A Virtual Teacher Community to Facilitate Professional Development

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Abstract. Information technologies revolution calls for new skills and teachers' qualifications. In order to help secondary school education to meet the requirements raised by the changes in information and educational technologies, development of new curricula and supporting materials is necessary, on the one hand, and building relevant teachers knowledge and skills, on the other. The paper discusses the problem for supporting teachers' professional development. Building a virtual community of teachers and experts is proposed in order to support teachers in building new knowledge and skills and to motivate and help them to collaborate, share and reuse educational resources.

1 Introduction

Information technologies revolution calls for new skills and teachers' qualifications. In order to help secondary school education to meet the requirements raised by the changes in information and educational technologies, development of new curricula and supporting materials is necessary, on the one hand, and building relevant teachers knowledge and skills, on the other. New communication technologies provide opportunities for teachers to collaborate with other teachers to build new knowledge, learn about new resources, and develop new strategies to enhance their teaching. Community of practice, as noticed in [11], arises out of people's natural desire to share ideas, get help, learn about new ideas, verify their thinking, and hear the latest "professional" gossip. As [12] notices, "studies of communities of practice and teacher communities demonstrate the potential for teachers to develop effective communities of practice", where they will collaboratively build new knowledge and skills and develop, share and reuse educational resources.

The paper discusses the problem for supporting Informatics teachers in continuous professional development trough virtual community. First, definition of virtual community for the purposes of this paper is presented. Some advantages and limitations of using virtual community to facilitate professional development are listed. A conceptual model of virtual community of teachers is presented, and the way of learning that is promoted in the community is discussed.

2 Virtual Communities Definition

Virtual community means different things to different people. According to [14], definitions of term “virtual community” differ depending on “who you talk with”. Here we present a few definitions from different points of view.

Regarding to the social aspect, a virtual community (VC) can be defined as a group of people who get together because of a common interest, problem or task. Usually the members of a VC meet and communicate not in person, but with the help of the Information and Communication Technologies, like computer bulletin boards and network forums, and get to know each other better over time [16, 9, 4]. For similar definitions see also [14, 13, 8].

Regarding to the technology aspect, VC is an interactive Internet application, mostly in the form of a special website that allows groups of people to communicate and exchange information over the Internet in their own private and secure area. Within each area, called an online community, participants are provided access to a suite of powerful tools that enable a group to effectively get organized, share knowledge and communicate [7]. But as [15] points out, VC is more than just software.

Preece [14] proposed to look at the development of online communities as a complex practical activity, and developers need a definition that guides practice. We accept this vision, because it provides a framework which will guide us to take operational decisions during the process of creating and facilitating our virtual community.

The definition of VC that is used in the paper describes a VC as consisting of: people, purpose, policies, places, activities, software environment, and profit model. This definition is based on combining Preece’s [14] components with Porter’s [13] attributes, and adding a new component - activities in community. This component refers to what can be done in the community, in order to satisfy members’ needs and help members to achieve their goals, for which they participate in the community. According to [1], the power of VC is “derived from the needs of people to learn” and a VC “must be able to foster science and promote a kind of education”.

There are a number of types of virtual communities. According to [15] and [2], VC can be classified based on the dimensions along which they differ. Usually, VCs are classified based on the primary purpose for community existing (e.g., education, business, professional support, health support, neighbourhood activities, entertaining, etc) or based on the type of software environments that support the community (e.g. listserver, bulletin boards, chat, instant messages, wiki, etc).

In the paper, we look at communities which are aiming at the development and exploration of informatics education knowledge area, and facilitating collaborations between secondary teachers in informatics. We refer to these communities as VC of teachers.

3 Advantages and Limitations of Virtual Community

According to [1], “learning trough a community is actually an attractive point”. This section presents some of the advantages and limitations of VC.

3.1 Advantages

a) *Support on demand.* VC can support the actual practices and daily tasks of the participants.
b) *VC improves learning.* According to [11], people need time to “think about their experience and its implications and incorporate new insights into their current mental models”. A VC gives time and possibilities for individual reflection of the new knowledge and possibilities for exchanging ideas between people. According to [3], VC gives possibilities to involved experts and encourages peer-to-peer interaction.
c) *The whole is much greater than the sum of the parts.* Research [3] confirms that knowledge acquisition and learning are greatly facilitated by interaction and collaboration with others. According to [6], “collaboration and discussion expose people to new ideas and outlooks”. This relate to the idea that “a group of people can create a more complete understanding than a single person working on his or her own” [6].
d) *Save the time and stimulate faster science development and focusing on individual student achievement.* The community collects experiences and represents them in an accessible and equitable manner, which allowed members to use the collection of community knowledge. Also, VC provides a framework to guide the learning process and allowing peer support as well as allowing an instructor to help many learners at once.
e) *Learning in communities promotes what may be called “learning beyond the content”* [17]. Learning in communities shows to members of the community how the content may be applied in a wide variety of situations by providing the examples trough shared experience. Learning in community incorporates constructivist approaches to learning.

