Implementation of Online System for Teacher Professional Development Based on Collaborative Learning Activities

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Abstract—Teacher Professional Development (TPD) is the most important means for teacher’s individual growth, and it is also an important aspect for students, schools and education development. Based on collaborative learning and activity theories, we built a network teaching and research environment, taken the learning activities as a core and using the personal studio and collaborative group. We hope to share recourses and enrich the practical experience according to individual planning, reflection blogs, collaborative lesson preparation, case studies and carry out the development for teachers and schools ultimately.

Keywords- teacher professional development (TPD); collaborative learning; learning activities; learning community

I. INTRODUCTION

The motivation of TPD is from the practice and experience of front-line teacher, we carry out needs interviews in Jiyang Primary School and The Primary School Attached to Jinhua Normal School and Huansha primary of Zhuji city of Zhejiang province. In spite of various requirements in different schools and teachers for professional development, the total demand for TPD is consistent, now it summarized as follows:

Research has shown that teachers professional development already have a good hardware environment and certain administrative and financial support. We main analyzed the professional development related to the "soft environment". Teacher Professional development is facing many aspects of the Actual Predicament, the lack of high-quality recourses, and the different to in-depth of collaborative studies are the most factors of the constraining to the TPD.

First, the concept of the teachers is different. The different concept is more obvious between the old and new teachers, ordinary teachers and school leaders also have difference. Second, high-quality resources are scarce. Teachers reflected that resources are complex and the useful resources are little when they searched topic data through the Web. They often listen to (or watch the video) the public school classes of the outstanding teachers, but they can't take part in those lessons of other schools every time, which they lacked. Third, the extension of group collaboration is lacking. Teaching and research group is the most direct means of communication between teachers, teacher collaboration based school is very convenient, but the teachers hope that more foreign experts, school teachers and education experts to participate in teaching and research activities (such as intercollegiate lectures and class evaluation activities to help teachers to learn more practical experience and reflection), to enhance (intercollegiate) collaboration and communication.

TPD is not only the development of isolated individual, it requires broad support from the external environment too. Through this analysis, we proceed to design and develop TPD system which based on collaborative learning activities, the knowledge centers designed to help teachers share and generate practical experience and knowledge; collaboration group and teaching and research activities were designed to implement professional development plans, supplemented by individual planning, reflection Blogs, collaborative lesson preparation, case studies and smart Q & A and other specific teaching and research methods; points and feedback mechanisms were designed to promote the activities constantly.

II. TEACHER PROFESSIONAL DEVELOPMENT(TPD)MODEL BASED ON ACTIVITY THEORY

Teacher professional development system (TPDS) is designed to provide teachers to take part in the collaborative learning and teaching and research activities with mentoring, experience learning and self-reflection to promote the development of individuals and groups, all of these rely on the system support for collaborative learning and teaching and research activities. Therefore, collaborative learning and activity theory owns great significance for teaching and research activities system construction.

Computer-supported collaborative learning is the integration of computer technology and collaborative learning, which is a process of interaction and collaboration for learner. Collaborative learning reflects the relationship between learning members, which is a multi-level, both competitive and cooperative relations, it also embodies the role-playing relationship, playing an important role for training teachers of their creativity, spirit of exploration, cooperation, and
communication skills.[1] From the perspective of interaction and collaboration, TPDS to support the transmitting and sharing information, multiple interactive forms, space-time flexibility and interaction of the records, TPDS to support teachers in role-playing, activity sharing, creative behavior and control of management.[2]

Activity Theory is a kind of the socio-cultural analysis patterns focuses on the activity system, which considered as a unit, activity system is a collective construction activity, which consists of the main body, tools, object, division of labor, community and rules and other factors, in the process of these elements interaction, production, exchange, consumption and distribution four subsystems are formulated. [3] Activity theory, considering the starting point of knowledge and psychological development based on the activities and the psychological development origins from the main interaction between the subject and their surrounding environment, Regardless of the development of people's thinking and intelligence, or the formation of emotions, attitudes, values, all of these achieved through the process of interaction between subject and object, while the host-guest interaction between the intermediary is involved in various activities.[4]

