

KNOWLEDGE MANAGEMENT AND ONLINE COMMUNITIES OF PRACTICE IN TEACHER EDUCATION

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ABSTRACT

Research on teachers' professional development is gaining popularity among educators since changes in society require teachers to improve their skills and knowledge.

Rather than transmitting information to teachers, knowledge sharing through emerging tacit knowledge among them has gained more importance. Because of new information and communication technologies, knowledge sharing among educators is becoming easier. This article examines the relationship among three important topics; teachers' professional development, knowledge management and online communities of practice. Furthermore, some online learning communities of practice environments are introduced.

Keywords: communities of practice, knowledge management, teacher education, professional development

1. INTRODUCTION

All over the world establishing settings for communities of practice has become an important focus within teachers' professional development projects, and it seems to be an effective solution to provide lifelong learning opportunities for teachers. A community of practice can provide both tacit and explicit knowledge sharing opportunities among teachers. In this vein, teachers can produce useful documentation, tools, and procedures and share these documents with other novel teachers. Çağiltay, et al (2001) propose the use of virtual communities facilities in which teachers share their experiences and practices with other teachers to provide lifelong learning opportunities. According to Coffman (2004) who studying on to what extent K-12 teacher transfer lessons learned in a professional development module to effectively integrate technology in their classroom, online virtual communities definitely have a place in professional development for teachers.

There are some research studies on communities of practice in the world while in Turkey this is a very new concept. Therefore, in this article we want to take attention to online learning communities in teachers' professional development. So, first of all the article begins with the history of teacher education. Then, theoretical framework of Communities of Practice (CoP) is discussed and finally some examples from both Turkey and abroad are presented.

2. HISTORY OF TEACHER EDUCATION AND LIFE- LONG LEARNING IN TEACHER EDUCATION

In Turkey, formal education composes pre-school education, primary education and secondary education. Services related to Pre-school education are given by kindergartens and foremost by the Ministry of National Education. Primary education is compulsory for all citizens, boys or girls between 6 to 14, and is free of charge in public schools. Secondary education includes all of the general, vocational and technical education institutions that provide at least three years of education after primary school. There are currently 16,090,785 students in 5,612 schools at the levels of pre-primary, primary and secondary education. The number of teachers employed is 578,805 (MEB, 2001). The responsible institution arranging professional development for teachers is the Department of In-service Training under the Ministry of Education. This unit was known as "The Bureau of Teacher Training" in 1960s and later it was renamed as Department of In-Service Training in 1975. There are six institutions which provide in-service training and accommodation since 1982 for teachers from all over Turkey. These institutions are located in Ankara, Aksaray, Mersin, Rize, Van and Yalova. In-service training had a central structure. That is, only the Department of In-service Training was in charge of arranging all in-service courses. After that, as this department failed to meet teachers' professional development needs, National Education Directorates in provinces were also given authorization to prepare and administrate in-service training programs locally. In 1980s, there have been teachers who had secondary education level. Therefore, the Ministry of National Education made complementary training compulsory to increase the quality of teachers. This complementary training was offered by distance education because of time limitation and the number of teachers. By cooperating with Anadolu University a 2-year higher education program was initiated in 1985-86 academic year. Within 4 years, 117,618 teachers participated in the programs. In 1990s, an undergraduate completion programs was initiated for teachers having 2 year higher education. Again, by distance education, teachers earned undergraduate degree. In 1992, laboratory school model required new skills for teachers since

this system emphasized student centered education and importance of technology in education. (Ozer, 2004). From 1995 to 2001, a new program was created by The Ministry of National Education for novel teachers. The duration of the program is 1-year. In this program, novel teachers were under the control of experienced teachers' guidance. Since 1998, teachers who want to be a school administrator, educational administrator and primary school inspector have to accomplish a test and if they are successful they have to attend an in-service training program lasting 120- teaching hours. Additionally, teachers, administrators and assistant inspectors wanting to be promoted have to attend in-service training programs (Ozer, 2004). As it can be seen, the Ministry of National Education stipulates an in-service training program for promoting or to be appointment for a new administrator vacancy. According to Ministry of Education's regulation, the aim of in-service training is

- Familiarize teachers coming from pre-service education with the regulations and rules of the Ministry of Education,
- To make teachers knowledgeable about the aim and principles of the Turkish national education,
- Make them competent in their profession,
- Introduce innovations in the field of education and help them gain necessary skills,
- To develop teachers' understanding of professional competency,
- To promote teachers who are enthusiastic and talented,
- To provide supplementary education for people who have different background,
- To make sure every teacher understand application of fundamental principles and techniques,
- To support improvement of educational system.

