Learning Management Systems in Vocational Schools

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Abstract: - As instruction and learning gain new dimensions in today's world due to the proliferation of information and communication technologies (ICTs) - multimedia, the Internet or the Web, as a medium to enhance instruction or as a replacement for other media-, education becomes independent of time and space. Consequentially, learners and instructors can utilize new modes of learning and communication due to the proliferation of information and communication technologies (ICTs). One of these new modes of learning and communication to support a full range of teaching and learning activities conducted by educational institutions is Moodle which facilitates online content creation and collaboration and entails various social and communication tools that support teacher-student, student-student, and teacher-teacher interactions.
In the present paper, our main purpose is to demonstrate the way of using the Moodle in the education process at the Gaia Vocational School (GVS). The platform was characterized and promoted among the School members of GVS. The impact of this new platform (e-Courses) on the learning institution activities was evaluated through an online questionnaire, which showed high satisfaction levels with e-Courses.

Key-Words: CSCL, LMS, LCMS, VLE, Open Source, Moodle, Vocational School

1 Introduction

The Information Society or the Knowledge Society, generated from the great changes resulting from advances in Information and Communication Technologies (ICT), created a new paradigm of science; knowledge distributed a network [1]. This change of paradigm is contributing mainly to a decentralization of knowledge and decision-making in organizations. In the beginning of the century, the human, economic and socio-cultural resources were considered the most important factors [2]. In the Technology Education field, the change of paradigm made mainly from the mid of 90ˢ, by the intensification of the Internet uses, which opened a new perspective and made clear the emergence of a new educational paradigm characterized as constructive, socio-cultural and transcendent [1]. At the same time, the World Wide Web - or simply Web - was designed with features that enabled a rapid expansion of the communication infrastructure, reaching a large number of users and a huge quantity of content available. One of the strategies qualified for the Web in the teaching- learning process is the e-learning, an innovative way for the learning that stimulates the growth of Knowledge/Learning communities in the institutions [3] and also includes a set of solution based on environments for the cooperative learning support or CSCL – Computer Supported Collaborative learning [4]. Learning Management Systems (LMSs) are available in a single environment content of learning that can be accessed via Web, resources of communication (email, chat, forum), between tutors and apprentices, and - assessment tools. There are other specific applications such as Content Management Systems (CMS) and Learning Content Management Systems (LCMS). A Content Management System (CMS)) *is "computer software used to create, edit, manage, and publish content in a consistently organized fashion "*[11]. Typically, a CMS consists of two elements: the content management application (CMA) and the content delivery application (CDA). The CMA element allows the content manager or author, who may not know Hypertext Markup Language (HTML), to manage the creation,

modification, and removal of content from a Web site without needing the expertise of a Webmaster. The CDA element uses and compiles that information to update the Web site. The LCMS applications allow users to create and reuse small units or 'chunks' of digital learning content/assets, commonly referred to as learning objects (LOs). An LCMS manages the creation, edition, storing and delivering of the e-learning content process. The components of an LCMS are: a content authoring/editing application; a learning object repository; a dynamic delivery interface; and, learner administration tools. These systems may be of great assistance to the educators in the construction of learning experiences as well as innovative and enriching for the apprentices.

The aim of this work is to show how the implementation of a learning management system can be helpful in the education quality improvement in a Vocational school. The paper is organized as follows: in section two a brief description of how the learning management system is made; section three describes the moodle platform; fourth section explains the case study and in section five the results about the implementation are presented; and finally, some conclusions are draw.

2 LMS

In the world of e-Learning and Course Design, a vast effort has been made into research and ideas on how to organize and structure on-line course environments. The Learning Management Systems (LMS) are used to help reach these objectives. LMS are also referred to as Course Management Systems (CMS) or Virtual Learning Environments (VLE). LMS allow institutions to provide online environments at distance, on-campus and hybrid learning. A wide range of commercial and open source products are now available (WebCT, Blackboard, ANGEL, eCollege, Intralearn, PostNuke). One of such LMS is the Moodle in which we have practical experiences. The LMS can be defined as a tool package assigning management which provides e-Learning. Its basic functions can be divided into two parts:

Educational Part:

✓ delivering and providing study materials for students;
✓ monitoring the student's work and testing them;
✓ evaluation of the students;
✓ communication support for students.

