

STRATEGIES FOR CULTIVATING COMMUNITIES OF COOPERATIVE TEACHERS: A 2-YEAR PROJECT FOR TEACHER TRAINING IN THE EDUCATIONAL USE OF LMS PLATFORM¹

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Abstract

This article aims to present and reflect upon the process of supporting communities of cooperative teachers in training initiatives on the educational use of LMS platform. The results of our analysis and reflection take as empirical data 7 field workshops developed with nearly 150 Portuguese teachers, ran during two school-years. The identification of restrictive factors and enabling strategies for supporting teachers' cooperative practices are also reported. The rationale for this analysis draws on the work of Jean Lave and Etienne Wenger, particularly on the notion of 'learning as participation in communities of practice', as well as Vygotsky's socio-cultural development theory and 'expansive learning' as viewed by Activity Theory.

Introduction

Vygotsky's Socio-cultural Theory of Human Development

Socio-cultural perspectives on human development revealed profound implications for the design of educational activities since the middle of the XX century. Vygotsky's work seems to be a structuring pillar for these approaches as it is commonly refereed as the genesis of social-constructivism perspective. Social-cultural theory of learning postulates that social interaction is the main source of human development, therefore "learning is a necessary and universal aspect of the process of developing" (Vygotsky, 1978, p. 90) and is conceptualized as a culturally organized phenomenon. The relationship between individuals and world-of-object is a mediated process that occurs through/by/with physical and psychological use of social-cultural artifacts. A triadic relation is established between subject, objects and mediation artifacts. Another central concept of Vygotsky's theory which is relevant in this research is the idea of zone of proximal development (ZPD). It can be defined as the distance between an actual developmental level determined by independent problem-solving and the level of

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potential development determined through problem-solving under other (adult) guidance or in collaboration with more capable peers. Van der Veer and Valsiner (1991) present ZPD as an “intersubjective space for analyzing how people become actors and communicators within any given activity or social practice” emerging from learning in dialogic interactions (p. 1).

The revolutionary dimension of the idea of ZPD is related to the fact that it is presented as a metaphorical space, created within activities, in which the participants teach/learn from each other and where personal meanings encounter social meanings and purposes. Within this Vygotskian framework, researchers have focused their attention upon the processes of collaboration rather than upon conflict, arguing that for interaction to be effective individuals have to work toward accomplishing joint goals (Tudge, 1990). In this sense, we add to ZPD its inherent part of the microculture of the specific context and moment where activity develops and take place.

Cultural-Historical Activity Theory (CHAT)

Cultural-historical activity theory recovers Vygotsky’s (1978) concept of (artifact) mediation and integrates Leontiev’s (1978) hierarchical structure of human activity, where activities are motivated by a specific need of an (active) agent, which makes him move towards an object in order to satisfy his need. Consequently, activity becomes necessarily linked to the concept of motive. It presents itself as a pre-condition for activity incorporating the object that will be transformed in an outcome (Leontiev, 1978). Activity is regarded as the motor of the historical-social development of humanity.

Engestrom’s work — most of it developed in organizational settings — is commonly presented as highly representative of CHAT 3rd generation. He takes Leontiev’s way of think about human activity and presents it as: (i) the smallest unit that preserves the essence of all the collective activity; (ii) a contextual or ecological phenomenon; (iii) revealing a productive character; (iv) always culturally mediated; and (v) emerging as dynamic, an “*in-evolution*” concept in which constant change should be considered through a social-historical and systemic perspective of analysis (Engestrom, 2001b). In this sense, human activity only acquires real meaning in its system, the activity system.

In an activity system there are multiple mediation relationships. The subject and the object (the agent and the environment) are mediated by instruments, including symbols and representations of various kinds. Vygostky’s triangular representation of the subject-object-artifacts’ relationships, is although seen as ‘the tip of an iceberg’. The less visible social mediators of activity — rules, community, and division of labor — are depicted at the bottom of the model.

