# SocialWire: Social Software for Informal Learning

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**Abstract.** Despite the fact that online social networks (OSN) are widely recognized as a powerful vector for adding a new social dimension to the learning management systems (LMS), OSNs do not fully integrate the specific features of the learning process yet. In this paper, we report the design and implementation of a software platform that leverages on the basic capabilities of an OSN and extends the functionality toward its use in education. It does so by the embedding of a variety of collaborative activities of informal nature, jointly with tailored assessment procedures and an associated reputation system for the users. The latter is essential in order to foster the students' engagement and improve their learning performance. This software system, though still work in progress, has been in use for two years in different subject areas. The outcomes and the feedback provided both by teachers and students are encouraging.

## 1 Introduction

It is with some delay compared to how other fields in the society and the economy have adapted, but it finally seems that the profound changes driven by the information technologies are reshaping the education system, even higher education. The move is universal, only its pace varies, and it is motivated from both the supply and the demand sides. The new cohorts of university freshmen comprise students who consume and produce digital contents as habits of their lives. Similarly, the learning materials they are exposed to are increasingly based on audiovisual contents, or on the intensive use of computer simulations for studying more easily many complex systems in every imaginable academic discipline. In the end, the Internet has substantially lowered any barriers, either physical, economic or social, against the open access to quality education. The popularity of many online LMSs (e.g., Moodle), used as tools for organizing courses and students, and the recent surge of MoOCs (Massive online Open Courses) supported by the best universities in the world are two signs of this trend (see the Coursera or edX initiatives [1, 2]). The majority of the software tools developed to aid in these online learning processes exploited the nearly limitless possibilities that web technologies offer to link distributed documents, transfer them efficiently to the users, and display the information through a graphical interface consistent across devices. However, those tools assume that the underlying learning process remains unaltered, namely it is still a student-based effort, rigorously constrained by the instructors' decisions. Consequently, several works have pointed out that the efficacy with such approach depends mostly on the (prior) existence of strong willingness to learn in the students.

So, if the social dimension is not incorporated into the learning platforms, it is likely

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that online education will be relegated to reach students in remote areas, to be narrow-focused toward highly specialized fields or to be useful only to self-motivated persons. Pertaining to a cohesive group (in the real world or in a virtual environment) not only reinforces the experience of learning, but also turns out to be a key factor for the activation of informal learning processes [3–5]. These happen when the goal is to assimilate the non-explicit knowledge that spontaneously flows among the group members, related to the skills and command of a given subject. For instance, the typical approaches in problem-solving, the de facto professional practices, and so on. In summary, an effective social network speeds up the task of learning those contextual skills, by means of behavioral emulation or by mutual recommendation, where recommendation applies equally to people or to items of content [6].

OSNs over Internet form a powerful environment to add a desirable social dimension to more traditional online learning systems. But, since the design of typical LMSs does not have a clean interface with OSNs, integrating the capabilities of a OSN into a learning platform is not entirely trivial. In this work, we describe the architecture and development of a software system [7] that extends the basic functionality in ELGG [8] —a popular, open source software engine for building OSNs— and enables the use of informal learning processes mentioned above. This enriched hybrid of OSN-LMS may also be useful for enhancing the generic skills of the students, for instance their criticism or leadership skills [9]. Nonetheless, that is not the primary benefit, in our view. Rather, we envision the system as an enabler to design and execute informal learning activities. These informal activities are of wide scope, but share some common features: i) they are specific activities, not necessarily formal, like answer a question, seek more information about a topic, participate in a challenge, etc.; ii) informal learning activities are measurable, in that every task of this kind must produce a deliverable (a piece of text, a report, a list of information resources, a computer program,...); iii) informal learning activities are open, in other words, there is possibly more than one valid response or deliverable object to them. In contrast, one should keep in mind that formal contents already have well-defined assessment procedures in current LMSs.

Preliminary tests of SocialWire in a real environment are being carried in our college, among undergraduate students in subjects of the Communications Engineering curriculum. Nonetheless, aside from our personal focus on engineering education, the design of the tool is neutral and generic and it might be useful in any other field. As a previous step, we have presented it to a group of e-learning experts to get their opinion. The feedback obtained encouraged us to enhance the initial functionality presented in [10] and develop new modules.