Management Part:

✓ providing information about student's evaluation and teacher problems;
✓ registration of all e-learning participants (students, teachers, administrative staff, among others);
✓ control access;
✓ activity monitoring.

A Learning Management System must address the needs of the ultimate end user: the learner [23]. Each LMS has key features that allow students to be actively involved in their courses. The different learning management system's key features extend teaching and learning, and engage learners in a deeper learning experience. In choosing and using any type of courseware, the instructor needs to have components that will allow him to create active learning courses. Learning is not a passive activity. Students actively participate in traditional classes by listening and talking to other students and the instructor. In an online classroom, the instructor needs to create an environment where the students can actively participate in lessons and discussions. Through the use of discussions, students are able to share past experience and apply those experiences to their own lives. The connection between the students and the instructor allows the students to feel that they are part of the course.

Each component of LMS is important in a student's learning experience. The right components can make a course and the wrong component can destroy a course.

Two key factors for the success of the course are:

✓ The content of the course - The course should be student centered because the student centred approach supports learners and motivates them to learn. The instructors need to create content based on the learner's ability to process and understand the course content. Content development should be coherent and logically sequenced in a way that learners can easily follow the course. *"It was immensely helpful for the students to have all their studying material organized without having to look out for hardcopies and notes"*[22]. So, an instructor should be choosing an LMS that support a student centered approach. It should allow the instructor to design high quality material.

✓ The usability of the learning management system – It is the key to the effectiveness and

efficiency of the online course. The effectiveness of the course will help the learners achieve the specific goals of the course. The ease of navigation through the course will help the learners achieve their goals. If the course is not effective or efficient, then it will affect the students' learning. Therefore, the instructors need to understand the different components of the LMS and how these components will work to make the course effective and efficient. The LMS should be able to create pedagogically sound course content and learning objects easily and efficiently. It should have all the necessary e-learning tools for assessment, communication, collaboration, and community building, as well as for the creation and management of online learning courses.[22].

From Figure 1, it is clear that the smallest self-contained piece of instruction in the LMS is the course itself. Thus, if there is to be any reusability, it would have to be at the course level (one course --> many learners).
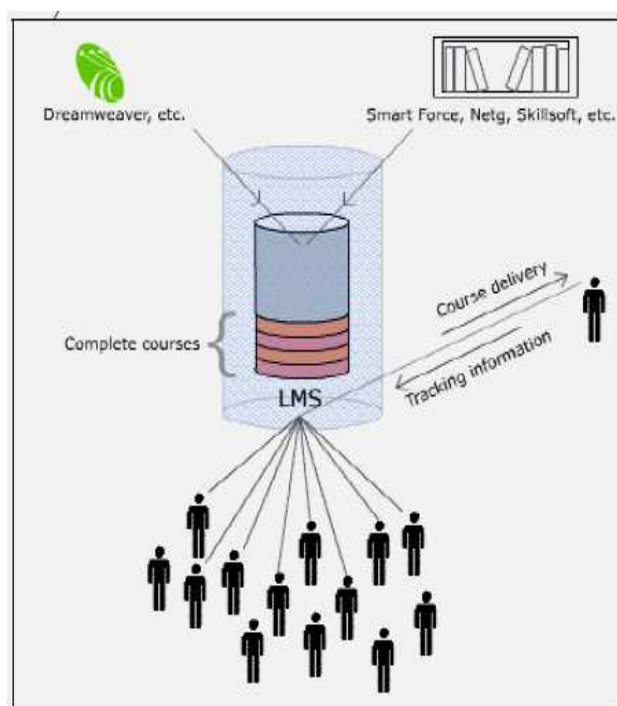

Fig.1. LMS [10]

3 Overview of Open-Source (Free Software) Movement

The terms "free software" and "open-source software" are sometimes often used interchangeably. However, it should not be

disregarded that free software the users' freedom to run, modify, adapt, customize and share without charge rather than being free in monetary terms.