Between the components of the system, there are continuous transformations. The activity system incessantly reconstructs itself, through full cycles of expansive transformation (Engestrom, 1999). An expansive transformation is accomplished when the object of the activity system is reconceptualized “to embrace a radically wider horizon of possibilities than in the previous mode of the activity” (Engestrom, 2001a, p. 137). In CHAT these expansive transformations are seen as attempts to reorganize the activity system in order to resolve its pressing inner contradictions.

The activity theory approach emphasizes that incoherencies, paradoxes and tensions are inextricable elements of activity systems. Contradictions assume here a capital importance, as they are the driving force of change and development in activity systems. They present as historically accumulating structural tensions within and between activity systems. Indeed, activity systems are perhaps best understood as disturbance producing systems. However, “contradictions do not manifest themselves directly. They manifest through disturbances, ruptures and small unremarkable innovations in subjects’ everyday work actions” (Engestrom, 1999, p. 68). In the context of work practices, contradictions manifest themselves as problems, ruptures, breakdowns (Kuutti, 1996), which interrupt the fluent flow of collective activity.

Situated Perspective and Community of Practice

Also with central and special relevance in the analysis and reflection about collective and community activity, learning and development, we find Situated Learning perspective. Learning is seen as a process of *social* participation, one where the nature of the *situation* impacts significantly on the process (Lave & Wenger, 1991). The meaning of learning is configured through the process of becoming a full participant in a socio-cultural practice: “Learning occurs through the increasing and evolving process of participation in communities of practice, and it concerns the whole person acting in the world” (Lave & Wenger, 1991, p. 49). The authors assume an inter-relational view of the person, learning and (situated) environment. Therefore, knowledge shouldn’t be seen as de-contextualized or dichotomized as abstract or general. Knowledge and learning are only properly conceived as being located in communities of practice. There is a strong connection between knowledge and activity: learning makes up part of daily living. The promotion and enhancement of problem solving, of questioning, of critical discussion based on experience become a central process for learning (Lave & Wenger, 1991) and becoming a participant of a community of practice.

Situated learning perspective assumes that learning involves a process of engagement in a community of practice. Wenger (1998) presents communities of practice (CoP) as formed by subjects mutually engaged in a practice — a process of collective learning in a shared domain of human endeavour: a tribe learning to

survive, a group of pupils trying to define their identity in school, a network of teachers intentionally exploring new web tools for pedagogical purposes:

Being alive as human beings means that we are constantly engaged in the pursuit of enterprises of all kinds, from ensuring our physical survival to seeking the most lofty pleasures. As we define these enterprises and engage in their pursuit together, we interact with each other and with the world and we tune our relations with each other and with the world accordingly. In other words we learn.

Over time, this collective learning results in practices that reflect both the pursuit of our enterprises and the attendant social relations. These practices are thus the property of a kind of community created over time by the sustained pursuit of a shared enterprise. It makes sense, therefore to call these kinds of communities, *communities of practice*. (1998, p. 45)

Three elements are revealed as important to identify a community of practice: (i) the domain — it has an identity defined by a shared domain of interest; the membership therefore implies a commitment to the domain, and therefore a shared competence that distinguishes members from other people; (ii) the community — the group of members that engage in joint activities in their specific domain, that share information and learn from each other in a web of inter-relationships; and (iii) the practice — the elements of the community are practitioners who develop a shared repertoire of resources (experiences, stories, tools, ways of addressing recurring problems) which leads to a shared practice through sustained interaction and time.

Although these three perspectives present some clear and distinguishable features, all of them also share important presuppositions about human development and learning, through a more individualistic or collective perspective. Also, each of them explicitly assumes its social-cultural background, so some roots are still linking them. Their reconciliation on the analysis and reflection about teacher's development in ICT competences tends to be enriching and expansive.