3.2 Limitations

a) Some of the limitations of VC relate of technology obstacles, for examples, the limit of connection or access to appropriate computer equipment.
b) Another limitation is intellectual rights protection which usually is an obstacle for sharing of materials.
c) Research [17] shows that most people who visit VC take information rather than share information. This means that in a VC should have a way to stimulate members to share information.

4 Virtual Teacher Community

The Virtual Teacher Community (VTC) is community of practice and its main purposes are:

- Continuous education and development of teachers
- Facilitation of the teachers' collaborative work

It offers various forms of help to the development, sharing and re-use of educational curriculums and content.

The development of new curriculum and content at the Virtual Teacher Community is performed by core group players (which forms conceptual layer) in close collaboration with team of initiators (most active teachers and students at their classes).

The initiators are the pioneers in the application of the developed curriculum and content. They realize the pilots in their schools. Best practice cases from these pilots are shared within wider teachers' networks.

VTC facilitates computer support collaborative work of the teachers through Virtual Resource Center where all developed materials are stored. The Virtual Resource Center is also a way network of educators to share experience, materials, discuss problematic issues. Generally, to use knowledge sharing through virtual communities of practice to connect with their peers in a way that helps them learn from and inspire one another.

4.1 Virtual Community Model

This section describes the conceptual model of a virtual community and all components of the virtual teacher community, that is build based on the proposed model.

We look at the virtual community as a system, where as input we have the people with their needs, knowledge, skills, interests and specific behaviours, and as output we expect results, which realize the purposes of the community. In order to achieve the desired results at the output of the system, we have to apply policies, activities and processes, supported by software environments, regarded as the "black box" inside the system. Figure 1 present this conceptual model of a VC.

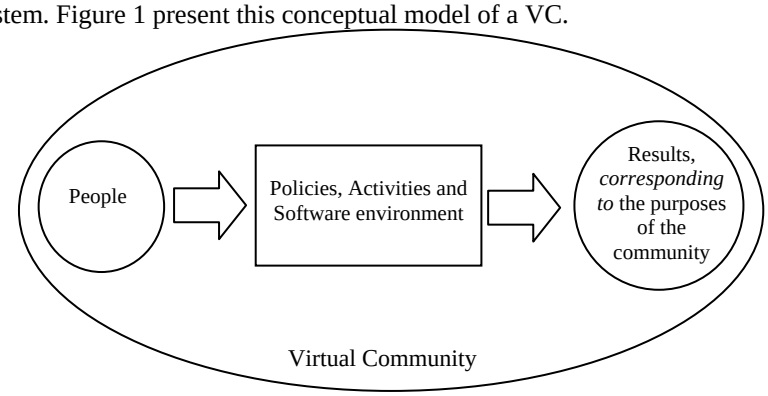

Fig. 1. The conceptual model of a virtual community

The virtual communities' model, described in this section, is used as a core for building VTC. Using the proposed model, we describe below our VC of teachers by discussing one by one each of the components of the community.

4.2 People and the Roles in the Community

The *target group or people* who will benefit from the virtual community are informatics teachers at secondary schools.

According to [5], an important factor to be taken into consideration in the designing of the virtual community's environment is the definition of the users' roles with in the community, as well as the levels of access that each role involves. There are five different users' roles in our VC: users, educators, experts, moderators and administrators. Each member of the community will have at least one of the listed roles. Furthermore, to some of the members can be associated more than one role. Each of listed above roles will have different privileges.

In order to differentiate responsibilities of the people participating in VTC, we divide these roles into three layers, with respect to the activities and related to them categories of people. Figure 2 presents the layers of the VTC trough which the roles at the communities are distributed.

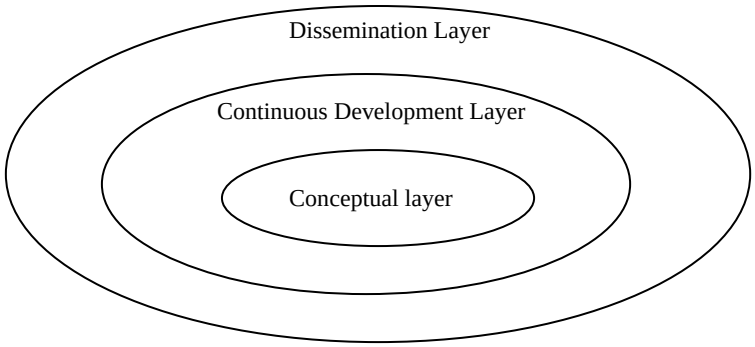

Fig. 2. The Virtual Teaching Community layers

– *Conceptual/Methodology Layer*

This layer includes people involved in teacher training and education activities at University level. They are responsible for (their role is) conceptual driving of the VTC, including development of new curriculum, methodology development for how the curriculum could be used, guidance and support of the teachers in application of the methodologies, facilitate the work of the teachers, coordinate activities in VTC, etc.