The concept of "free" in this discussion is best stated as (FLOSS, [25]):

- The freedom to run the program, for any purpose
- The freedom to study how the program works, and adapt it to your needs
- The freedom to redistribute copies so you can help your neighbors
- The freedom to improve the program, and release your improvements to the public, so that the whole community benefits.

The open-source software, Moodle, fulfils the criteria listed above for "free software" and has rapidly built a community of users who have the freedom to download, install, run, and modify the software without cost.

According to Bonk and Pan [12] the term "open source" derives its meaning from a 'gift culture' where people are allowed to access source code freely becoming engaged in a give-and-take process by modifying and improving the source code.

Bonk and Pan [12] further note that similar to this practice of gift culture and distributed development in open source, participants in an online discussion can post their ideas about a topic freely in a community of inquiry as real people [13]. When knowledge sharing occurs, "*a common ground of interest and understanding*" [14] is established. These shared understandings make up the norms, values, attitudes, beliefs, and paradigms, or in other words, the culture, in this community of practice [12]. In this way, a community of practice is established that is grounded on the same shared experience of its members [15; 16]. Promoting values and sharing ideas occur through asynchronous communication tools and are grounded in existing knowledge contexts [13]. With the emergence of OSS (Open Source Software)/ FS (Free Software) movement, no-cost products such as Moodle that are more flexible and customizable than typical proprietary software are preferred by many instructors to enhance their teaching activities for the student's benefit.

4 Moodle

Moodle, an acronym for the Modular Object-Oriented Dynamic Learning Environment, is a VLE developed and written by a PhD student called Martin Dougiamas [5]. Moodle is written with the

programming language PHP and database MySQL. It is based on the open source (GPL) license agreement. In 1999, the first version of Moodle (Modular Object-Oriented Dynamic Learning Environment) was launched; whose basic principle is the socio-constructionist approach of education. This software was developed based on modular design, allowing the rapid development of features, and a philosophy in the open source distribution and development.

The stated philosophy of Moodle includes a constructivist and social constructionist approach to education, emphasizing that learners (and not just teachers) can contribute to the educational experience in many ways. Moodle's features reflect this in various design aspects, such as making it possible for students to comment on entries in a database (or even to contribute entries themselves), or to work collaboratively.

In Moodle all participants share knowledge. The teacher must take into account that each participant can be a teacher besides student. The teacher may be the "source of knowledge", or the person that influences the students as a model example of the culture of class, addressing their needs for learning, moderating discussions and activities to take the group of students to achieve their objectives.

The fundamental concept is a page, where the teachers provide resources and activities with and for students. A possible metaphor for the page of Moodle could be the classroom ubiquitous. Each registered user is associated with a profile and they can communicate with any other, strengthening the social component of this platform. The moodle, as the management system of teaching and learning functionality, introduced a strong component of participation, communication and collaboration with students and peers (fig.2).

Fig. 2- Main Page of Moodle- http.//moodle.org

The component of assessment and inquiry couldn't be forgotten as educational software. That helps teachers follow the student progress and the course completion. The system allows teachers to use a course at the same time they are developing it, and then re-use and improve it each year. They are offered specific tools for evaluating various activities, such as the ability to classify (by teachers or peers), through a scale established for this purpose, discussion forums, curricular work sent by

e-mail, lessons with questions, glossary of entries, among others. The main features are:

Forum - is a tool for discussion, but may have another type of use, such as mailing list, a blog or even a space for reflection;

Work – work curricula allow teachers to rank and comment on the moodle page subjects submitted to students or offline activities;

Chat – facilitates the synchronous communication through short messages between teachers and students;

Dialogue – can be used in several ways, such as collection of opinion or membership in a particular activity;

Glossary – enables participants to create dictionaries of terms related with the discipline;

Lesson – combines logic of delivery, an interactive component and evaluation.

Questionnaire – permits to build questionnaires for the participants of moodle

4.1 Installation and Special Requirements

Moodle is server-based software, meaning that the program is installed on a server, which can be implemented in a variety of ways--from remote hosting by a commercial server farm to local installation on a personal computer. All the functions and content of Moodle are accessed through a standard web browser, and deployment is relatively easy.

