

“The Postman Always Rings Twice”: Evaluating E-Learning Platform a Decade Later

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Abstract—E-Learning represents an effective answer to the continuous request for life-long learning. In fact, this approach allows the flexibility and quality requested by such a kind of learning process. In this scenario, a great number of E-Learning platforms have been introduced on the market and their selection is not a trivial task: various features should be taken into account during the evaluation of an E-Learning platform. Obviously, the analysis of the technical features of an E-Learning platform is not enough: it is also important to understand how it can be integrated in the didactic context in order to facilitate learning and training and what principles are applied to guide the way the system is used. A decade ago, the authors of this paper introduced a model for describing and characterizing on-line learning platform components. Today, the aim of this paper is to evaluate and upgrade this model. During this period, many things have changed in the Web (the introduction of social networks, new multimedia protocols, etc.): what has changed in the E-Learning platforms? Today how to evaluate the E-Learning platforms? In this paper the evaluation model will be updated and then used to evaluate the most known existing platforms.

Index Terms— e-Learning, Computer-Assisted Education, Evaluation

I. INTRODUCTION

Our society is living a transformation, maybe the most important of the latest years, which, through the strong diffusion of the new information technologies, is radically modifying the nature of the relationships among countries, markets, people and cultures. This technological revolution has clearly facilitated the process of globalization – Internet well represents the concept of global village – and the information exchange [13][14].

Information can be considered as an economic good whose value is tightly linked to the amount of knowledge that can give to its users. Gaining new knowledge, competences or skills has determined the need for a continuous update by the actors of the supply chain of the new economy. In fact, in this context, a fundamental service is the life-long learning, or permanent training, which continues all along life and aims at promoting people's fulfilment both at personal and social level. In the learning society – or knowledge society – keeping continuously up-to-date is the essential condition to live in it and follow the changes of our times. In this scenario, the information technologies, the languages, the business management are among the sectors that depend more and more on the on-line training services.

For about twenty years, the ‘e-learning’ phenomenon has largely spread itself in the distance-learning panora-

ma. This reality reverses the paradigm of the old distance education experiences representing the evolution through the technological platforms. These use the Internet and/or the web and the user's monitoring and tracking procedures perfectly integrating the pedagogical and technological aspect for a dynamic learning [15].

Employing the new tools offered by the Web 2.0, the e-learning gives innovative services that make possible the realization of typical aspects of the ‘collaborative learning’ and allow the users to have an efficient on-line ‘conversation’. The students can leave the old role of users who received information with a top-down approach, to assume a new position of talkers, of people who interact among them creating and exchanging culture [16][17].

Currently, the e-learning market is very wide and has four areas of research and development: technology, contents, services and consultancy. The map of the diffusion of the e-learning in the world shows – both in terms of users and turnover – the United States in the highest position, closely followed by the United Kingdom and the Northern Europe countries (Sweden, Finland and Norway).

In an e-learning market that is full of several solutions, the choice of an institution or an enterprise of undertaking a process of distance training is obviously not easy. The attention is focused on the development of training models based on two fundamental aspects: pedagogical and technological [18]. In the first case, it is necessary to clearly define how to structure the new training processes and their contents and how to distribute these contents according to the consumer. The technological aspect, instead, aims at creating new tools for the distribution of knowledge that reproduce as much faithfully as possible the pedagogical models for the education [19].

The purpose of this work is offering a methodology of evaluation and choice of the distance training environments and highlighting the functionalities that they offer in support of the constructivist collaborative learning. Moreover, this analysis aims at underlining how the distance-training world has changed after more than ten years from the previous work [12]. In fact, at that time, we carried out a similar study obtaining a series of interesting results. After a decade, what has changed? How have the new technologies linked to the Internet influenced the distance-training world?

To answer these questions, first of all, we will present an overview about the basic concepts of the e-learning and then a detailed description of the main characteristics of the analyzed platforms. The analysis makes a comparison among the examined platforms through a series of specifically developed evaluation grids.

