Distance training for physics teachers in education sciences: flexible and efficient.

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Abstract— Continuous training courses for the teachers of the Minister of National Education are essential to update their disciplinary and pedagogical skills. However, teachers in Morocco rarely benefit from continuous training courses, especially in educational science. This lack is due to organizational constraints as well as temporary unavailability of teachers. In this paper, we propose distance learning, across the Moroccan Kingdom in educational science based on complete, intelligent and communicative e-Learning platform. The main objective of this distance learning is to provide teachers with solid, efficient and flexible training courses in educational sciences. Flexible, because our distance learning use some approaches that allow each teacher to preplan their learning activities and collaboration with other teachers. Efficient, because traditional training is done at each city and requires an important budget, while our distance learning is at the national level and without cost of the training courses (movement of both teachers and Supervisors, Indemnities of the supervisors, catering and also accommodation). The added value of our distance learning platform is to offer various advantages: First, updating their knowledge in physics science, Second helping teachers improve their methods and teaching strategy, Third sharing courses and new teaching strategies between the teachers, fourth encouraging teachers to educational research and also preparing teachers to become future scientists in education.

Index Terms— distance training, educational sciences, physics teachers, educational research.

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1 INTRODUCTION

Education plays a fundamental role in the socio-economic and cultural development and the improvement of people's lives. Today, its importance has increased as powerful tool for the construction of the knowledge society and technology. Therefore, it was officially classified as second priority after national territorial integrity. Thus, it was necessary to undertake a profound reflection to reform the education and Training systems. The teacher's qualification and the redefinition of the pedagogies practice should be the subject of special attention.

The education system cannot tolerate the differences observed between pedagogical orientations and educational practices in the classroom. Efforts are needed to harmonize these two aspects (elements) of education by providing ongoing training for teachers in education science.

However, teachers (Ministry of Moroccan education) rarely receive ongoing training and there is a lack of effective policy and support rigorous, diligent and complete continuing education requirements. [2]

This lack is due to the constraints of availability of temporary teachers who perform their duties in their schools and also to financial constraints (movement of both teachers and Supervisors, Indemnities of the supervisors, catering and also accommodation...).

Our research is targeted at filling this gap by proposing distance learning, across the Moroccan Kingdom in educational science for the physics teachers. This training is based on a platform e-learning that allows the development of online courses, and also provides space for physics teachers to identify problems learning their discipline and to seek solutions to these problems in collaboration with other teachers using some of synchronous communication (eg chat) and asynchronous (eg Forum). .

The platform provides a space for physics teachers to identify the learning problems of physics and to seek solutions to these problems in collaboration with other teachers. Teachers are invited to share their course to improve it. They discuss the content of these courses and also the most appropriate pedagogical and strategies approaches (their target audience, the concepts addressed...). The platform contains teaching guides, official instructions, the strategic direction of the MEN and ministerial orders etc... On the other hand, provides teachers with the latest in educational science as a thesis, scientific articles or final project study. Teachers can also share other resources to enrich the platform. These resources will open up avenues for discussion, analysis and scientific research.

2 BACKGROUND AND OBJECTIVES

Significant changes underway in the Moroccan educational system aim to improve the quality of education and training to respond more effectively to the demands of modernization and the challenges of globalization. Formally, the area of teacher training is one of the keys to any kind of reform such as education system. Also, «Teachers have the right to benefit

from a powerful initial training and continuing education opportunities, allowing them to continually improve the level of their educational practice and to best perform their missions»[3].

Teachers training, both initial and continuous, can renew their teaching methods to encourage innovation in education, mobilize elements of knowledge and expertise in their teaching practices. Thus, teachers are encouraged to develop their professional skills and even acquire new skills in order to make their teaching more effective. The aim of our distance learning platform that we propose in this article gives teachers the opportunity to consult the education science resources so to updating their knowledge. Thus, the platform aims to encourage learning that involves the research, the construction of knowledge, autonomy, creativity and cooperation so as the teachers can act as agents of change in the school day. The added value of this distance education in the fact is that teachers can identify, propose, share and discuss their educational problems, then participate in the resolution of these issues in collaboration with other teachers.