Installing Moodle is relatively simple. It requires the source files to be downloaded from the Moodle website, and then decompressed onto the local hard disk. Once it was successfully saved, the required files are transferred to the web server and then the settings are changed in the configuration files to match our settings at Progress through Training. The installation of Moodle is aided by several automated pages, which speed up the installation process. Moodle as server will run on any computer that can run PHP, can support many types of database (particularly MySQL) and will run on any computer with web browser.

Features:

✓ Administration of students, instructors, courses and files in multimedia storage;

✓ Tools for the development of tests, forums, assignments (ability for trainers to set students any number of assignments, with targeted completion dates), announcements (users are reminded of forthcoming announcements/ assignments when they first log into the system), course info, available course calendar and file transfer, html editor;

✓ Asynchronous communication using email, discussions (themed discussion forums), messages;

✓ Synchronous communication chat;

✓ Searching, grade-book, management tools (personal tasks, personal calendar, system announcements), among others;

✓ Customization of the site layout and theme feature to allow administrators/students to change the look & feel of the VLE without requiring a new style sheet;

✓ Basic security features to limit customer access to particular courses

✓ 'Journal feature' to allow students to set questions, maintain a course diary or aid revision.

This versatility allows Moodle to be used in a variety of ways depending on the needs and capabilities of the school or district: from a simple classroom management to pure e-learning or a "blended" combination of the two, with e-learning content and utilities extending on-site classroom learning.

5 The School

On 23rd of August of 1990, four teachers had founded the Gaia Vocational School, whose purpose was to give its students the skills needed to perform a certain job or jobs and working with the Training Centers of Employment and Training Professional Institutes. The Vocational school is endowed with a high degree of educational autonomy and its administration has a strong connection to the social and economic environments. The educational model presents a modular structure that allows organizing and evaluating the professional training, characterized by the division of a cohesive curriculum structure in autonomous parts, known as modules that work in individual pace and not in a traditional form. During the training experience, the students can be in touch with the company, in the form of internships, study tours and exhibitions seminars. At the moment, the courses last for three years and have 3100 hours, and prepare the students for entering the workforce. The curriculum includes little academic general education, while the practical skills of each trade are stressed. The Vocational school provides also a period of training and an actual context of work that change in accordance to the course. The subjects follow a modular structure, which is a matrix of training project of vocational schools. When the advancement conditions are created, based on the rhythms of teaching and learning of each one, we can affirm that the learning is focused on the student. The programs are organized into modules, known as units of learning. The school pedagogical model consists in four parts, as we can observe in Figure 3.
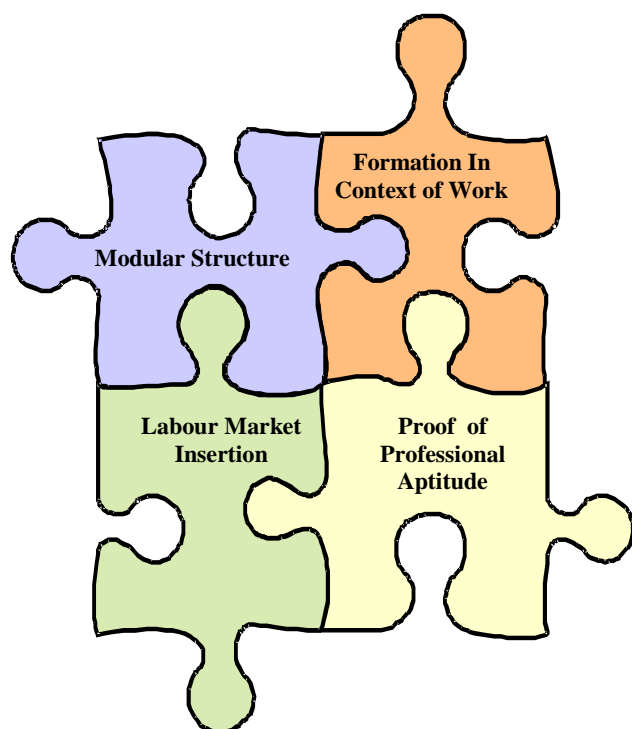
Fig. 3- Pedagogical Model.