II. THE EVOLUTION OF THE E-LEARNING PLATFORM

The on-line learning environments define the distance learning and the transmission of knowledge through the Web. The e-learning uses the multimedia technology and the learning characteristics of new media, such as interactivity, dynamicity and personalization of the training path. Some tools, like chat, e-mail, forum, mailing list, give the possibility of interaction among teachers, tutors and students. The communication and interaction among these actors can be synchronous or asynchronous. This distance learning, also known as fourth generation distance learning, creates processes of collaborative learning thanks to on-line networks. The impact of the technology on the learning, training and education has generated e-learning models [20]. Today the most used and widespread types are three:

- Content + Support (Erogative), which is the most common type, characterized by the separation between contents and tutorial support. This model is mainly oriented to the individual learning;
- Wrap Around (Active), which gives wide freedom to the students in the planning and evolution of their own education process. The learning is an ‘active construction’, based on sharing and collaboration;
- Integrated or Collaborative, which improves some aspects of the previous model. The virtual classroom and the sharing-collaboration become fundamental.

The main features of these types of technologies are the easy upgradability, the high flexibility and the multiple possibilities of personalization. The e-learning platforms, present today on the market, have a pedagogical approach based on a constructivist model that stimulates the students to construct and create their own training and learning path. When building a platform, there are three essential elements to consider: the contents associated to the courses, the activities tracking and the architectural infrastructure. A distance platform is organized into three macro areas: a Learning Management System (LMS), a Learning Content Management System (LCMS) and Tools to distribute contents and facilitate the interaction.

The Learning Content Management System (LCMS) is the module for the management of the contents present in a platform. In this system, there are all the functionalities and services that allow the creation, description, import/export and management of the contents generally organized in independent containers, called learning objects. An advanced LCMS has to be able to record all the interactions of the user with the several learning objects. On the other hand, the Learning Management System (LMS) is made up of a set of services about the management of the on-line training activities. In particular, its functionalities are:

- student management
- course management
- student skill assessment
- student activity monitoring and tracking
- activity reporting.

Often, LMS and LCMS work together, dealing with both the contents and the user and course management. The learning objects, which, as already stated, are little reusable education units of knowledge lasting 4-5 minutes, are characterized by auto-consistency, modulari-

ty, availability, reusability and interoperability. They are created on the basis of a standard of reference that is SCORM (Shareable Content Object Reference Model).

Inside a distance learning system, we can identify different actors with different specific tasks and competencies. The administrator looks after the course delivering and the maintenance of the system. They supervise the technological infrastructure looking after its right functioning. The teacher is expert of the contents and gives information about the topics of the courses. The tutor is an on-line mediator who facilitates, supports and guides the on-line learning, helping the groups to achieve their objectives. Finally, the students are the final users and have today a more active and collaborative role in their own learning process [11].

Currently, the revolution of the Web 2.0, with a more collaborative orientation, affects the on-line learning too. It replaces the previous models of linear surfing, entirely revolutionizing the methodologies and the tools of the traditional didactics. Today, the key words are participation, sharing, collaboration and interactivity. The users have become active protagonists in the use of the Web. They do not only receive information, but they create and share contents. The Web 2.0 has four main components:

- It is a platform supplying services by the browser;
- The diffusion of applications and Social Software with whom the user can create, share, publish and spread contents and information;
- There are new systems of information classification and collaborative research using key words (tags);
- The Social Networking that creates relationship and contact networks.

These new ways of learning have transformed the e-learning too, become e-learning 2.0. It is a collaborative learning system supported by computer, where knowledge is socially built. The methodologies and the tools of the new generation distance learning are more and more oriented to the collaborative education, putting the users in the center of relationships and making them active participants and knowledge builders. They have flexible learning solutions, having the possibility of choosing the didactic process, without space and time limits, but, above all, they create new knowledge and contents to share on-line. In this context, the learning object is continuously fragmented and rebuilt thanks to the collective and collaborative elaboration with new participative technologies [22] in a highly social and interactive environment.

