

# Evolutionary Approach of Virtual Communities of Practice: A Reflection within a Network of Spanish Rural Schools

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**Abstract.** The isolation of rural communities creates special necessities for teachers and students in rural schools. The present article describes “Rural Virtual School”, a Virtual Community of Practice (VCoP) in which Spanish teachers of rural schools share learning resources and teaching methodologies through social software applications. The article arrives to an evolutionary model, in which the use of the social software tools evolves together with the needs and the activities of the VCoP through the different stages of its lifetime. Currently, the community has reached a high level of maturity and, in order to keep its momentum, the members intentionally use appropriate technologies specially designed to enhance rich innovative educational approaches, through which they collaboratively generate creative practices.

**Keywords:** VCoP, social software, affordance, appropriate technologies.

## 1 Introduction

It is recognized that rural communities are one of the disadvantaged groups in Europe due to their physical distance and isolation of other communities. Rural schools and teachers, as part of such disadvantaged group, also encounter difficulties in accessing services and resources for working with peers. New opportunities for bridging the gap between the rural and the urban teacher could emerge through the use of ICT tools.

Traditionally, communities of practice (**CoPs**) have been defined by Wenger as “groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly” [1]. In many cases, the forming of a CoP of individuals scattered over a broad geographical area, can also occur. In such contexts, collaboration needs to be supported by ICT and, thus, forming Virtual Community of Practice (**VCoP**). In this paper we study how a group of rural school teachers, scattered around remote Spanish rural territories, created and consolidated a VCoP, and appropriated the technologies through an evolutionary process in which technology affordance was challenged by their practical needs.

## 2 Supporting the Evolution of VCoP with Social Software

CoPs are complex processes which naturally evolve on time. In this sense, Wenger et al. [2] formulate five typical stages of community building and community development, which might be observed in many cases (Table 1).

**Table 1.** Stages of community development (Wenger et al., 2002, p. 69)

Stage	Definition
<b>Potential</b>	A loose network of people juggles with the idea of forming a CoP; structure, members, and common interests are identified and agreed upon.
<b>Coalescing</b>	The CoP is officially launched. The CoP activities are starting. The main focus is on establishing value.
<b>Maturing</b>	The CoP develops a stronger sense of itself. While its core practice is better defined, members develop new areas of knowledge. Members know each other; a level of trust has developed.
<b>Stewardship</b>	The CoP goes through a stage where the biggest challenge is to sustain its momentum.
<b>Transformation</b>	An event in the community will trigger the need for renewal. The CoP may start all over again on a new basis or simply fade.

Palmisano [3] lists some of the technologies that can be used within VCoPs, among them: e-mail (one-to-one communication, sharing of knowledge within a group), web forums (sharing of ideas, opinions and knowledge among members), blogs (sharing of information and knowledge internally and externally), wikis (co-authoring of documents), social media (social networking web sites such as Facebook and YouTube, that provide personal information, such as pictures and videos). These technologies can be tagged as social software.

Social software is generally accepted as supportive tools for VCoPs, since they provide affordance for most of their activities. An affordance is “a quality of an object, or an environment, that allows an individual to perform an action” [4]. The term is most commonly linked to the visual perception of clues in the environment that indicate possibilities for action. In this article, we use this terms in relation to the potentialities of specific functions and characteristics of ICT tools as key attributes or “educational affordances” in rural educational settings. Technological affordances are however not enough when the socio-educational context is very specific. “Appropriate technology” concept takes special consideration of the environmental, ethical, cultural, social, political, and economical aspects of the community it is intended for [5]. The term is usually used to describe simple technologies proponents considered suitable for use in developing nations or less developed rural areas of industrialized nations. In this article we refer to appropriate technology as technology which matches the economic, learning, and social environment of the rural schools. Appropriate technology means integrating technological solutions, carefully structured, organized, and interrelated, materializing the concept of a shared space for communication, exchange, and mutual support among users. The appropriate technology would be invisibly integrated into learning activities that are central to a matured VCoPs, only if their affordances pass the filter of the evolving needs of the users, in this case rural school teachers.

### 3 A VCoP of Spanish Rural Schools

Rural education in Spain has been significantly improved in the recent years [6]. With the decentralisation of the educational system, each autonomous regional government has developed educational structures and services adapted to the needs of rural schools. However, there are still clear needs to be tackled [7]. Indeed, rural schools need to be re-thought as embedded within the information society.

In the context of several EU-funded projects locally coordinated by the University of Barcelona (UB) Future Learning research team, and through a continuous communication process supported by social software, a VCoP named “Rural Virtual School” was created and consolidated over time during more than four years. Fifteen primary schools with students aged from 3 to 12, scattered in three different Spanish regions, made their way to an active collaboration by initiating common telematic-based projects, sharing learning contents and exchanging about teaching methodologies. This section presents a short overview of the evolution of the formed VCoP. It formulates the different stages of its lifetime, through which the activities, the needs and the social software tools used have been progressively evolving.