Modular Structure - allows organizing and evaluating the training. It is characterized by the division of a cohesive curriculum structure in autonomous parts – **modules** - that are covered by individual pace, and thus replacing the traditional division of content by school years;

Formation in Context **of Work** - during the training experience students are connected to the businesses through study visits, internships, seminars and exhibitions;

Proof of Professional **Aptitude** - personal project, structuring of the student's professional future, focusing on issues and problems seen by the student. Knowledge and skills acquired during their training should be invested;

Insertion in Labour Market - allows the integration into the labour market .

5.1 Introduction and Use of Moodle at School

The Gaia Vocational school has been overlooked for using a learning management system. The learning remains limited to the classroom or laboratories, with fixed timetables, where the teacher continues to transmit the curriculum content based on a book or another source of static

consultation. However, vocational educators have the desire to give students the objects of learning to before classes begin, but they did not care to reproduce the content. A very high percentage only did it in the eve of the evaluation tests. This was the main reason why the school chose to implement a learning management system. The choice focused on Moodle for the following reasons:

✓ It is an Open Source Learning Management System (OS LMS);
✓ Moodle looks more like a set of tools that share an environment;
✓ Given the simple requirements of our potential users, and the fact that online courses do not have any dedicated management process; a set of tools was far enough of our needs;
✓ The hardware demands of OS software are usually significantly lower than the actual commercial software;
✓ Compatible with the SCORM and other standards;
✓ Moving to an OS solution mitigated the next three issues: given the low cost, even a failure would have a reduced impact on the overall budget, and would not have prevented moving to another OS or even a later commercial solution;
✓ One of the big issues of OS software, and of its major hidden costs, is the need of an infrastructure (hardware and network connection) and a place for setting up the system, to maintain the application and check select and install updates. All of these issues are quite unproblematic in our setting, as in the major of schools, there is dedicated IT staff able to take care after of the infrastructure, the installation, maintenance and software application updates.

5.2 Public Target

The target audience of this project was the vocational educators and learners. The vocational educators are collaborators, who along with their students, research, interpret and analyze the information necessary to build the knowledge of students. In this school there are many vocational educators who are resistant to changing paradigms, above all if it is related with new information technologies.

In March of 2007, a survey was conducted through a questionnaire in order to evaluate the skills of vocational educators and learners, the level of information technology as well as their fears and difficulties.

From the 84 educators, who constitute the school faculty, only 71 completed and handed the investigation. The charts below show the profile of trainers on:
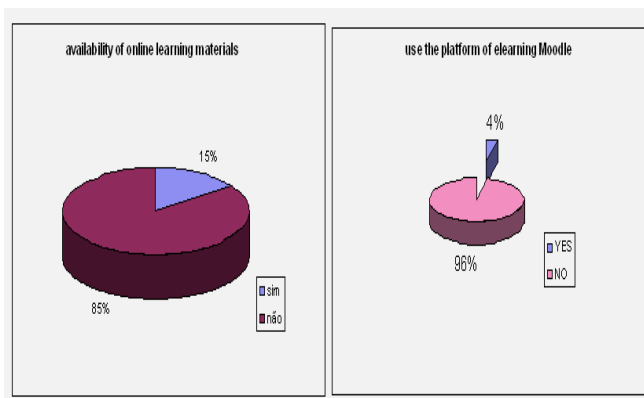
✓ Computer and Internet access from home;
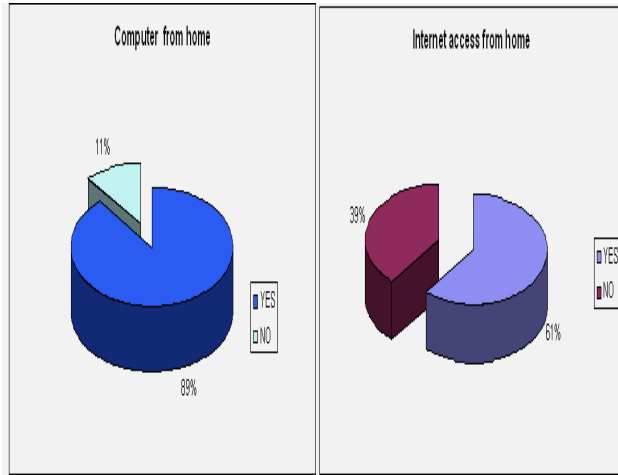
✓ Weekly use average of the computer at home;
✓ Use of ICT's in the preparation of lessons;
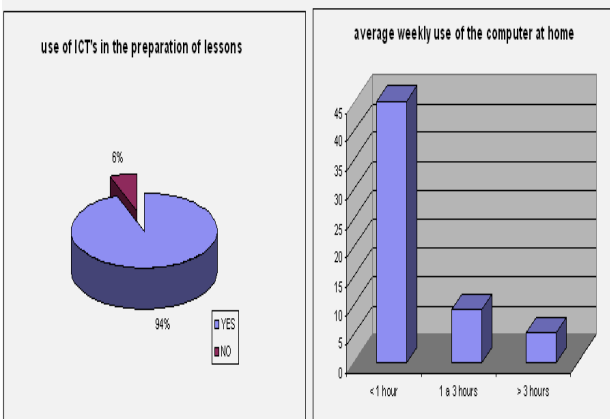
✓ Availability of online learning materials;
✓ Use the platform of e-learning Moodle;