III. AN EVALUATION MODEL FOR E-LEARNING PLATFORM

An evaluation model is necessary to highlight the pedagogical and technological aspect of the education process. The evaluation of the quality of an on-line platform is based on three principal macro-categories, which are the Web surfing, the contents and the learning evaluation [21]. These criteria aim at verify if the services that an efficient distance learning platform should offer are implemented. Briefly, these benefits are:

- Web surfing easiness and personalized training courses;
- Information availability;

- Continuous update following the evolution and progresses of the life-long learning;
- Constant check of the students' learning.

There are several evaluation methods to determine the level of quality and competitiveness of an on-line platform. In this survey, we have used some evaluation grids about the different pedagogical and technological features of the analyzed LMS. Consequently, from the examination of these grids, some indexes have been calculated in order to show the current state of art with reference to the significant sample of existing commercial platforms taken into account in this study.

Analyzing the pedagogical aspect, the offered services start from a division between the student's environment and the teacher's one, that provide different functionalities. However, in both the environments, the tools can be divided into two essential categories:

- Asynchronous communication tools
- Synchronous communication tools

The tools belonging to the first category are e-mail, forum, blog and newsletter, fundamental elements that give the possibility to solve the problem of a lack of simultaneity in the communication among the interlocutors. On the other hand, the synchronous tools are textual, vocal or video chat, whiteboard, progress tracking, audio/video streaming (videoconference) and visual classroom. The simultaneous interaction gives the opportunity to re-create the traditional classroom environment but making distance activities and opening the pedagogical approach to a collective and collaborative interaction.

In addition to these aspects, other tools differentiate the student and teacher's environments. In fact, in the student's environment, the following tools allow the access to the contents:

- Content search engine;
- Available/personal courses catalogue;
- Agenda.

Moreover, the evolution of the World Wide Web towards a more dynamic and collaborative environment, where users' interaction plays a fundamental role, has led to the development of several tools aimed at facilitating collaborative learning. Such tools are:

- Feedback;
- Tag;
- Wiki;
- Podcasting;
- Social networks (Facebook, Twitter, Skype);
- Media sharing platforms (Flickr, YouTube, Vimeo, Google).

With the Web 2.0, the concept of Open Content opens the path to free and shareable contents.

With reference to the teacher's environment – divisible into two macro-areas, teachers/authors and administrator – in addition to the asynchronous and synchronous communicative tools, it has different functionalities and tools concerning the course content management and the students' management. In the category of the course content management, we can find:

- Course indexing;

- Multiple course management;
- New course creation;
- Course catalogue;
- Content importation with different formats;
- Standard contents (IMS, SCORM) using authoring tools;
- Course report;
- Reports on course frequency and utilization;
- Documents sharing;
- Glossary;
- Syllabus;
- E-Portfolio;
- Etherpad;
- Library.

These elements are employed by the teachers to create the contents of the courses and deliver them.

The second category relating to the teacher's environment is the students' management, linked to the administrator figure. It is characterized by these tools:

- On-line registration;
- Student groups' creation and management;
- Subgroups;
- Test creation;
- Reports on test results;
- Role assignment.

These functionalities aim at organizing and coordinating the entire process of registration and fruition of the learning platform.

All these tools have taken the on-line learning towards a new frontier, characterized by a more pedagogical, participative and active approach.

On the basis of these considerations, we have developed four macro areas about the parameters of interest:

- System requisites;
- Training management;
- Students' management;
- Offered services.

For each of these macro areas, we have created grids and tables to better show the fluxes and the trends of the analyzed platforms. Moreover, three indexes – collaborative, management functionality and global – have been defined with the aim of valuing the overall of the process of distance learning in each of the analyzed platforms.

IV. ANALYSIS OF THE EXAMINED PLATFORMS

In this paragraph, we show the outcomes of the comparative analysis carried out on the main existing platforms for on-line learning, to state the current situation in this field. The examined platforms are the following:

- .LRN [1]
- ADA [2]
- ATutor [3]
- Claroline [4]
- Docebo [5]
- ILIAS [6]

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- Moodle [7]
- Sakai [8]
- Blackboard [9]
- SumTotal [10]

The first eight platforms are open source while the latest two are proprietary. The analysis of these platforms has been carried out by comparing the parameters defined in the previous section.