In Turkey, teachers mainly get their professional knowledge during their university education and they have limited training opportunity after graduation. According to World Bank (2003), traditional education methods are ill suited to provide teachers with the skills they need (Table 1). New learning context implies a different role for teachers. Today, they need to learn new skills and become lifelong learners to keep up to date with new knowledge, pedagogical ideas, and technology. Lifelong learning "encompasses formal learning (schools, universities); non-formal learning (structured on the job learning); and informal learning (skills learned from family members or people in a community)" (p. vii).

Table 1.

Differences between traditional learning and lifelong learning (Worldbank, 2003)

Traditional learning	Lifelong learning
<ul style="list-style-type: none"> ▪ The teacher is the source of knowledge ▪ Learners receive knowledge from the teacher ▪ Learners work by themselves ▪ Tests are given to prevent progress until students have completely mastered a set of skills and to ration access to further learning ▪ All learners do the same thing ▪ Teachers receive initial training plus ad hoc in-service training ▪ "Good" learners are identified and permitted to continue their education 	<ul style="list-style-type: none"> ▪ Educator are guides to source of knowledge ▪ People learn by doing ▪ People learn in groups and from one other ▪ Assessment is used to guide learning strategies and identify pathways for future learning ▪ Educators develop individualized learning plans ▪ Educators are lifelong learners. Initial training and ongoing professional development are linked. ▪ People have access to learning opportunities over a lifetime

It can be seen from the history of in-service training in Turkey that during to history there had been important changes in Turkish educational policies. All these changes has required new teacher training programs. Today, as a result of new curriculum change the educational system also faces with the need of a new teacher training. Therefore, teachers' professional development has gained importance. In the following part, an alternative solution of online communities of practice environments for teachers' professional training will be discussed.

3. COMMUNITIES OF PRACTICE

21st century has been called as "knowledge age". In this age, how to access knowledge and ways of knowing are changing with the complexity of knowledge. So, the issues of knowledge management have been gaining more attention among researchers.

Before discussing the meaning of knowledge management and its connection with teacher education, it is important to discriminate the term of knowledge from information. Though these terms sometimes can be used interchangeable, essentially they have completely different meanings. First of all, Information is unprocessed

knowledge and need to be processed by human beings to be able to become knowledge. We can exemplify information as unripe data in a survey. According to a dictionary (<http://www.webster.com>) knowledge is defined “the fact or condition of knowing something with familiarity gained through experience or association”. That is, knowledge interpreted the information. In Greek, knowledge was classified into 4 categories.

- Know what
- Know why
- Know how
- Know who

Know what is related to facts in the world. As mentioned above, it is close to information. Related to teacher education, learning theories which presenting descriptive information such as how learning occurs is an example of know what. Owing to this type of knowing teachers obtain information about what learning theories are. Know why and know how are more complex knowledge types than know what. Know why is related to principles and laws while know how is related to skills and ability to do something. In their daily life teachers know why they should measure their students. Further, know how is that teachers judge possible results of a new application for instruction. Lastly, know who refers to information about who know and who know what to do. This knowledge type is related to teachers knowing who they can consult when they encounter with a problem. (OECD, 2000).

In teacher education, educators are mainly interested in whether knowledge has gained or not. Therefore, it is important to understand the process of knowledge creation.

According to Polanyi (1966), There are 2 types of human knowledge, explicit (codified knowledge) or tacit. Polanyi makes difference among these knowledge types with these words “we can know more than we can tell (cited in Nonaka 1994, p.16). Tacit knowledge is a kind of knowledge that is hard to take a shape and transmit to other people. It has both cognitive and technical elements. Cognitive elements provide human beings to understand and perceive their world while technical elements are related to crafts and skills can be applied in specific context. Explicit knowledge is more simple knowledge type. These two dimensions of knowledge creation have an important role by interaction of people working in an organization. (Nonaka, 1994).