From the activity system perspective, TPD rely on a sound activities organization and implementation mechanisms. Compared with the traditional teaching and research, teaching and research activities of the network is a relatively loose organization, learners more prone to get lost and fatigue, so how to compensate for these deficiencies is an active system must be of concern. The system as an open social network, has a wealth of teaching resources and teaching resources, using advanced technology web2.0 tools (such as Blog and Wiki) to support efficient implementation of teaching and research activities, to develop a unified points system and the level recommended encouraging the participation and maintaining of the system dynamics.[5]

III. TPD NETWORK SYSTEM DESIGN

The system is designed to try to implement the (Inter-school) collaboration for TPD and build a teacher collaboration eco-culture learning environment, teachers learning community. Inter-School collaboration brings the collective wisdom of many teachers together, teachers and the assistant shared knowledge and experience, explored collaborative teaching and managed issues in the inter-collegiate collaboration and cultural background, figure 1 is the teaching and research collaborative network.

A. Design Ideas

1) Construction of learning community: In the learning community, learners and other learners feel that they belong to a group, abide by common rules, with the same values and preferences. learners in the community owns a sense of belonging, identity and the sense of respect, which will conducive to enhancing the participation of learners to the community, to maintaining their sustained efforts in learning activities. Learning Community is an an important way for learners’ communication and collaboration, to construct knowledge jointly, to share of knowledge, that is, exchange of information. [5](Inter-schools) under an atmosphere of collaboration, teachers and campus cultural pluralism provides a more abundant source for the Learning Community, learning community as social strengthens and information exchange functions are extended and strengthened.

2) Support learning activities

a) TPD follows the goal-oriented learning activities, the system must be designed to support learning activities as the core for teaching and research activities. According to activity theory, teaching and research collaboration groups and individuals studio design to carry out learning activities, achieving the activity system functions such as consumption, production, exchange and distribution.

b) Teaching and Research Consortium is a basic tools for communication, different qualities of teachers to participate in learning activities, to take reasonable task, to share the energy and resources of teacher groups. Teaching and research activities, is a process of knowledge sharing and transformation, it makes use of personal planning, reflection blogs, collaborative lesson preparation, case studies and so on, all these tools and resources help teachers to strengthen and acquire knowledge and skills. Personal Studios is the teacher's personal space, also including the above-mentioned tools and resources.

3) Sharing mechanism: Knowledge Center is designed to share the high-quality learning activities for teachers; teachers participate in the accumulation of resources for knowledge center together, aimed at the formation of high-quality resource transformation and sharing mechanisms. Knowledge Center designing included instructional design, courseware, articles, video and other types of resources, which comes from learning activities, is the result of teaching and research activities such as individual planning, reflection blogs, collaborative lesson preparation, video case and so on.

B. Frame Model

In accordance with the activity system model of Engestrom and Learning Community system model of Dr. Zheng Wei, TPD system is seen as learning activities in the ecosystem, the model shown in Figure 2:
As figure 2 model, teachers and learning communities play a main role in the system, teachers' practical knowledge is an object of active system, the aim is to achieve the desired goal or outcome, that is, to achieve the development of teachers' practical knowledge. The teaching and research collaborative group carried out the learning activities, tools and resources as the most important intermediaries of activities, based on the consumption, communication and distribution of teachers, the tool and resources produce the practical knowledge, and promote themselves; rules and divided labor of activities is the basis of the activities, the relation of individual, other members and community regulated by rules, to maintain the exchange continues, the division of labor make a clear mission of the members of the Community, the aim is to play the greatest performance of Cooperative Group. Learning environment is the learning culture feature of the (Inter) Collaboration, the teachers' individual, learning community, and practical knowledge maintained interactions in the teaching and research activities based on the network [6].