Firstly, we have established the system requisites, which are web-based, modularity and portability. Such requisites are linked to four main functions – communication, information sharing, information access and cooperation – that characterize both the pedagogical and technological approach. A web-based platform simply uses a web browser (Safari, Internet Explorer, Mozilla Firefox, etc.) to access the system, so it does not need to install anything on the computer. This allows the user to employ the system interacting from everywhere and they only need a basic knowledge in computer science to use it, avoiding complex installations of proprietary software. Thanks to the portability, instead, the system can be used on any other platform different from the one has created it. A portable system runs on any machine and operating system. Finally, the modularity gives the platform an architecture characterized by a set of learning modules, linked among them. This feature gives a wide flexibility to the system, allowing adapting it to the user's different needs.

All the platforms are modular and web-based. About the portability, they work on several operating systems.

Some indicators have been determined to evaluate the positive and negative aspects of each platform. The first parameter is the analysis of synchronous and asynchronous communicative tools, examined both for the student's and for the teacher's environments. This comparison gives a uniform and homogeneous framework about the degree of interaction between students and teachers that the platform makes possible.

The necessity to communicate, have a confrontation and operate together in these fields is an essential aspect for the development of LMS/LCMS systems. As we can see from Table I, all the tools are supported by all the platforms, giving a homogenous context.

As already stated, the Web 2.0 tools are fundamental for the distance learning. In the following chart, we can see the use or the lack of these elements in the examined platforms.

Table II shows that some services, like Feedback, Blog, Forum, Podcasting, Tag and Wiki, are supported by all the platforms. While Skype is supported only by Claroline, Blackboard, Moodle and Sakai. From these results, it is possible to see that Moodle and Sakai are the only open source platforms to be afraid of the competition with the proprietary Blackboard that has all the tools for the development of social networks. ATutor, Docebo and ILIAS are at an intermediate position, while SumTotal and ADA have a considerable delay in the development of the Web 2.0 characteristics about the social networks.

As examined for the student's environment, a similar analysis for the communication tools in the teacher's environment have been performed. In particular, we considered only the asynchronous and the synchronous commu-

TABLE I.
EVALUATION GRID FOR STUDENT'S ENVIRONMENT (S SUPPORTED
CHARACTERISTIC – NS NON-SUPPORTED CHARACTERISTIC – PS
PARTIALLY SUPPORTED CHARACTERISTIC)

	.LRN	ADA	ATutor	Blackboard	Claroline	Docebo	ILIAS	Moodle	Sakai	SumTotal
Asynchronous communication tools										
E-mail	S	S	S	S	S	S	S	S	S	S
Forum	S	S	S	S	S	S	S	S	S	S
News	S	S	S	S	S	S	S	S	S	S
Blog	S	S	S	S	S	S	S	S	S	S
Synchronous communication tools										
Chat	S	S	S	S	S	S	S	S	S	S
Virtual Classroom	S	S	S	S	S	S	S	S	S	S
Whiteboard	S	S	S	S	S	S	S	S	S	S
Audio/Video Streaming	S	S	S	S	S	S	S	S	S	S
Content access tools										
Search engine	S	S	S	S	S	S	S	S	S	S
Available personal course catalogue	S	S	S	S	S	S	S	S	S	S
Agenda	S	S	S	S	S	S	S	S	S	S

TABLE II.
EVALUATION GRID FOR THE WEB 2.0 SERVICES (S SUPPORTED
CHARACTERISTIC – NS NON-SUPPORTED CHARACTERISTIC – PS
PARTIALLY SUPPORTED CHARACTERISTIC)