In the rest of the paper we describe the main components of the software system. The functionality of the ELGG OSN engine is briefly reviewed in Section 2, for completeness. Section 3 gives the details of a number of software modules that, as plugins, have been developed and tested to fulfill the requirements of social interactions in our platform. In Section 4 we report some results obtained with the use of the system. Lastly, Section 5 summarizes the main conclusions gathered after using the system.

## 2 System Overview

SocialWire, our OSN-enriched learning platform, is based on ELGG, a widely used open source OSN engine.

The core of elgg uses a unified data model to manage the different objects that can exist in the ecosystem of an OSN (users, messages, posts, etc.). The basic and more general attributes of any object are enclosed in the class ElggEntity, but the extensibility and flexibility of elgg relies on three other classes for the purposes of linking objects, tuning their attributes and define actions to execute on object instances. Specifically, class ElggRelationship can connect virtually any two objects. The connection entails a relationship between the two, it could be friendship, sharing information, membership to a common group or something alike. Particularization of the attributes that describe an object is done via objects in Class ElggMetadata. The semantics of the new attributes is not constrained, so most of the flexibility in elgg comes precisely from this type of object. Finally, the actions that are to be executed on a given object can be defined with class ElggAnnotation, giving the users the privilege of modifying the objects' behavior and add more actions.

Thus, by combining objects in those classes, elgg can be extended easily into an online social environment oriented toward educational applications and informal learning. We did so, developing several software modules to support the outlined functionality. Each module is actually a plugin, a companion software piece to the elgg core that handles the new classes an objects devised to convert the original platform in a OSN-based learning product. The interaction between those plugins and the core takes place through message-passing of events, actions (hooks and callbacks) and views. Actions and events are code scripts invoked as a result of the users' actions in the interface. Together, events drive the internal state of the OSN, understood here as a finite state machine, whereas actions are the responses generated by a chain of events. In turn, views define the way objects are exactly rendered or presented to the users. Thus, views are essential to manipulate objects in a organized, systematic way.

A shortcoming in the elgg engine is its lack of support for subgroups, i.e., communities of students undertaking the same tasks, assignments or with shared interests. Thus, we extended elgg to allow the creation of arbitrary subgroups within a parent group. Membership to a subgroup entails access to the same capabilities as in the larger groups, only with a restricted audience, duration, etc.

The description of the several modules (plugins) that comprise SocialWire is the matter of the next Section.

## 3 The Software Modules

### 3.1 Questions and Answers

This plugin's functionality is fairly obvious: some user pose questions and other users in his/her group may attempt a response. Answers are curated either by teachers or by other group members.

The workflow of question creation is part in the design of this plugin. To be specific, both students or instructors can be authors of a question in a group. In the former case, the question ought to be approved by an instructor, who also assigns points to it according to his/her judgement. When the question appears open, a period to provide answers starts. That time period can be definite or indefinite, depending on parameters used at the creation time. And the answers can be either individual or collective. While open, any answer uploaded can be edited or corrected by its authors, unless the answer has already received an evaluation by the instructors. In this case, the particular answer is closed (it remains visible) and becomes inmutable.

Points awarded to a question or to an answer serve two purposes simultaneously. First, to classify questions and answer, that is, using the points as a measure of relevance/importance of that item. Indeed, the plugin can display a thread of answers not by chronological order, but by relevance or ranking order. Second, points awarded to a question or an answer are meant to be distributed among its authors, using rules defined elsewhere. Consequently, this plugin interacts with a generic ranking plugin, one that collects the points assigned to tasks in any other plugin, sorts the scores by user (or subgroup) and, ultimately, builds a reputation for every user in the group.