Knowledge management is a term originally coming from business and there are lots of web sites and books about it. However, there isn't any constant definition of it. Barron (2000) defined knowledge management by citing from a conference board as “an integrated, systematic approach to identifying, managing, and sharing all of an enterprise's information assets, including databases, documents, policies, and procedures, as well as previously unarticulated expertise and experience held by individual workers (p.3)”. In education, knowledge management has been placed in teachers' professional developments. A novel teacher as a worker is appointed a school (an organization) after graduation and she/he begins to manage explicit and tacit knowledge in his/her school. That is, teachers learn their profession in practice by communicating with their peers. So, in professional development terms, schools are organizations and teachers are workers of this organization.

Investigated the ways of obtaining knowledge in schools, teachers obtain explicit knowledge by reading books, handouts, regulations, etc and they construct tacit knowledge by imitating, observing, or chatting in a social environment. (Brown & Duguid, 1991). Therefore, it is clear that socialization has a critical role to obtain tacit knowledge. In that point, theoretical framework of communities of practice based on situated theories provides in detailed knowledge to understand how learning is achieved in social environments. Brown and Duguid (2000) said that “Only by engaging in work and talking about the work from inside the practice, one can learn to be a competent practitioner. Practice is an effective teacher and community of practice is an ideal learning environment” (cited in Schlager & Fusco, 2003, p. 203).

First of all, it is important to explain place of online environment for knowledge management. With developing information technologies, online environments allow user to communicate in an interactive environment, synchronously or asynchronously. Therefore, online environments have been popular knowledge management places with portals including interactivity.

Before focusing on communities of practice, it is better to introduce some terms to describe new forms of this social learning. These are learning communities, communities of learners, learning circles, learning organizations, knowledge communities, communities of practice, professional community. (Riel & Polin, 2004). These terms are used interchangeably by some although they have slightly different meaning. That is, communities of practice having different aspect of collaborative learning is only one of these terms describing

social learning. In terms of online environments, Riel and Polin (2002) describe 3 different but sometimes overlapping types of learning communities to provide a common language for understanding the different forms of social organizations. These are task based, knowledge based, and practice based learning communities. They examined the types of learning communities according to their membership features, task features, participation structures, and reproduction and growth mechanism (Figure 1).

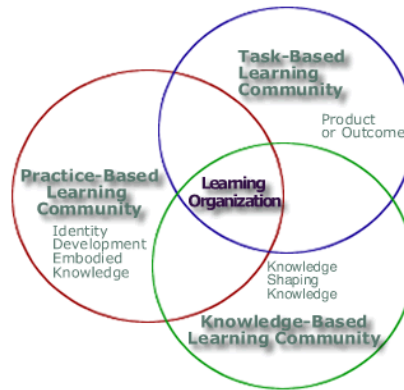


Figure 1. Types of learning communities (Riel & Polin, 2004, p.40)

Firstly, task based learning community aims to produce a product or outcome and their members know each other. These are generally temporary groups whose members try to accomplish well-specified tasks. A small group's interaction occurs among members of the group. Secondly, knowledge based learning communities. The aim of this type of learning communities is to compose knowledge based on a specific area. Members of it may or may not know each other personally. There is a long-term commitment to construct knowledge base. Thirdly, practice based learning community differs from task based community mainly by voluntary participation. There is a shared activity among members of the community to produce knowledge. Tacit knowledge is shared among members.