	.LRN	ADA	ATutor	Blackboard	Claroline	Docebo	ILIAS	Moodle	Sakai	SumTotal
Tools Web 2.0										
Facebook	S	NS	S	S	S	S	S	S	S	NS
Feedback	S	S	S	S	S	S	S	S	S	S
Chat	S	S	S	S	S	S	S	S	S	S
Blog	S	S	S	S	S	S	S	S	S	S
Forum	S	S	S	S	S	S	S	S	S	S
Tag	S	S	S	S	S	S	S	S	S	S
Youtube	S	NS	S	S	S	S	S	S	S	S
Vimeo	NS	NS	S	S	S	NS	S	S	S	NS
Podcasting	S	S	S	S	S	S	S	S	S	S
Skype	NS	NS	NS	S	S	NS	NS	S	S	NS
Twitter	S	NS	S	S	NS	S	NS	S	S	NS
Google	NS	NS	S	S	S	S	S	S	S	S
Flickr	S	NS	S	S	NS	NS	S	S	S	NS
Wiki	S	S	S	S	S	S	S	S	S	S

nication tools. Also in this case, all the tools are supported by all the systems.

According to what we have underlined in the previous section, the teacher's environment has also a second category: the management and administration area. For this section we show a chart based on the tools employed in the course content management and students' management.

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The situation is homogeneous enough, although the category of ‘subgroups’ is supported only by .LRN, ADA and Moodle.

From these considerations, it is clear that some tools have to be present for a good and efficient on-line learning platform. These elements are:

- E-mail;
- Chat;
- Blog;
- Forum;
- News;
- Feedback;
- Virtual classroom;
- Whiteboard;
- Audio/video streaming;
- Agenda;
- Contents search engine;
- Integrated authoring tool;
- Library;
- Glossary;
- Diary;
- Bookmarks;
- FAQ;
- Wiki;
- Register;
- Etherpad;
- E-portfolio;
- Syllabus;
- Certificates;
- Statistics.

The just mentioned tools are present in the examined platforms as noticeable by Table IV, which shows a rather uniform presence of the tools in each platform.

From these data, we can affirm that the consolidated tools of a virtual learning environment are guaranteed by all the considered platforms. In fact, in particular, e-mail, chat blog, forum, agenda, news, virtual classroom, audio/video streaming, web conference, feedback, glossary, search engine, wiki, register, statistics and library are on average equally offered by all the systems, being fundamental elements. Once again, Sakai has all the listed tools, while Moodle lacks in a module for the syllabus.

It is important to take into account that not all the functionalities offered by these platforms are proprietary. Therefore, their availability depends on the acquisition from other products of the lacking services.

Furthermore, it is necessary to compare how many services are offered by a platform and how many others are instead acquired by other products. The situation between these two elements is shown overall in the graph of figure 1.

A great advantage of all the open source LMS is that there is a continuous development of new functions, even if, on the other hand, there is the very likely possibility of an extreme presence of any type of features that requires, then, an intervention of reshaping, often neglected.

TABLE III.
EVALUATION GRID FOR THE TEACHER’S ENVIRONMENT: MANAGEMENT AND ADMINISTRATION

	.LRN	ADA	ATutor	Blackboard	Claroline	Docebo	ILIAS	Moodle	Sakai	SumTotal
Course content management tools										
Course indexing	S	S	S	S	S	S	S	S	S	S
New course creation	S	S	S	S	S	S	S	S	S	S
Course catalogue	S	S	S	S	S	S	S	S	S	S
Content inclusion	S	S	S	S	S	S	S	S	S	S
Content import/export	S	S	S	S	S	S	S	S	S	S
Standard contents	S	S	S	S	S	S	S	S	S	S
Content sharing	S	S	S	S	S	S	S	S	S	S
External link addition	S	S	S	S	S	S	S	S	S	S
Application sharing	S	S	S	S	S	S	S	S	S	S
Course report	S	S	S	S	S	S	S	S	S	S
Students’ administration tools										
User’s registration	S	S	S	S	S	S	S	S	S	S
Users’ list	S	S	S	S	S	S	S	S	S	S
Role assignment	S	S	S	S	S	S	S	S	S	S
Groups creation	S	S	S	S	S	S	S	S	S	S
subgroups	S	S	NS	NS	NS	NS	NS	S	NS	NS
Test and survey creation	S	S	S	S	S	S	S	S	S	S
Report on tests and surveys	S	S	S	S	S	S	S	S	S	S