average 49 trainers use computers at least one hour a week, 9 use it from 1 to 3 hours per week and only 5 trainers use more than 3 hours. However 67 of these trainers use the ICTs for the preparation of its contents. Only 11 trainers' offer online content and 3 already use the platform Moodle. For the trainees, the computer is an indispensable tool, allowing the growing use of these technologies to investigate and prepare their work. Students create a good field by using the Internet to search for any subject or use the e-mail as a mean of communication.

6 Moodle Implementation

The platform implementation was carried out by a team, consisting of three vocational educators - a vocational educator was responsible for carrying out the configuration of the platform, creating the groups of subjects as well as creating and recording the disciplines of users; the other two vocational educators were responsible for releasing the contents, interacting with educators and learners.
The platform was installed on a UNIX server and the database chosen was the MySQL(see the figure).
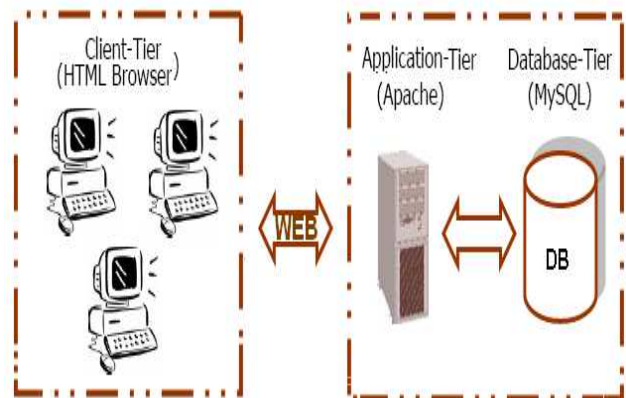
After the installation, which was simple and intuitive, the groups of students were created as we can observe below through figure 4.

Fig. 4- Subjects Groups

Then the subjects were created for IT (Technologies of Information) and Economics. Finally we were created users.

The management of subjects was developed by vocational educators, who are responsible for the content and materials provision. It was necessary to support training for some subjects in the structure of the content and availability of materials, because they were not in digital format. The vocational educators responsible for the ICT subject, due to their experience in using the platform, held a workshop for the entire academic community. The vocational educators designed the content according to some specific norms, such as SCORM.

The content was divided into small units of learning to:

✓ introduce a new concept or idea

✓ give students practice with something they are learning   give students a new experience of a familiar idea

✓ pose problems for students to solve

✓ give students practice at something they are having difficulty with

✓ provide students with a variety of experiences in a learning sequence

✓ assess student knowledge and / or understanding.