3 COLLABORATIVE LEARNING

3.1 Definition

As Collaborative Learning refers to any activity in which two or more people work together to create meaning, explore a topic, or to improve skills. The practical definition of it is any learning activity that is carried out using peer interaction, evaluation, an/or cooperation, with at least some structuring and monitoring by the instructor[2]. Collaborative learning becomes online collaborative learning when it takes place via computer communication systems. It is the capability of the computer system to store, search and display the communications of its users. The collaborative learning offers more flexibility in time and space for learners encourages reflection, sharing of resources, autonomy, critical thinking and synthesis [3].

The Collaborative Online Learning is a method that is consistent with the proposals of the training, since it is based on the communicative aspect of ICT and concepts of collaboration between teachers to solve problems in their school day. The aim of this method is to encourage active learning content and develop cooperative work of teachers. It allows them to find solutions that meet the needs of each learning situation, and not to be limited to the use of standard recipes [4].

3.2 Advantage

The online collaborative learning offers more flexibility in time and space for learners encourages reflection, sharing of resources, autonomy, critical thinking and synthesis [5].

The Collaborative Online Learning is a method that is consistent with the proposals of the training, since it is based on the following concepts:
Knowledge is built from the subject's activity in situations of imbalances caused by the environment (classroom);
The subject of knowledge is an autonomous subject;
Cooperation is the fundamental activity for expansion,

knowledge structuring and solving problems identified; Communicative aspects of ICT can support collaborative work by providing communication tools, creation and access to a wide variety of resources.

The intent of this method is to encourage active learning content and develop in teachers a cooperative work. It allows them to find solutions that meet the needs of each learning situation, not be limited to the use of standard recipes.

This method is not limited to the transmission of knowledge by developing the explanatory capacity of the teacher. Teachers learn, also using this method to find solutions and develop educational skills (pedagogical scenario) which customized for each student taking into account these specific representations.

4 ARCHITECTURE & HIERARCHY OF THE TRAININGS PLATFORM

There are a variety of e-learning platforms available. Each of these e-learning platforms has different features which make them best suited to different applications. In our district (training), we chose eFront [6] for the following reasons:

- Chamilo is designed to stimulate thirst for knowledge by being easy to use with a visually attractive user interface. It maximizes the time spent on learning new skills, instead of learning how to use the platform.

- Chamilo is an open source eLearning platform that means we can customize it totally to suit our needs, integrate it with other existing systems and add new functionalities through Chamilo's modular architecture.

- Chamilo automatically detects mobile devices (Smartphone or tablet) and uses a special theme for them, which gives more flexibility in our training [7].

- Chamilo is easy to install.

5 ARCHITECTURE & HIERARCHY PLATFORM OF TRAIN-ING

The following diagram explains the prototype of our distance learning:
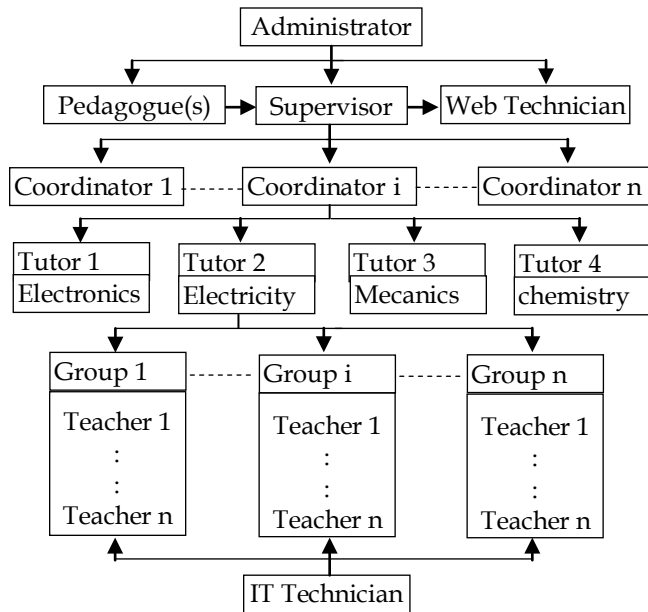
6. PROFILES OF THE MAIN USERS OF THE PLATFORM

6.1 The tutor's Profile

The tutor should be a source of knowledge in his discipline; however, he must facilitate access to knowledge. Also he has four roles: a social role, a role of organization, an educational role and a technical role. [8]

In a collaborative distance learning, the tutor, should be visibly involved in the work, his feed-backs must be fast, he should act as a facilitator, provides guidance in the process of collaboration and help teachers to make decisions [9].