TABLE IV.
AMOUNT OF AVAILABLE TOOLS

Platform	Number of available tools
.LRN	22
ADA	20
ATutor	22
Blackboard	21
Claroline	19
Docebo	21
ILIAS	22
Moodle	24
Sakai	24
Sumtotal	20

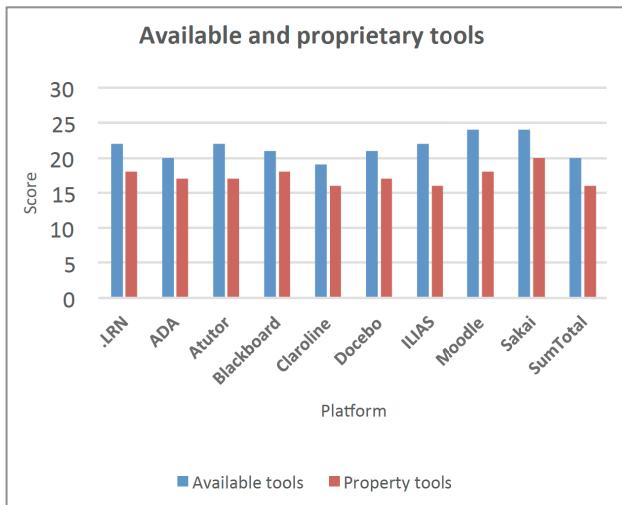


Figure 1. Comparison between available and proprietary tools.

V. COMPARATIVE ANALYSIS

At this stage, our comparative analysis has progressed with three indexes: the collaboration index, the management functionality index and the global index. These indexes are developed on the use of some tools which, facilitating the communication (e.g. chat, video conference, etc.), create an optimal collaborative environment. Each of these tools has a specific weight (0 to 3) to evaluate their importance. The highest weights have been given to those avant-garde tools that facilitate the real-time communication: 3 has been assigned to applications sharing, audio/video streaming, whiteboard, virtual classroom, Google, Facebook, Twitter, Flickr, Skype, YouTube and Vimeo. 2 has been given to tag, etherpad, podcast, contents downloading and wiki. 1 has been attributed to e-mail, chat, forum, blog, news, agenda, library and glossary as they are all more common and easily implementable tools. The collaboration index IC is defined by the relation between the total of the weights of the single platforms and the total of the weights of all the tools.

IC (collaboration index) = platform's collaborative tools / overall collaborative tools

The graph in figure 2 shows the values of the IC for the examined platforms.

The majority of the examined platforms offers collaborative and stimulating distance learning environments. Moodle and Sakai have all the tools and even pass the competitor Blackboard that has not the etherpad. ILIAS is penalized by the absence of Twitter and Skype. .LRN and SumTotal have a same insufficient use of social networks tools, while ADA has the lowest score in terms of social networks.

The second index is the management functionality index IFG, relating to other fundamental functionalities, which should be present in an on-line learning platform. These services are defined ‘management functionalities’ and facilitate contents, courses and students management and administration. Among these, the most important are:

- Progress tracking;
- Multiple course management;
- Students' groups creation;
- Subgroups creation;