So, the content was developed using a Learning Authoring Tool, enabling the creation of multimedia learning objects that can be directly exported to the repository. The curricular units thus produced can be implemented in any e-learning platform that follows the two widely used international standards SCORM and IMS and integrated into a LMS (such as MOODLE or Blackboard) in order to offer e -learning and b-learning programs, and even face-to-face courses with specific curricular units. The next figure, resume the process of e-content creation
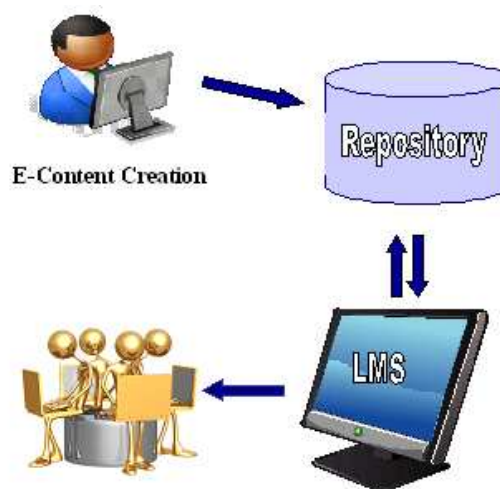

Fig 5 - Representation of a lifecycle in the development of learning content

After submitting the project through Moodle, each submitted project is evaluated. During evaluation we take in four basic pieces of web page design:

✓ Graphical design – coloring of the page from users' point of view, spreading information within window area, lucidity, etc.

✓ Designed web page – easy orientation for new user between other pages of web-site, possibility of easy transition to other pages, etc.

✓ Used technology – the main criteria are functionality of hyperlinks, correct names of files, visibility of images or other used graphics like themes, buttons, other components, etc.

✓ Information content – relevancy of used information (considering to basic concepts and teacher's notes).

7 Promoting, Innovation and Evaluating its Impact

Once the platform had been installed and tailored-made according to the school' needs, the problem was to communicate and promote it within the community, namely educators and students. As a matter of fact, innovations do not automatically spread in the contexts where they are supposed to be adopted, but need to be adequately promoted and communicated[8]: eLearning makes no exception [9]. It must be also considered that the vocational educators do not have economic incentives to integrate technologies into their courses. Despite the low use of the platform it was found that:

✓ students who used the platform have been given a more active participation in class;

✓ students concern themselves with timely access to content;

✓ the greatest access to the platform was made during the afternoon and evening;

✓ communication between students and vocational educators increased;

## 7.1 Students Feedback

Our objective is to "oblige" gain the knowledge of the content of the subject. From this point of view, we are interested in students' satisfaction with the subject as the unit. For this purpose, it was decided to ask them to fill out another questionnaire. The feedback questionnaire had consisted in 10 questions concerning different parts of the subject:

✓ the way and quality of lectures and classes;

✓ the quality of study materials;

✓ communication between teacher and students;

✓ the evaluation methods of different parts of the subject,

✓ the quality of used LMS Moodle.