- *Stage 1 (“potential”)*. In 2004, in the context of NEMED<sup>1</sup> (Network Multigrade Education), a EU project aiming at bringing multi-grade education to the policy front, three rural schools have entered in contact, under the coordination of the UB, in order to start a collaboration. In this first stage, the common interests and needs were identified: a) Communication with other schools featured by similar contexts; b) Individual training for rural school teachers regarding ICT; c) Access to new learning resources; d) Promotion of the visibility of rural schools. To this end, a Moodle platform was proposed by the UB in order to share training resources with teachers. According to them, this system was satisfying to receive information such as tutorials and links related to ICT-based teaching methodologies, however, they encountered difficulties to communicate in a spontaneous way. This is why e-mail was widely used among the schools in order to communicate at distance.

- *Stage 2 (“coalescing”)*. In 2007, Rural Wings project<sup>2</sup> provided the schools with satellite connections, thus breaking many of the previous communication barriers. First, schools communicated with each other in order to get acquaintance; afterwards, they tried to define some lines of actions and started to collaborate. They defined their first common activity named “Sharing Traditions”, in which each school attempted to present its specific environment to the rest of the community. During this stage, mainly communicative tools have been used among the network, such as Google group (to communicate spontaneously and to organize their collaboration), chat (for informal one-to-one communication), video sharing (to show the schools’ environments and the conducted activities). These tools can be characterized by their easy-to-use, spontaneity and possibility for the participants to express their personality. They enabled the group to get to know its members and form its identity.

- *Stage 3 (“maturing”)*. Once a stable communication process was established, the VCoP was refining its core practice, as well as broadening its knowledge areas.

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<sup>1</sup> NEMED - Socrates Programme, Comenius 3 Action (2004-2007).

<sup>2</sup> RuralWings - VI Framework Programme (2006-2009).

Schools agreed they needed to focus on more specific subjects (e.g. Meteorology, Astronomy). Thus, related educational activities were shared among schools by means of pictures, videos and videoconferences. New schools were incorporated into the community. The VCoP grew thanks to the motivation, satisfaction and initiative of the teachers, who felt a sense of belonging. Rich personal relationships developed at distance. In parallel, the network started working on their own, applying for a national project (“Grouping Schools”) funded by the Spanish Ministry of Education. The previous tools were still widely used, however, the interest in some of them decreased. Indeed, some new generative and interactive tools were introduced to enhance the network’s new activities. For example, a shared blog was created and used as an open platform for exchange and communication (Rural Virtual School blog<sup>3</sup>), in order to display and share the conducted activities, illustrated by pictures and videos. The blog was also a reference point for sharing external educational resources in relation to topics, or local traditions and schools’ events. The blog enabled to regulate the communication flows between teachers, to show the activities to external audiences, while acting as a motivational element for students and teachers when seeing its impact outside the classroom. Thus, with the maturity of the VCoP, the tools necessary for supporting its dynamic became more complex, combining a variety of media for supporting comprehensive exchange of resources among the participating schools.

- *Stage 4 (“stewardship”)*. Currently, the educational activities among schools continue. The community can now be defined as a mature one, while its members are in constant search for personal growth and group progress. In order to keep the CoP’s momentum, a need for defining new scenarios that are goal-driven has emerged, which would involve the participants in a contextualized collaboration process. In this stage, part of the VCoP started participating in a new European project, SoRuraLL<sup>4</sup>, which enables a context to develop new educational scenarios in which the goals are defined by the teachers. As an example, four schools are co-designing a hypermedia story of the type “choose your own adventure” by using a wiki platform. To this end, the VCoP needed a platform which can facilitate the definition of specific goal-driven collaborative learning scenarios. As an answer, teachers were provided the SoRuraLL Virtual Learning World (VLW), a web-based platform which integrates several social networking tools carefully structured and interrelated, materializing the concept of a private shared space, facilitating the exchange and mutual support of the community. The VLW combines technologies which have emerged as appropriate to the context of the rural schools.

The following table represents the evolution of needs, learning activities and social software used within the VCoP “Rural Virtual School”. Furthermore, the table shows the needs that have been identified at the beginning of each stage of the VCoP’s life-cycle, as well as those needs that have been really covered at each stage. Thus, the Table 3 explicitly shows how new needs emerge on each stage.

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<sup>3</sup> <http://escuelaruralvirtual.wordpress.com/>

<sup>4</sup> *SoRuraLL - Lifelong Learning Programme, Key Action 3 (2009-2010)*.