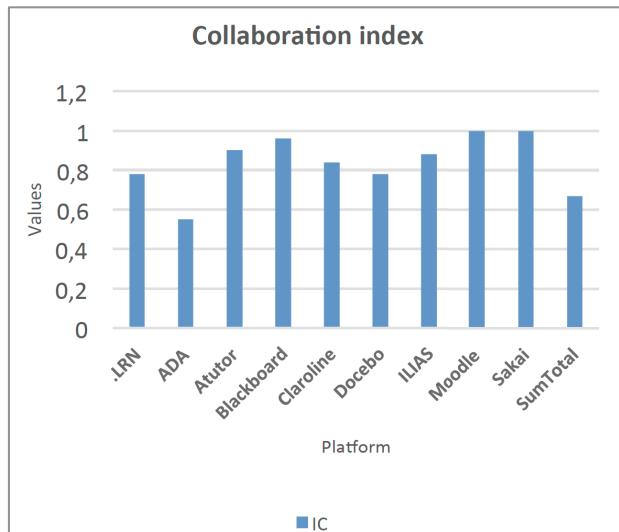


Figure 2. Collaboration index

- Content inclusion;
- Content sharing with other teachers;
- Content importation;
- Standard content importation (IMS, SCORM);
- Multiple course creation;
- Course indexing;
- Reports on course frequency and utilization;
- Test creation;
- Course catalogue;
- Multiple choice tests;
- Reports on test results;
- On-line registration;
- Role assignment.

Also for this index, we have assigned weights to the functionalities: only the progress tracking has 3. 2 has been attributed to multiple course management, students' group creation, subgroups creation, content sharing, content importation, frequency reports and reports on test results. 1 has been assigned to content inclusion, standard content importation, new course creation, course indexing, test creation, course catalogue, multiple choice tests, on-line registration and role assignment. The IFG index is defined by the relation between the total of the weights of the single platforms and the total of the weights of all the services.

IFG (management functionality index) = platform's management tools / overall management tools

The graph in Figure 3 shows the situation of the analyzed platforms with reference to this index.

The functionality index results to be irregular with .LRN, ADA and Moodle with the highest value and the others with a largely lower value because of the lack of the possibility of creating students' subgroups. On the basis of the other functionalities, instead, all the platforms present an overall balance. According to what has been analyzed until now, the definition of a global index IG is necessary to consider how both the aspects of collaboration and functionality are combined and integrated in each platform.

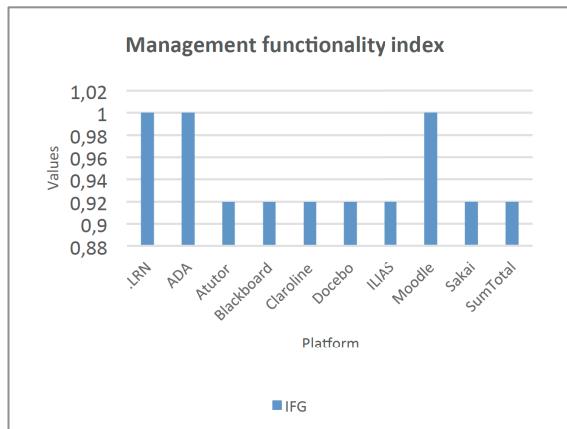


Figure 3. Management functionality index

The global index is defined by the arithmetic average of the IC and IFG of the single platforms.

$$\text{IG (global index)} = (\text{IC} + \text{IFG}) / 2$$

The overall values are exemplified in Table V.

The general situation of all the examined platforms about the global index is illustrated in the graph in Figure 4.

The figure 4 does not present particular disparities among the LMS/LCMS systems taken into account. This depends on the fact that each of them makes an effort to deliver a quality on-line learning system, trying to meet the users' needs and to identify themselves in a highly competitive worldwide market. It is immediately noticeable that the platforms with the most numerous functionalities are Moodle, Sakai and Blackboard, offering an efficient system for the resource management, advanced tools for the synchronous collaboration and more integrated social applications. Once again, ADA and SumTotal represent the weakest platforms with reference to the quality of the available functions.

VI. CONCLUSION

The purpose of our work has been the analysis of the most famous and used e-learning platforms present on the market. We have examined eight open source platforms and two proprietary ones to show the current state of art. The analysis wanted to evaluate the quality of the distance training environments using an evaluation model capable of highlighting the differences and their strength and weakness factors.

As seen, the main components of a platform dedicated to the on-line learning are:

- Learning Management System (LMS);
- Learning Content Management System (LCMS);
- Content delivering and fruition services.

