A Social Network Based- Enhanced Learning System

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Abstract—The availability of p2p distributed systems on wireless networks makes possible to explore new e-learning paradigms for adapting learning workflow to be more interactive. In this work we give a preliminary description of EduSHARE that is a p2p-based quiz management system running on wireless ad hoc network and supporting traditional learnong workflow with a dynamic interactive quiz sharing and evaluation system.

I. INTRODUCTION

During the last decade a variety of Learning environments, experimenting new modes of communication, have emerged with the goal to increase interaction and to improve quality. Some recent educational research, have proven that these approaches due to their inherent limitations, have demonstrated modest benefits compared with the face-to-face classroom methods, thereby sacrificing quality.

To this purpose the design of such enhanced e-learning infrastructure has become an issue that is being addressed by many researches. One of the suggested solutions to this problem is the use of P2P file sharing technology. In fact last research in Technological Enhanced Learning demonstrated effectiveness of interoperability between classic teaching techniques and technological instruments for an improved and simplified learning process.

We decided to take advantage of an existing mobile P2P file sharing tool named MobiSHARE ([3]), that could be extended with an adaptive sharing mechanism for classroom handouts and dynamic feedback issues by means of built-in advertising system. In this article, we discuss the learning model behind this extension and the corresponding functional model used in a prototype tool named EduSHARE ([4]).

II. SHARED-BASED ONLINE LEARNING DESCRIPTION

Traditional e-Learning software are designed in accord to the Client-Server paradigm (see Figure 1). However P2P systems are becoming a promising alternative that is able to support file sharing among a network of clients thus allowing a cooperative distributed learning model. In this section we want to discuss the way how this type of implicit cooperation could improve e-learning systems. As noted in [1], the use of collaborative tools allows to adapt the role of the teacher to a new educational model according to which students must actively lead their learning process. Figure 2 shows the cooperative p2p learning model that could be defined in a way similar to social networks. Students are connected through a

p2p sytem while downloading and sharing documents. This new learning model has the following advantages:

1) students could take advantage of p2p paradigm to collaborate in real time (sharing documents and feedback)
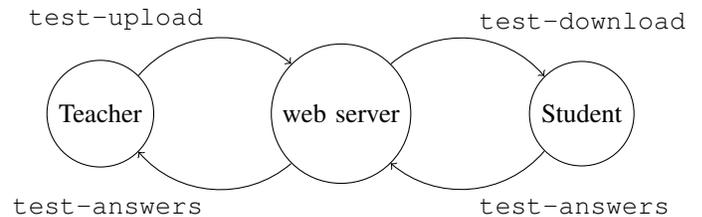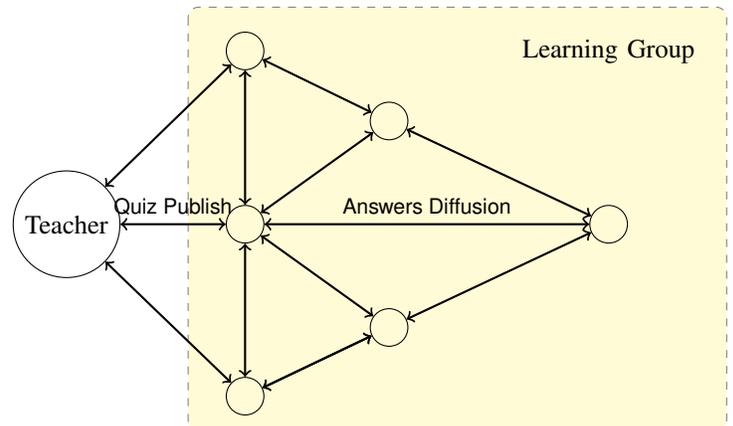2) teacher can adapt learning process in a better way by considering online reactions as soon as they are available

Fig. 1.   WebQuiz Process

Fig. 2.   Social Network based Learning activity

We assume a mobile learning scenario in which students and teacher are connected in a dynamic way through a wireless network. In general learning activity is supported via a fixed infrastructure like a web learning platform. However in absence of any fixed infrastructure it could be useful to explore the way of how to use mobile devices. In P2P file sharing, to support learning activity, the following issues can be implemented:

1) *P2P file sharing* Handouts could be shared by the teacher by simply putting them to a shared folder

in the lecture. By using P2P advertising system, files are dinamically propagated to other students (automatic notification)

2) *student-context analysis* We could evaluate tests and questionnaires results to create a dynamic classification of best students in the classroom. Obviously that classification has to be seen by both teacher and students. Through this feature we want stimulate competition in order to improve students performance.

III. EDUSHARE FEATURES

EduSHARE ([4]) is a p2p-based quiz management system running on wireless ad hoc network that exploits a social network based learning activity. In accord with the P2P-based learning model, we have designed a dynamic quiz management system that runs on wireless ad hoc network and allows a social network based learning activity (see Figure 3) by means of the following issues:

- *Handouts Sharing* It allows sharing of handout documents among students in a simple and fast way. This feature increases interaction between students and so the understanding of topics explained in a class.
- *Topic based Chat* This feature allow the communication between teacher and students. Students can communicate with each other and ask questions to the professor without disturbing the lesson.
- *Test Publishing* This allows teacher to send one test to all students that are connected in order to assess their knowledge/understanding level. Students answer are managed by the system to compute the number of questions answered correctly and the elapsed time in order to make a score report. This score report contains the scale scores achieved by students in the tests and the performance level achieved in them. Each test is presented as a multiple field form, and it is submitted during a lesson break to determine whether a student has grasped the concepts of the lesson.
- *Student Context* Student context is an innovative feature useful to evaluate tests and questionnaires results in order to perceive an immediate classification of students learning activity. Obviously such classification has to be seen by both teacher and students. Through this feature it is possible to stimulate competition in order to improve students performance. This feature is in accord with [1] in which it has been proved that competition in a classroom could improve learning results.

EduSHARE actors are classified as teacher, who prepares and set up the teaching content for adaptive learning and student who carries out the learning activities in a personalized way. The Figure 3 shows results obtained in a simulated execution of EduSHARE functionalities that have been used in a real learning environment corresponding to an Italian academic course in our Faculty of Engineering.

Besides an increase in learning efficiency, a good satisfaction level has been obtained at the end of simulation thus resulting in a good acceptance from students although its novelty.
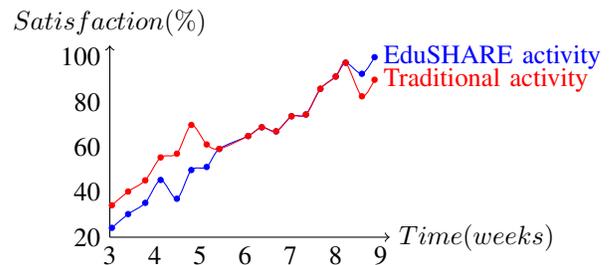

Fig. 3. Experimental Evaluation Chart of EduSHARE vs Traditional Learning

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