– *Continuous Development Layer*

The main participants in this layer are initiators (most active teachers and students). They are responsible for the development of supporting materials for the

new curriculum, following the proposed methodology and expert guidance from the members of the conceptual/methodology layer. They are storing the developed materials in the virtual resource center. After that they use the stored materials to apply the new curriculum in their classes. On the base of the performed pilot implementations of the new curriculum and developed materials, best practice resources are identified and given special attention at the Virtual Resource Center.

– *Dissemination Layer*

This layer includes all teachers involved in the proposed community of practice. They can use developed materials and best practices in their regular activities at schools. They also could join the continuous development layer. The dissemination layer has one very important role – it is used for the evaluation of the developed and stored in the repository materials, by measuring the interest shown to different materials, and by explicitly voting how useful each one of the available materials is.

4.3 Purposes

At the beginning, we foresee four purposes of the community. But as [15] states, nurturing the community is one of the most important phases while community exists. This leads to changes in the community, which can be seen as changes in the purposes of the VC, as well as changes of the members or the environments of the VC.
The community of teachers will start with the following purposes:

- Support on demand - helping at work and professional development;
- Developing and exchange of learning materials and digital content;
- Education - Provide courses relevant to the users needs.

4.4 Polices

Polices contain the rules and norms under which the members will participate and behave, and also can use the productions of the community. We assume to have polices, which are more acceptable for the users, and will be developed and evaluated initially by some of the potential members of the community, as [2] has suggested.

4.5 Places

The community will be of hybrid type – it will exist in both physical and virtual spaces. Since some of the members can work in the same school, so in their case, they can communicate face-to-face. Also, one of the activities in the community will be to organize seminars and workshops, where members can collaboratively work and communicate face-to-face. On the other hand, most of the time members communicate and work virtually trough the VTC platform.

4.6 Activities

The purposes of the communities determine the activities, which from their part determine some of the tools of the environment.

The activities that should be supported by software environment are:

- Developing and exchange of electronic content, which include:
  - Data base with “best practices” of digital content such as lessons; learning materials, assignments, etc.
  - Methodology for teaching IT;
  - Methodology for using IT across different school subjects;
  - Methodology for assessing students’ IT competences.
- Communication and collaboration with colleagues;
- Experts’ consultations;
- Organizing seminars and workshops;
- Learning and qualification.

4.7 Software Environment

The software environment is not yet fully specified. However, the software environment should:

- Provide access for the community members, which includes access to appropriate areas and services, according to the roles, listed in section 4.2.
- Provide access to a personalized space for all community members.
- Allow and facilitate collaborative work
- Allow and facilitate searching and sharing of digital content
- Be easy to manage from technical point of view, not requiring a high level of computing expertise to administer.
- Allow private and public synchronous and asynchronous communication.

According to the listed functionalities some of the tools trough which the learning in the community is supported are described below.

4.7.1 Communication Tools

Members will communicate between themselves in order to exchange ideas, ask questions, ask and offer advice, discuss, etc. Communication should be both synchronous and asynchronous, and both private and public. Public synchronous communication will be scheduled in advance. It will be used for discussion around particular topics such as online conference or receiving expert support.

4.7.2 Collaboration Environment

The collaborative environment contains tools which should provide members with adequate functionalities that support virtually cooperative work. It will contain:

- *Share Space* – this tool will be used to cooperatively create documents.

- *Calendar* and *News board* – will be used to keep members informed about scheduled seminars, workshops, courses, online meetings, and other events.
- *Virtual Resource Center* – it contains structural information of various types, detached in learning object. A learning object can be lessons plan, learning materials, assignments, etc. In this repository, each member of the community can submit, edit and view learning object. Each learning object has rating and comments that are given by members. Based on the rating, each learning object is classified as "best practice" or still evaluating or new.

4.7.3 Learning tools

Since one of the main purposes of the VTC is to facilitate learning, the software environment should contain some features of Learning Management Systems. These tools give possibilities for delivering e-learning courses. The courses can be proposed by the conceptual layer of the community members or can be requested by each member.

5 Conclusions

This paper is discusses how to support teachers in their daily work and professional development. As a possible solution, we propose building a Virtual Teacher Community. VTC is a virtual community of practice of teachers and experts where they can build new knowledge and skills, collaborate, share and reuse educational resources. We divide the roles in the community into three layers, with respect to the activities and related to them categories of people. Usually, most of the existing teachers' communities are formed around a web site that allows members to communicate by using forums or submit and download lessons' plans. We assume that Virtual Resource Center will contain structural information of various types, detached in learning object, which in the future will be comparable with e-learning standards. In regards to professional development of teachers, most of the existing teachers' communities only announce possibilities for learning, but do not support it. We propose all the activities in the VTC to be supported by an integrated electronic platform. In order to achieve the desired situation, the platform includes Communication tools, Collaboration tools and Learning tools.

In conclusion, it is essential that a virtual community should follow information technologies developments in order to promote professional development, communication, collaboration, share and reuse of educational resources at a distance.

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