An efficient platform has to be able to integrate all these components, making them interact. As already stated, it is necessary to remember that a good system has to be characterized by portability and modularity and be web-based. All the examined platforms present these features giving a uniform situation thanks above all to the competitiveness of the current market, constantly asking for high quality standards.

TABLE V.
IFG VALUES.

Platform	IC	IFG	IG
.LRN	0,78	1	0,89
ADA	0,55	1	0,78
ATutor	0,9	0,92	0,91
Blackboard	0,96	0,92	0,94
Claroline	0,84	0,92	0,88
Docebo	0,78	0,92	0,85
ILIAS	0,88	0,92	0,9
Moodle	1	1	1
Sakai	1	0,92	0,96
Sumtotal	0,67	0,92	0,8

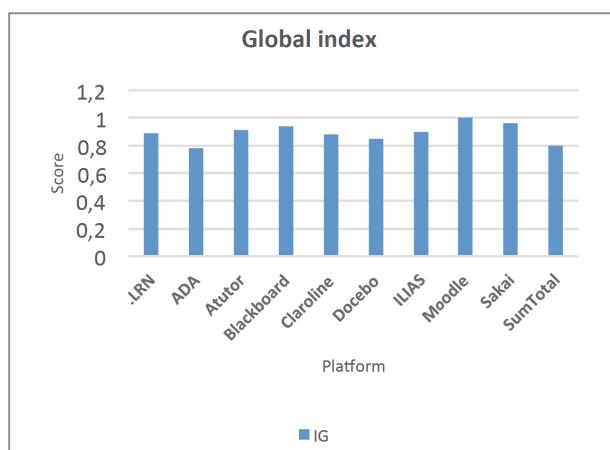


Figure 4. Global index.

Contents and functionalities management is an essential point for a right building and implementation of these platforms. The management functionalities are fundamental for the teachers who need a constant monitoring of students and course progresses. The services, instead, have the purpose of increasing the collaboration among the users. We have noticed that, besides the use of the already consolidated tools such as e-mail, chat and forum, present in each on-line learning platform, today the most important tools are those that facilitate the synchronous communication (e.g. virtual classroom) and those linked to the Web 2.0 (e.g. wiki, blog, podcasting, tagging, social networks, YouTube and Google).

The evaluation of the indexes (collaboration index, management functionality index and global index) has underlined a substantial uniformity among the different platforms. In fact, the examined LMSs do not present peculiar divergences thanks to their efforts to guarantee a quality product and to satisfy users' and market requests.

As it can be deduced from our analysis, we can state that the platforms with more functionalities are the open source Moodle and Sakai and the proprietary Blackboard, which, with an efficient system of resources management, offer advanced tools for the synchronous collaboration and many integrated social applications such as Twitter, Skype, YouTube, Flickr and Facebook. Especially for the open source platforms, it is clear the will of implementing the use of collaboration and social relationship services, following the Web 2.0 revolution. This new approach indicates the separation line between today's e-learning and that of a little more than ten years ago, when the interactive and participation aspect was not so peculiar. Nowa-

days, with the explosion of the world of social networks and interactive and collaborative online systems, the way the distance training and learning is considered has deeply changed, opening the path to a new pedagogic approach, mostly based on the synchronous communication and on the collaborative fruition, recreating the same environment of the traditional classroom, even if from different places.

This current tendency has encouraged some platforms to revise their contents and offered services. In particular, for example, .LRN and Claroline have activated some renovation processes. .LRN points to integrate resources like Flickr, Google, Amazon and YouTube. While Claroline wants to create, along with Spiral Connect, a platform of new generation named Claroline Connect, interconnected with the worldwide web.

For the moment, the most powerful and efficient online learning platforms are Moodle, Sakai and Blackboard with an optimal set of content and functionality tools, combining more traditional features and more participative and co-operative elements. On the contrary, the weakest systems have resulted to be ADA and SumTotal with a poor supply of some tools, even if the quality of their offer is not so low. They are penalized above all by a poor presence of tools connected to the world of Web 2.0, essential in today's distance training, strongly characterized by needs for collaboration, interactivity and participation, given in particular by synchronous communicative tools.

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