Elements of Higher Vocational Class Learning Community**

Traditional learning community compared with the traditional teaching mode has its era advanced, in the process of classroom teaching and online teaching has certain guiding value, but reveals inadequate to face the higher vocational education classroom teaching process, first of all, that is the traditional learning community failed to contact higher vocational characteristic learning to organize implementation; Secondly, the components of higher vocational class learning community includes important information and spatio-temporal organizational relations. Finally, in the pre-class and after-class which support and service teaching can not meet the needs of higher vocational education development in the new era. As it is different in the activity time, activity space and constituent elements, the traditional learning community is difficult to meet the needs of class teaching process in higher vocational colleges.

### **The Space and Time of Higher Vocational Class Learning Community**

The teaching process is the learning community to complete an orderly activities in the limited time and space, there are before class, class and after class in time and space linking form. As the artificial intelligence and big data gradually applying and developing in teaching, the teaching and learning space and time compare with the traditional teaching environment have taken place epoch changes, under the background of education informationization, the teaching and studying way beyond the boundaries of time and place of the traditional classroom, covers the informationization, the digital and virtual space orderly activity process, its time and space with higher latitude and deeper scope.

The sufficient and necessary conditions are the space-time latitude of teaching and learning environment for the learning community to carry out activities orderly, higher vocational learning community environment beyonds the category of traditional learning community, which divided into virtual and physical space-time environment, the physical space-time environment refers to the solid state equipment, tools, teaching materials and teaching place, the virtual space-time environment refers to the information technology, digital technology designed teaching resource, spirit culture, style of study and atmosphere etc..

### **Construction of the Higher Vocational Class Learning Community**

#### **Space and Time Activities Construction**

In time and space of vocational class learning community activities, the subject of “teaching” (teacher and supporter) activities have teaching task, teaching process design, implementation, evaluation, preparation, service and etc.. the main body of “learning” (learners of community) activities have knowledge, skills, training, ability, quality cultivation and etc..

The physical space of the learning community provides the practice of learning tasks and hardware, such as carrier, service and etc.. The virtual space provides the digital resources, information collecting, recording, monitoring data, spirit of the culture and atmosphere. The recorded space

information and data which help teachers and supporters provide services, support to activities progress speed and quality control.

The above time and space activities of the higher vocational learning community build a structure model as the figure 1 shown, information transfer uses computer or mobile phone APP to complete by 4G networks, this model is far beyond the teachers, learning resources, support services and key technology of four core elements to build mobile learning environment model [10], its function beyond the traditional network learning community.

In figure 1 the classroom teaching process shows the orderly activities of the learning community processed along the time axis in space and time. The physical teaching space and virtual space are parallel structure, the learner's knowledge and skills ability training are difficult to achieve in the process of implementing, the information of physical and virtual spaces interaction entirely depends on the middle network connective layer, particularly, the activity of community is low synchronicity in two kinds of teaching space, that leads to the learning community efficiency is difficult to guarantee. In view of the knowledge, ability and quality cultivation process cannot be obtained at one-time principle in the classroom, it must construct innovation teaching space, track the learner's behavior in the dynamic community, meanwhile offering continuing support services, to achieve the interaction and the high efficiency of the learning community in the extending time axis.

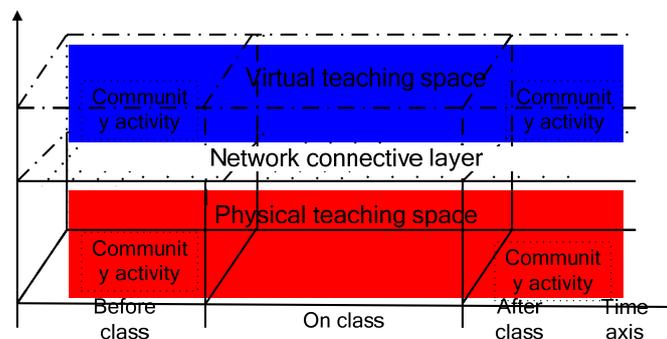


Figure 1. The mode of learning community in space and time

### Reconstruction of Spatio-temporal Activity

To solve the deficiency of the learning community, now to the figure 1 teaching physical space and virtual space is designed into a spiral structure, all activities of the learning community are interwoven together in the actual space, this kind of teaching space can not only make up the defect of single teaching space, but also enhance the learners closely contact between scholars and sustainer, there are also high for continuity, compactness, synchronicity of activities and information transfer in virtual and real space. Therefore, the integrating construction of spatial-temporal activities can achieve better interaction than parallel structure in the designed learning community, the high efficiency of classroom teaching can be realized.