ICT in Education: Actual Moment

In 2001, the European Community (EC) stressed its ten year-resolutions where the commitment to enhanced cooperation in vocational education and training in order to remove obstacles to occupational and geographic mobility and promote access to lifelong learning were assumed. EC declares its aim of improving closer cooperation in order to “facilitate and promote mobility and the development of

inter-institutional cooperation, partnerships and other trans-national initiatives, all in order to raise the profile of European education and the European training area in an international context so that Europe will be recognised as a world-wide reference for learners” (EC, 2001, p. 6). Emphasis is put on access to education and training systems, on opening them to the rest of the world and on the increase of European educational systems’ quality and competitiveness.

In Portugal this general policy was interpreted and implemented in different forms. One of the strongest dimensions deals with the social integration of Information and Communication Technologies (ICT). Political discourses integrate newly developed concepts, such as info-society, e-government, e-citizenship, and e-business.

Portuguese national policy for ICT integration (Technological Plan for Education – TPE, 2008) puts a quite ambitious target of placing Portugal, by 2010, among the five top nations in terms of ICT use in education. This Technological Plan intends to cover three central dimensions — equipment, educational contents, and training. It is primarily based on substantial efforts to provide infrastructures and hardware to schools. In 2007 the national average was 1 computer for each 13 students; in 2010 the aim is 1 computer for each 2 students. This requires a massive acquisition of computers (both desktop and laptop), interactive whiteboards for schools, and financing for the acquisition of laptops by teachers and secondary school students. Another central strategy relies on promoting teacher training and certification in ICT. In 2007 nearly 25% of teachers had ICT certification and the authorities’ goal is to increase that number to 90% by 2010.

In spite of visible investment in ICT in the last ten years, the reality is yet far away from the aimed goals. Schools’ use of ICT is rather variable and the country is not close to having ICT integrated in the daily school practices in most classrooms.

In order to support teachers in the use of ICT in education, the Ministry of Education set up a web of ICT Competence Centres with the task of supporting teachers and schools to develop forms of integrating technologies in their daily practices both with pupils and colleagues. There are 22 centres spread around the country, settled at universities and schools of education or Training Centres in secondary schools. The Competence Centre of Faculty of Sciences at the University of Lisbon (CC-FCUL) adopted as general principle that the ICT use in education should aim to transform teachers’ practices, avoiding the simple reinforcement of traditional approaches or the updating of old methods. It developed a set of activities in order (i) to support teachers and schools in the use and integration of ICT in students’ activities; (ii) to develop teachers’ competencies in using ICT as a practice, reflecting and sharing experiences; and (iii) to develop resources for the use of ICT in schools (LMS platforms and

experimental work in science). The work is informed by the notion that ICT should act as a mediator (e.g., having a significant role of facilitator, in drawing participants into conversation and patching up broken communication channels among schools and between schools and the central educational authorities). As such, CC-FCUL should be attentive to certain aspects: cordiality (e.g., sustaining participation and creating entry points for motivation in the use of ICT as participants respond more eagerly to friendly, inviting comments); reciprocation (e.g., calling in an effort of collaboration as participant's sense that they should "give something in return" for a positive experience), and social responsibility (e.g., creating opportunities for the development of a sense of belonging — for instance, when a comment is undersigned by a group, participants could feel a stronger responsibility to interact with it).

In the present school year, CC-FCUL supports near 280 primary, junior and secondary schools, with a 5-element team working at Faculty of Sciences at the University of Lisbon.