In our training, tutors have a central role, they support the following tasks:

- help teachers to express their problems
- they animate the group's work,
- they facilitate exchanges between teachers,
- They organize groups of learners and they select the leaders of each group of teachers based on their communication skills and their CV.

6.2 The teacher's Profile

In our training, teachers must have certain prerequisites so that they can take this course:

- Teachers must be initiated in the field of ICT: the use of an operating system, web browsing and use of discussion forums.
- Teachers must be available to work in groups, collaborative

NB: Teachers may use the computers in the engineering room of their establishment if they don't have their computer connected to the Internet.

6.3 The educational coordinator's Profil

The educational coordinators are professionals that use ad-ministrative and teaching skills to develop, evaluate, and co-ordinate education programs. This may include designing the courses for the program. Depending on his or her role in an organization, an educational coordinator may serve as a liaison or "point person" between teachers, administrators, parents, and community members [10].

Competencies expected of educational coordinator are presented in the following table:

Competence	Description
General	Ability to report to the supervisor (admin) on progress and / or problems and propose appropriate solutions.
Techniques	Strong ability to immerse themselves in the education and training issues; Know and practice of office software, project management and collaboration; Knowing the distance learning platforms (advanced or expert level)
personal	synthesis listen Ability to communicate Versatility in a team work

7. METHOD

Our distance learning is based on an elearning platform. This platform is rich in educational resources dealing with the teaching of the physical sciences, and new educational practices and strategic direction of the Ministry of Education of Morocco. The platform provides an opportunity for teachers to publish their learners' cognitive problems and try to solve them by opening discussions via forum, emails and chats. Teachers can also share courses in order to improve it and to renew their teaching methods.

The aim of this training is to provide opportunities for the teacher who is faced with problem-situations to seek for creative methods with other teachers. This is the *Online Collaborative Learning* based on school day situations and based on Learning through Problem Solving (LTPS)

The method include the following steps:

7.1 Step 1: Identify the problem

In this step teachers propose a real problem, which took place in their respective schools for the study group in the platform. They identify, in cooperation, the nature of the problem (cognitive, methodological, emotional or otherwise). Collaboratively, they determine what needs to be solved according to their experience, research and expertise.

7.2 Step 2: Discussion of the problem

From the study of bibliographic material and previous experience, the problem is discussed in the online platform, the discussions meditated by tutors.

7.3 Step 3: Proposed (or) solution (s) of the problem

Teachers develop possible solutions to the studied problem and share the solutions with their group colleagues. They present the results (solutions) of online collaboration. Tutors ac-

company this work and ask their supervisors and coordinators when they fail to solve the problems that challenge their teachers.

7.4 Step 4: Defining an action plan to address similar problems

Both teachers and tutors discuss between each other and define an action plan for the problems studied.

7.5 Step 5: Publishing solutions to educational problems in scientific journals

To give more credibility to this work, teachers publish the results of their work in scientific journals.

8. CONCLUSION AND OUTLOOK

This Continuous distance learning is a challenge for teachers in its method and it can encourage an online national debate bringing together teachers from the Moroccan Education Ministry. Teachers and tutors are encouraged to familiarize and accept the challenges of assimilation of the training methodology. It must be noted to the strength of online collaborative learning which is based on problem solving which encourages the practice of construction of knowledge in dealing with real problems of education.

The Pedagogical Coordination ensures the success of this online training accompanying the collective work of teachers in the process of problem solving. They are also invited to make proposals to remedy the difficulties that can block the research and learning of teachers.

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