Virtual and physical environment is the carrier of supporting teaching activities and learning resources, with the development of education technology and information technology, the learning resources and carrier have traditional books, physical and simulation objects, portray images of text, reproduce things images, developed to modern equipment, information terminals, space of digitization, information documents, virtual reality and even today's information platform space, their functions also extend from the traditional teaching resources learning resources to help students' innovative capacity.

Developing the learning resources and carriers of virtual space by science and information technology, it will not only stimulate learners' interest, also can compress the teaching time and space, improve the learning efficiency. The virtual space learning resources such as the process of dismantling equipment may few minutes complete the physical space operation, an open integrated virtual engineering training platform, network learning platform resources and so on can get rid of learning limitation of physical space and time. Virtual space learning resource carrier can reduce the teaching cost and realize unlimited use, which supports the activity process that is difficult to realize

in the physical teaching space, and provides the most effective carrier for community activities on the infinite extension time axis.

### Application Analysis and Conception

#### Application Analysis

Taking the course “Electronic technology and application (ETA)” as an example, which is higher vocational manufacturing, electrical and electronic information majors’ course in our college. The study community implementation has 20 classes in different teaching years, which is roughly analyzed as shown in Table 1(Norm: in table + is good, ++ better, +++ best).

Table 1. Application analysis

course	learning community	Interactive Platform	Interactive Tools	Open-ness and sharing	Inter-action	Knowledge & Skills transfer	Studying result
ETA	Traditional learning community	 Normal online course	Cell phone or computer	+	+	+	+
ETA	Net-worked learning community	 MOOC	Cell phone APP	++	+	+	+
ETA	Time-space integrating class learning community	 <a href="https://www.mosoteach.cn">https://www.mosoteach.cn</a>	Cell phone APP	+	++	++	++
-	Time-space integrating class learning community	<b>5G Educational space-station</b>	Mobile terminals	+++	+++	+++	unknown

In table 1: Before 2015 year with the help of high-quality teaching resource platform for traditional teaching adding part of the online teaching mode, the openness and sharing of learning community normally meet the requirements, the interactive teaching network function is good by mobile phones or computers, but the virtual technology learning resources cannot be used by the restriction of platform running speed, not only the online learning effect is poor, but also it is difficult to achieve the migration of knowledge and skills study, so the overall teaching effectiveness is low; After 2016 some classes based on the networked learning community, under the Chinese universities MOOC platform, the networked learning community has good openness and sharing, but the learning resources of MOOC platform bearing document format, storage capacity and interactive finiteness, the overall studying results is normal.



Figure 2. Class platform (<https://www.mosoteach.cn/> )

After 2017, the teaching team started to apply the higher vocational classroom learning community for ETA course, and carry out online and offline mixed teaching for some teaching classes by the “Lanmoyun” (<https://www.mosoteach.cn/> ) teaching platform in figure 2. In the actual application it shows that have better openness and sharing of learning community, the interactive function is better than aforementioned platforms, but the virtual technology learning resource using exists the same defects on the two platforms.

## **Future**

For the higher vocational class learning community, when all the activities are conducted through information terminals, requires open platform of network, diversified interactive means, long-distance real-time synchronization class teaching, today the “new dimension space station” provides a new teaching mode [11].

The information capacity of the constructed higher vocational class learning community is huge, the transmission speed is extremely high and the information interaction mode is more diversified, which poses challenges to the existing network teaching platform function and education technology. With the coming of communication “5 G” era, its intelligent information environment has already begun to affect people’s work and lifestyle, “5 G” and the integration of education will influence the transformation of the learning community, the future “5 G” education space station will be extremely high speed of information transfer and function applied in classroom teaching, it will be realized speech recognition, notes analysis, face recognition and etc. by using artificial intelligence teaching activities, can be through natural pen input and multi-mode electronic terminals provide digital entrance, support for multiple terminals of mobile learning and interaction of the cloud integration, all the learning resources are highly digital and networked, create the future of the highly integrated intelligent classroom teaching space, realize the classroom teaching of big data recording, and large data real-time evaluation, achieve the higher vocational class learning community’ openness, interactivity and high efficiency.

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