IV. THE FUNCTION OF TPD NETWORK SYSTEM TO ACHIEVE

Combined with the above analysis, we achieved system functions mainly from the four aspects: Knowledge Center, teaching and research systems, information centers and management system (as Figure 3).

Each module has a separate function, but it also need for mutual coordination and support, in service to TPD together.

A. Knowledge Center
Knowledge Center refers to resource-building of the professional development system, the accumulation of knowledge center origin from the network teaching and research activities, extract knowledge mainly from the process and outcome of learning activities, including instructional design, courseware, articles, videos, and other types of resources. The aim is to build Knowledge Center is to achieve a better personal knowledge management on the Internet. Personal knowledge management help to manage the growth of personal information effectively by using computer technology, communications technology and network technology, it is a framework to integrate the information and will become a personal knowledge base. Personal knowledge management also provides a strategy for personal knowledge which scattered, random and could convert into the systemic and scalable information. [7]Knowledge comes from practical activities of teachers, and then applies to teachers' classroom practices, high-quality resources be used repeatedly and transform, and combined with the appropriate incentives to push the high-quality resources and transformation, it is also the resource-building mechanism which we advocated.

B. Teaching and Research Subsystems
TPD system advocates activities based on the studio and collaborative group, which is teaching and research subsystems. "learning activities" as a link of teaching and research subsystems, the extensive methods of teaching and research on network through the system (including individual planning, reflection Blogs, collaborative lesson preparation, case studies and smart Q & A, etc.), and as a means of accumulating knowledge center. In addition, the teaching and research subsystem provide feedback for teachers through the message system.

The aim of Personal Planning is to help teachers to make, imply and evaluate personal development plan. First of all, establishing a system planning which the level of discipline / grade level (school planning); secondly, establishing a individual plan which accord with the characteristics of individual teachers (personal planning). Achieving real-time publication of personal planning, monitoring and evaluating, rising the personal planning and implementation of the efficiency and quality by network mechanisms. Blog is an important tool for teachers to reflect, the Blog recorded in the form of teaching teachers teaching step by step, self-reflection and peer coaching help teachers continue to progress and grow. Collaborative lesson preparation through classroom teaching has always been to the process of teaching and research closer together, teachers and experts, teachers, peers help improve the instructional design, combined with online classroom for lectures and class evaluation record, helping teachers to improve classroom teaching. Case studies for teachers to observe teaching cases, such as the schools, other schools, provincial or national level in several high-quality courses and conduct lectures and Class Evaluation-based online activities to
help teachers learn from the experience of others and to promote their own reflection. Intelligent questions and answers for teachers as an online Q&A system provide the necessary function of the non-real-time interaction.

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V. CONCLUSION

This paper examines systematically the design and implementation from the learning community and learning activities. Learning community is a democratic, open, collaborative learning culture, and it is a mutual process remedy and negotiates dialogue, in that TPD in collaboration context blend in different culture, learning activities is a activity combining with teacher’s teaching practice. System support implementation and evaluation process of teacher’s research activities by using advanced technol Blog, and then return to class to start a new application of a transformation process. Learning Community and learning activity is an activity system that can not be separated, and is also the core of the system of the teacher professional development.

In addition, this study should firstly be applied in The Primary School Attached to Jinhua Normal School educational group in Zhejiang, mainly including The Primary School Attached to Jinhua Normal School and WuCheng Normal School and Lake Road Primary School of Jinhua so on, you can visit the website (http://www.jsfx.cn/Teach.aspx). Teachers carry out teaching and research activities through the creation of a coordination team, apply for teaching and research activities that they are interested in, and also invite other teachers or experts to participate in their activities. The last, through writing reflection Blogs, participating in collaborative prepared lesson and observing case, it can carry out practice activities of professional development. Meanwhile, every school set up the appropriate incentive mechanisms to promote the professional development activities to carry out.

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