Describing 2-Years Project of Teachers Training in Educational Use of LMS Platform

In the prospective scenario of Portuguese ICT educational integration, learning management system (LMS) platforms are assuming an increasingly important role. Since 2006, the Portuguese Ministry of Education made available MOODLE platforms for every public school which reveals interest in using one. MOODLE (Modular Object-Oriented Dynamic Learning Environment) is an open-source software package with a wide range of supporting services that provides a virtual space for more effective ways of working within and outside the classroom. Through it, class material and coursework can be accessed "anytime-anywhere" in a safe online environment (BECTA, 2008). It incorporates tools and resources such as: (i) messaging, discussion forums, and chat rooms that support communication and interactivity; and (ii) wikis, web pages, glossaries, books, and portfolios that enable users to create, transform and manipulate digital content. Users can work independently or collaboratively. It was designed with social-constructivism pedagogical principles, trying to help educators create effective online learning communities and to teach in a more transformational way.²

² for more information see <http://moodle.org/>.

1st phase: Spring 2007

In the 2006–2007 school year, the Portuguese Ministry of Education project “LMS platform for each school” led to a school demand for MOODLE. Nearly 60% of basic, junior and secondary public schools made a request for it. In a natural and common way, a growing and expanding movement emerged.

By February 2007, CC-FCUL opened 3 workshops oriented for the use of MOODLE for teachers of almost 200 schools supported by the Centre. In a 3-week period, the teachers signed up individually and no special requirements were demanded.

A total of 93 teachers registered. Although, this can be seen as a small number considering the amount of schools supported, it is important to notice that the average number of total registrations in other training courses or workshops (also conducted in that school year and in previous years) was never more than 30. Research and experience show that Portuguese teachers tended to reveal reduced involvement and investment in professional development in ICT. In that year, CC-FCUL found a high imbalance between “supply and demand” — the number of training sessions had to be tripled. Every training session took place at the Faculty of Sciences of the University of Lisbon, and all exploration activities presented in the sessions to teachers were conducted in CC-FCUL MOODLE platform.

2nd phase: Winter 2008

In the second year (2007–2008) another socio-historical moment emerged in the Portuguese educational system. A wide range of equipment (laptops, wireless Internet connections and interactive whiteboards) had entered schools; every junior and secondary school was asked to elaborate an ICT school-project for two years; a new model of teacher evaluation and career progression was implemented, where professional training and certification acquired an important role. Consequently, the run for ICT training has intensified. Also, the number of MOODLE platforms opened for schools increased greatly. At present, almost 92% of Portuguese public schools have their own MOODLE.

In January 2008 new workshops on the “educational use of LMS platforms” were scheduled and a new 3-week period for registration was opened for the nearly 280 schools supported this year by CC-FCUL. This time, however, some requirements were presented: (i) teachers couldn’t sign up individually, registration could only be made by schools; (ii) each school had to organize a group of 5–6 teachers who explicitly show an interest to develop and to promote MOODLE educational use in their school; and (iii) one teacher of each group assumed the responsibility of helping to identify what teachers could constitute that group, of stimulating/sustaining the use of MOODLE by her/his school community and acting more closely with CC-FCUL. Four workshops were opened for teachers of 10 different

schools. Each workshop had three sessions that took place within teachers' daily context (school classrooms), and in between the interaction and discussion continue online (a particular course in the CC-FCUL MOODLE platform). Part of the teachers' work during the workshop is to organize a course in their school's MOODLE platform for posterior use (for students or teachers work). Teachers could do this work alone or with a colleague. So they are working at two levels — as a participant in the CC-FCUL MOODLE platform and as a facilitator in their school's MOODLE platform.

Analysis of CC-FCUL Training Practices: Applying Central Concepts of Socio-Cultural Theoretical Perspectives

The rationale for this analysis draws on the main principles and concepts of three socio-cultural theoretical perspectives previously presented: Vygotsky's socio-cultural development theory, Activity Theory and Lave and Wenger Situated Learning perspective, particularly the notion of learning as participation in communities of practice. A set of theoretical principles were present in the design of each task of the training session of "lms platforms" workshops, as social interaction, collaboration, mediation (Vygotsky, 1978), participation, involvement, mutuality, reciprocity, sense of belonging (Lave & Wenger, 1991), expansion, transformation, production, contradictions (Engestrom, 2001a) and collective responsibility.