The student's feedback fulfilling was voluntary, that is why we received only 40 from 150 students. We realize that the number of obtained feedbacks is rather small, but we can present the results only from these submitted ones, as a sampling of our universal sample. Below, we introduce only the most important outcomes of the questionnaire. Each chart contains the individual question as well as participation answers in percentage.
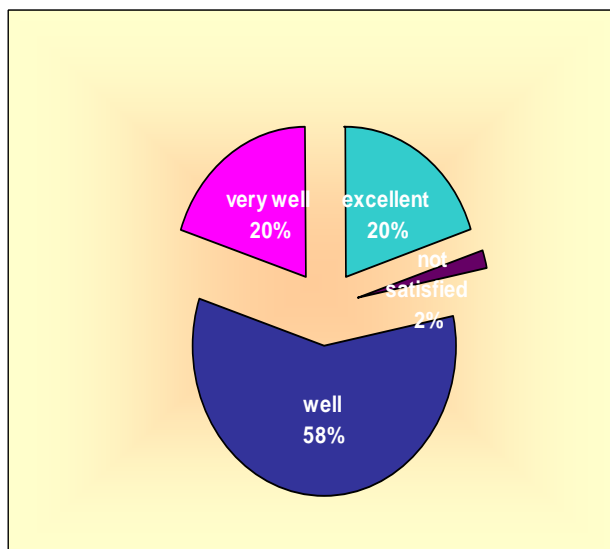
➕ Are you satisfied with the subject content?
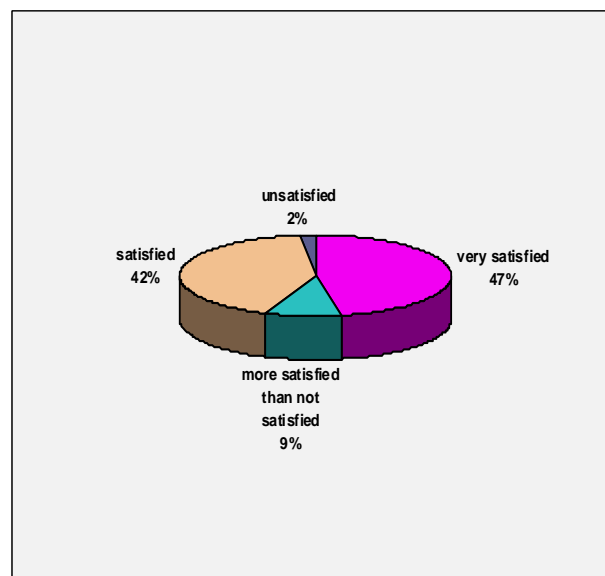
➕ What kind of study materials did you use during your study?
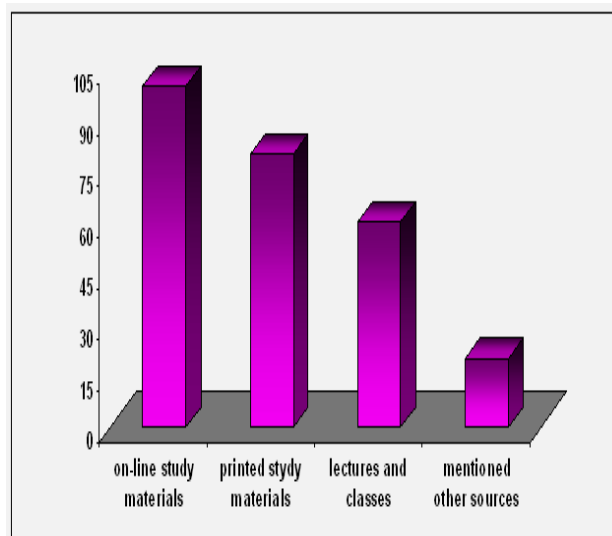
➕ Satisfaction with LMS Moodle and its features.

As it is possible to observe in the following graph, satisfaction with LMS Moodle dominates (89%). But they had suggestions how to improve Moodle. The most frequented suggestion was to add missing "incoming message notification".

Students were satisfied with the content of the subject and the available study materials. They just missed more tests, which can help them to check their knowledge. In the future, we will work on the subject improvement by widening it with more tests and practical exercises to enable students to test their skills continuously during the school year and give them chance to pre-test themselves before the tests at the end of the subject.

8   Conclusion

The Moodle as a platform of teaching/learning management makes   the interaction teacher – student easier as well as the presentation, delivery and correction of works in an virtual classroom environment (available at any moment and potentially in any place, through the Internet).
The use of b-learning demands more time of teacher dedication, because he has to structure and to update the pages. Weekly, the teacher needs to evaluate and comment the individual work developed by the students. It becomes extremely difficult to manage groups with more than 30 pupils per teacher. The students recognize improvements in the learning namely in the work organization and rhythm as well as in the written expression, understanding capacity and assimilation of the matter.

We believe that to be effective, education should engage learners as active participants in their learning. Achieving this means offering learners opportunities to interact in ways that can promote change and growth in the learner's conception of knowledge. Such pedagogies aim to encourage learners to become autonomous lifelong learners, capable of problem solving and critical thinking, and to move them from being passive recipients of information and knowledge to being active, enthusiastic learners and knowledge creators. Moreover, this pedagogy is concerned with building meaningful learning relationships between learners and teachers, and learners and their peers. It involves encouraging collaboration in learning as well as cooperation; the technology appropriation for teaching suggests great opportunities for the promotion of innovative and interactive quality e-learning environments

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