While practice-based communities are described as one type of learning communities by Riel and Polin (2004), it is used interchangeably with learning communities. The term "Community of Practice" was coined by Lave and Wenger (1991) in their discussion of the social nature of learning. The basic argument made by Jean Lave and Etienne Wenger is that communities of practice are everywhere and that we are generally involved in a number of them - whether that is at work, school, home, or in our civic and leisure interests. In some groups we are core members, in others we are more at the margins (Wenger, 1998). Wenger (2002) describes the Communities of Practice as

Groups of people who share a concern, a set of problems, or a passion, about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis (p.4)

Barab, Makinster and Scheckler (2004) define CoP as A persistent, sustained social network of individuals who share and develop an overlapping knowledge base, set of beliefs, values, history, and experience focused on a common practice an/or mutual enterprise (p.55)

Barab and Duffy (2001) define characteristics of community of practice as 1) common cultural and historical heritage, 2) interdependent system, and 3) reproduction cycle. They seem that these characteristics are requisites for communities of practice (p.36) as can be seen in Table 2. Barab, Makinster and Scheckler (2004) add new characteristics on them; 4) a common practice and mutual enterprise, 5) opportunities for interactions and participation, 6) meaningful relationships, 7) respect for diverse perspectives and minority views. Indeed, many of these ideas are based on the works of Wenger (1998 and 2001).

Table2. Characteristic of a community (Barab & Duffy, 2000, p. 37)

Common Cultural and Historical Heritage	Communities go beyond the simple coming together for particular moment in response to a specific need. Successful communities have a common cultural and historical heritage that partially captures the socially negotiated meanings. This includes shared goals, meanings, and practices. However, unlike the social negotiation of practice fields that primarily occur on the fly, in communities of practice new members inherit much of these goals, meanings, and practices from previous community members' experiences in which they were hypothesized, tested, and socially agreed on.
Interdependent System	Individuals are a part of something larger as they work within the context and become interconnected to the community, which is also a part of something larger (the society through which it has meaning or value). This helps provide a sense of shared purpose, as well as an identity, for the individual and the larger community.
Reproduction Cycle	It is important that communities have the ability to reproduce as new members engage in mature practice with near peers and exemplars of mature practice. Overtime, these newcomers come to embody the communal practice (and rituals) and may even replace old timers.

Recently, there has been increasing number of research studies on online communities of practice environments. They focus on dynamics of CoP. One of the studies aims to investigate challenges in development of an online community of practice for mathematics and science teachers. To it, indeed, designing for virtual communities involves balancing and leveraging complex dualities from the "inside" rather than applying some set of design principles from the "outside." (Barab, Makinster & Scheckler, 2004). In another study, five design dualities stated by the researcher during the design of an online communities of practice environment. These dualities, purpose, boundaries, social, usability and design emerged and characterized the interactions between teachers and the site designers (Baek & Barab, 2005). There are also some research studies on pre-service teacher education. One of them focuses on a model of delivery of professional experience courses whose purpose was to assist the development of a reflective approach in pre-service teachers. The researcher evaluated that the model of the course is a substantial teaching experience in a secondary school (Sim, 2006).

4. ONLINE COMMUNITIES OF PRACTICE EXAMPLES

With the development of new Information and Communication Technologies, the idea of using them in the establishment of communities of practice for teachers' professional development has gained more importance in instructional technology. As a result of this, many online communities of practice environments have emerged. Some well known examples are Harvard's Education with New Technologies¹, SRI International's Tapped In², Learning Circles³, The Math Forum⁴ and Indiana University's Inquiry Learning Forum (ILF)⁵. Middle East Technical University's Professional Development Circle (PDC)⁶ is another example from Turkey. In this part of the paper, these online communities are introduced.

Harvard's Education with New Technologies is an online learning community which aims to help educators how they effectively integrate new technologies in their classroom. It composes of mainly 5 parts. Learning center is one of the places in which the participants learn more about the use of new technologies. Workshop part includes tools to support their use of new technologies. Furthermore, meeting hall is a place the participants talk with their colleagues and library part includes resources related to improving education with new technologies. Final part is gallery that the participants can see examples of classroom practice using new technologies.

Tapped In is a web-based learning environment created by SRI International to transform teachers' professional development into social learning environment by professional development providers and educators. Tapped In enables providers to offer high-quality online professional development experiences and support more teachers in a cost-effective way. Through Tapped In, educators can extend their professional growth beyond courses or workshops the online tools, resources, colleagues, and support they need to implement effective, classroom-centered learning activities.