Through a retrospective analysis of the 2-year project of teacher training in the educational use of LMS platform, central concepts and principles of it is undeniable that CC-FCUL strategies were marked by important changes which were immune to the socio-historical moments that marked those two years. As Engestrom (2001b) points out, human activity (systems) must be analyzed in direct dialogue with the context and also with its historicity, in its present and also past form, through an evolutionary point of view. Lave and Wenger (1991) work also underlines the important of considering learning from a context situated perspective. Therefore, one of the main changes in CC-FCUL strategies in teachers training with MOODLE (not only on MOODLE) was moving the training setting: sessions were situated in schools. In that way, CC-FCUL could achieve a better understanding of teachers' real context, its features, resources, potentiality and constraints.

Another CC-FCUL strategy, one which was always present in both years, was the fact that training sessions were always conducted *with* teachers and not only *for* teachers. Teachers were seen as partners and the development of competencies was approached as a collective transformation. Vygostky's notion of ZPD points out the importance of collaboration with others for individual development and

although ZPD terms as “level” and “more capable” were not rejected, the vertical notion of improvement was substituted mostly by horizontal learning movements (Engestrom, 2001b).

In order to achieve ways of establishing favorable conditions for the constitution of a cooperative teachers' community, the individual expression and presence of the teachers were valued (by participation in discussion forums, or publishing individual works or by presenting intentions of managing their own course). Participation in social practices is a vital element of learning in communities of practice (Lave & Wenger, 1991). With that intention, exploring MOODLE tools with teachers was developed in a strict relation with their daily context, their schools, their academic areas, their classes, their students, and their needs. CC-FCUL intentionally tried to help them to find some personal and collective sense and meaning to those tools (activities and resources). Simultaneously, CC-FCUL acted in order to stimulate the identification of a *domain of practice* (more innovative teaching methods) and the constitution of a *shared repertoire*, built within the practice and knowledge sharing. Both aspects assume a vital importance in the constitution of communities of cooperative teachers (Wenger, 1998).

In the same sense, teachers' learning and development was always seen as happening *in action*, in a pragmatic conceptualization. Consequently, teachers were asked to actively participate and cooperate with each other in all tasks. Learning and development are seen both as socially constructed and socially supported (Vygotsky, 1978) and occurring through cyclic movements of expansion (Engestrom, 2001a). Tasks were designed and presented as ways of promoting expansive learning, as a collaborative process. In exploring MOODLE tools teachers were led to think about how to use it in their daily teaching practices, than questions and practical issues and problems tend to arise. For that purpose, contradictions (within and between system) were raised, pointed out and intentionally underlined. In the analysis of the problems, the diversity of teachers' perspectives was used and a model solution for the problem was collectively constructed and new and stable forms of teaching were built (Zappen & Harrison, 2005).

Another central aspect that emerged was the urgent need to develop some strategy that could help teachers (and schools) to identify a motive (Leontiev, 1987) for embracing educational use of MOODLE. Most of the teachers only presented diffuse intentions, based on curiosity and some kind of ‘fashionable’ interest. Therefore, replacing individual enrolment by school enrolment in the workshops, and putting forward the request that an element should act as a link to every involved part, assumed the purpose of promoting the rise of a (collective) motive in order to respond to specific needs.

Requesting for one element in each group who assumed the role of mediator was one way of helping CC-FCUL team to move into each group of teachers' activity system. CC-FCUL also assumed a mediation role, specifically, between each group of teachers and the new virtual learning environment, MOODLE. As Kozulin (1990) noticed, this mediation role can be performed either by a material tool, a psychological system of symbols and signs (semiotic), or by the behavior of another human being.

A final (or principal) strategy used in both years of teachers' training in the educational use of LMS platforms was the concern of always showing teachers that they should use technology in practice, not only practically using technology. Learning how to use some new software, how to work with some emergent web tool is rather important, but it is central to reflect upon what pedagogical value it can have.