**Table 2.** Evolution of VCoP needs, activities and technologies

Stage	Identified needs*	Supported needs	Learning activities	Technology
Coalescing	- <i>Initial Teacher Training</i> - Continuous Teacher Training - <i>Communication with other schools</i> - Access to Learning resources - External visibility of the rural school	- Initial teacher training (new pedagogies and ICT) - Communication with other schools - Access to learning resources provided by third parties	Definition of activities to be implemented in the future, such as “Sharing Traditions”	Communicative (e-mail, Google Group, Chat) Generative** (Moodle)
	- Activities and resources related to specific learning subjects - External promotion of the schools’ activities	- Access to a repository of shared learning resources - External visibility - Continuous teacher training	Sharing traditions, activities related to Astronomy and Meteorology	Documentative (blog, video conference tools)
Stewardship	- Goal-driven scenarios - Meaningful activities	- Goal-driven scenarios - Meaningful activities	Wiki storytelling	Interactive, Generative, Collaborative (VLW)

\* Needs marked in *italic* are the needs that have been covered in the stage they were identified, thus disappear. All other needs continue as explicit need to next stages.

\*\* See the discussion on Moodle usage

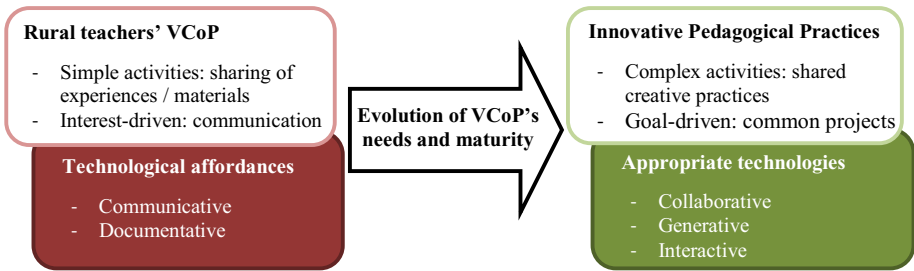
## 4 Discussion

Learning occurs in a socio-cultural system in which learners use various tools and multiple forms of interaction to create collective activities supported by technology affordances. Social software tools are pedagogical tools that stem from their affordances for exchange, communication and information discovery. The creation of a VCoP enabled Spanish rural schools to enter into such rich socio-cultural system through properly selected technologies that served as affordance to respond to their needs: to communicate through technologies in a more spontaneous way, thus creating richer relationships; to easily share learning resources and teaching methodologies; and to show the activities to external audiences. As a result of this process, to empower the rural school.

Once these needs were met, the community was experienced enough for new educational endeavours. Moreover, new interests emerged, such as to conduct meaningful activities that would give sense to the collaboration and keep the momentum of the community. The use of social software tools enabled teachers to learn how to contextualize the use of the ICT tools in the classroom, as well as for their own development. Indeed, the VCoP gathered the necessary skills and abilities to manage social software tools, which allowed them to distinguish between the adequate characteristics and functionalities of the tools, and the inadequate ones. We can claim that teachers are now able to identify the *adequate* affordances of the technologies.

Furthermore, for sustaining its momentum, the VCoP needs tools that facilitate complex and comprehensive goal-driven activities for which appropriate technology integrating interactive, generative and collaborative tools, is crucial. As a consequence, due to the access to appropriate technologies designed for their specific context, teachers from the Spanish rural schools are now able to build their own goals and define new learning scenarios.

The Figure below demonstrates the Evolutionary model of the VCoPs supported by technology. Various technological affordances enable the creation of the community and its first stages of maturity. While maturing, the network identifies and selects the appropriate ones for the activities and the potentially interesting characteristics for their context.



**Fig. 1.** The Evolutionary Model of VCoP and Technology

The use of technology creates new needs and gradually brings the community to a new level of innovative pedagogical practices. Shared creative activities, however, needed the support of appropriate technology where the technological affordances are especially adapted to the socio-pedagogical context of the community.

## 5 Conclusions

This article presents how a VCoP - “Rural Virtual School” - has naturally evolved during four years. The above reflection outlines an evolutionary approach, according to a multiple dynamic:

- According to its evolution stages, the needs of the VCoP have been constantly evolving, from communication and teacher training, to goal-driven scenarios. Through these stages, the VCoP develops more and more focused activities, until arriving to rich innovative educational experiences. Indeed, at first stages, the activities conducted among the VCoP were related to exchange and communication. Progressively, they evolved to subject-based activities. Finally, innovative educational activities were conducted, in which schools collaborated in the objective of a common result.

- The use of the social software tools evolves together with the needs and the activities conducted in the different stages of VCoP. Indeed, among the tools used at the first stages, some “survived” (e-mail, chat), some evolved in their community role (the Google Group), some disappeared (Moodle), while some new tools appeared

(Blog). Currently, the VCoP needs specially designed appropriate technologies to enhance its innovativeness (SoRuraLL VLW).

As a conclusion, the VCoP has reached a level close to the Transformation phase (according to Wenger), in which members intentionally use appropriate technology to enhance rich innovative educational approaches, through which they collaboratively generate creative practices, and at the same time extend the community to parents and other rural stakeholders.

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