¹ Harvard's Education with New Technologies web site: <http://learnweb.harvard.edu/ent/home/index.cfm>

² Tapped in website: <http://tappedin.org>

³ Learning cycle web site: <http://www.learn.org/circles>

⁴ MathForum website: www.mathforum.org

⁵ Inquiry Learning Forum web site <http://ilf.crlt.indiana.edu/>

⁶ Professional Development Circle web site <http://mgc.metu.edu>

Learning Circles are highly interactive, project-based partnerships among a small number of schools located throughout the world. To join iEARN Learning Circles, you must be complete an iEARN Learning Circle placement form before the session. The aim of this learning environment is to produce powerful student projects with the partnership of different schools on the world.

The Math Forum is an online place for mathematics educators. It aims to provide resources, materials, activities, interactions among its members. It allows enriching mathematic teaching and learning.

The Inquiry Learning Forum (ILF) is an online community created by Indiana University for K-12 teachers and administrators, pre-service teachers, and university teacher educators. Their aims are to work together to share and improve learner-centered classrooms. The forum was designed for Indiana math and science teachers. It has resources available for all grades and content areas.

Professional Development Circle (Mesleki Gelişim Çemberi) is a web based learning environment created by Middle East Technical University for K-12 mathematics teachers, teacher candidates and academicians who want to work together, to share their knowledge and to improve their skills related to their profession. The PDC is designed especially for people interested in mathematics education. According to Riel and Polin's classification, the nature of this learning community changes depending on how it is used. Turkish mathematics educators can use it to support their school practice course or to compose a community among different university teacher candidates. That is, it can be used both as a task based learning community and knowledge based learning community. Furthermore, PDC took attention of teachers in practice. It has 211members, recently. PDC have a way of being practice based learning community. There are monthly discussions in PDC by the electronic list. The discussion topic is selected among hot topics in mathematics education such as drama in geometry education, fractions or students' attitudes toward mathematics. Within the PDC, the participants can obtain or share their lesson plans, watch video examples of expert or novel teachers discuss them, engage in online discussions and communicate with other members through the electronic list (Figure 2).



Figure 2. Home page of the PDC

The PDC portal has four main parts. These are library, videos, communication and forum. Any instructor authenticated by the system can compose different classes for his/her lesson. Library section of the portal includes materials related to math education. New Turkish mathematics curriculum, academic papers, electronic materials, mathematics software, lesson plans and activities for K12 are located in the library. Materials are provided by academicians, teachers and other participants. In video section of the portal, the members can watch other teachers' real classroom environments. The participants can discuss about these videos and lesson plans. Communication section lets the members to communicate with other members of the portal. Finally, forum section includes some discussion topics both related to practical experience and videos of the portal.

5. CONCLUSION

Online settings as professional development environments seem a promising solution for teachers when the number of teachers and the lack of professional development opportunities are taken into consideration. Such settings have an advantage of providing synchronous and asynchronous interaction opportunities for people. In global world, it also allows users to share their knowledge (tacit or explicit) or resources. These and other features of online settings have made them an important knowledge management tool.

As stated before, the number of online communities of practice environments for teachers is rapidly increasing even if some of them have dispersed. Some of them are planned and controlled online communities of practice environments (CoP) while most of them are the outcome of individual works made by teachers. This may be considered as a sign that the teachers who need to share their practice or to obtain materials or resources for their classes have created their own learning environments on the Internet. According to our PDC portal experience, some teachers are eager to learn new things and improve their field knowledge. These teachers search information related to their profession on the Internet and as soon as they find an online community related to their interest area they join it. If they get what they need from such resources, this affects the length of teachers' community membership period.

Although there are some researches studies on CoP which are introduced in this article, these studies do not provide complete picture on why CoPs disperse, why CoPs are established or which factors are important to take attention of teachers in the evolution of a community. Apart from these questions, there are still many questions left to be answered (Barab, Kling & Gray, 2004). The answer for these issues will give instructional designers valid CoP design principles. Since establishing a community is not as easy as the blink of an eye, it requires patience and a variety of strategies to be used in different times. In sum, CoP needs more research and in the following years, we may learn more about it.

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