Reflecting on Challenges and Constraints: The Identification of Restrictive Factors in Supporting Communities of Cooperative Teachers

Looking over the last two school-years developing teacher training sessions in "educational use of LMS platforms" and acting in order to establish some contextual factors that can help promote the development of communities of cooperative teachers, some challenges and constraints can be pointed out:

Reduced level of confidence and competence in ICT use: In the Portuguese national curriculum, ICT is not a transversal matter, it is a specific subject taught by ICT teachers within strict hours of the school timetable; therefore, teachers tend to assume ICT training as headed by the group of ICT teachers. This fact tends to work counterproductively for the promotion of teachers' higher level of investment, competence and confidence in the use of web tools. They do not see ICT competence development as a matter that should concern all the teachers. In addition to this problem, research shows that teachers who have little or no confidence in using computers in their work tend to avoid them altogether (BECTA, 2004) therefore the circle is closed and changes do not happen. Teachers' competence and confidence stay reduced.

Time: Answering to all the pedagogical, technical and bureaucratic tasks that compose teachers' daily lives does not leave much time left. However, it is also undeniable that the development of a high level of confidence and competence requires time-consuming investment and international and national government-led agendas and discourses show that teachers will not be able to continuously run away from ICT use in classrooms. So, teachers will have to find time to explore

new web tools. At this stage, it seems important to distinguish two types of time: physical time (a discrete construct measured by accurate clocks) and psychological time (a continuous and infinitely large container of all events, which are sequenced in a system of relations by a certain order of priority). Only the second can be promoted and/or produced and only this integrates an agency perspective of human beings. Individuals can *create* time, but they tend to do that only for prioritising worthwhile things.

If teachers can see technologies as a worthwhile educational tool and as something that can bring considerable time-saving in both the medium and long term, and, moreover as something valid for their daily life (not just as professionals), it is more likely they will invest their time and effort in getting involved in exploring it. ICT use can then be seen as a teacher priority.

Teachers' attitudes, habits and behaviours: Considering the past and looking at the present social-historical moment in the national educational system, evidence is found that supports the fact that Portuguese teachers' professional culture is based on individualistic attitudes and non-collaborative practices. In that way, establishing training sessions built upon knowledge-sharing activities and cooperative competencies development can be seen, by teachers, with a concern perspective. They do not adjust with their professional culture background. This kind of resistance to change tends to be a factor which prevents the full integration of ICT in the classroom (BECTA, 2004) and the construction of a real community of cooperative teachers. This resistance can be seen, in a micro-analytic perspective, in terms of teachers' unwillingness to change their working practices and, in a wider analysis, in terms of schools organization, which find difficult to promote internal reorganization where innovative and cooperative practices involving ICT become part of a shared repertoire.

Building a community is not something that can be imposed: Favorable or facilitating conditions can be created in order to cultivate the rise and consolidation of a cooperative teacher's community (of practice). But building it can't be forced from outside, it only grows from within and through time, bounding teachers with each other through joint and shared experiences. Therefore, CC-FCUL team can not absolutely guarantee that, in these last two school years, some of the 150 teachers that participated in their training sessions on educational use of LMS platform, did engage themselves with others in one or more community of cooperative teachers and truly emerge as a community of practice.

Promoting real change teachers' practices: Like any change, it does not *happen*, it goes on happening. A long-term perspective is required. It is important to notice that the introduction of a new technology does not promote by itself an expansive

transformation of the internal structure of the teaching activity (system). As Bin and Munro (2008) pointed out, it can really result in the rejection of that new element and teaching practices remain unchanged. Experience has shown (and research also; see, for instance, Marchin 2006) that innovative teaching practice with ICT only happens where there is fertile ground for making efficient use of it. Thus, teachers practices only tend to change when the motive and the will for change is already present then the new technology only work as a catalyser artefact.

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