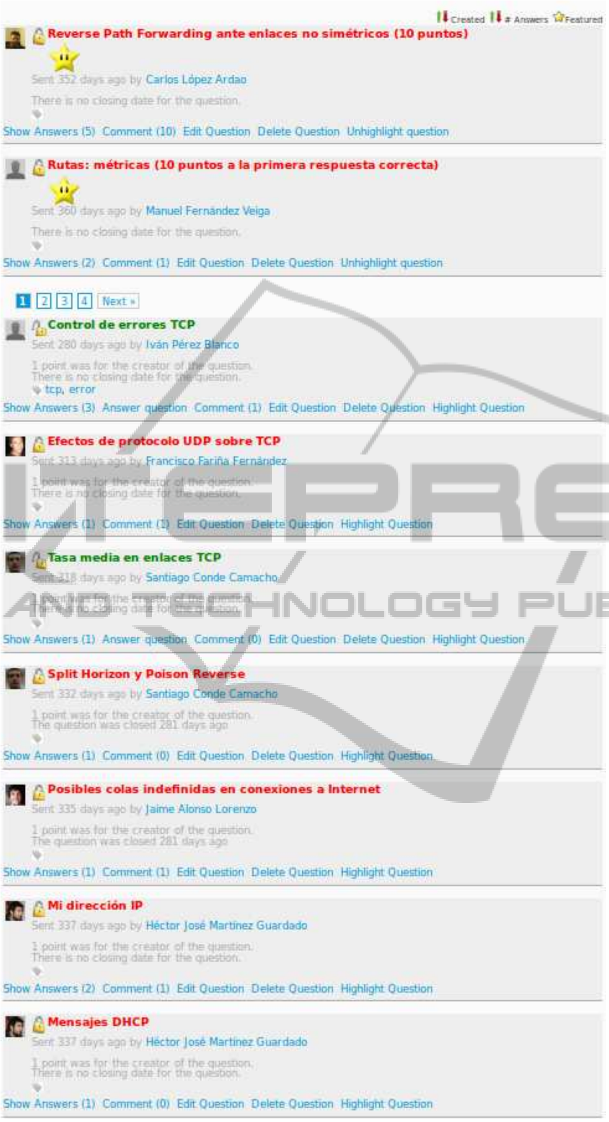
Visibility of questions and answers is under direct control of the instructors, as a primary mechanism to restrict inaccurate, vague or misleading threads of discussion. As an illustration, Figure 1 shows the appearance of the questions and answers plugin.

### 3.2 Challenges

Challenges are in SocialWire synonymous of strategic games. More clearly, a challenge is in our view any proposed activity asking for hints, ideas, full solutions or suggestions to a complex problem, one with a nontrivial or non-unique answer. Without loss of generality, when we identify challenges with strategic games, we are taking the assumption that challenges are always cooperation (and not competitive) games, i.e., the goal of a challenge is to achieve collectively an approximate solution to a difficult question. Hence, there are not incentives for confusing, misguide or take profit from other participants.[1] As before, a challenge can receive answers during a definite or an indefinite time period, as the authors decided. But, being intrinsically open, challenges are graded differently than ordinary questions. Here, the answers do not receive points while the challenge is open to new contributions. Instead, after the challenge has been closed, two possibilities exist. One option is that the instructors distribute points between the different answers, according to their quality, completeness or any sound criterion. Alternatively, the answers (possibly curated of filtrated by the instructors) can enter a poll, whereby the students themselves vote for the closest to solve the challenge. Then, points are awarded proportionally to the votes collected by each answer. The context and topic of the challenge determines which of the two options suits better.

Clearly, this plugin interacts closely with the ranking plugin, too. See Figure 2 for a screenshot of an example challenge.

[1] Pure competition, albeit not in the most general form, can be achieved with the questions and answers plugin, simply closing the question as soon as the first correct answer has been provided.



Created # Answers Featured

Reverse Path Forwarding ante enlaces no simétricos (10 puntos)

Sent 352 days ago by Carlos López Ardao

There is no closing date for the question.

Show Answers (5) Comment (10) Edit Question Delete Question Unhighlight question

Rutas: métricas (10 puntos a la primera respuesta correcta)

Sent 360 days ago by Manuel Fernández Veiga

There is no closing date for the question.

Show Answers (2) Comment (1) Edit Question Delete Question Unhighlight question

Control de errores TCP

Sent 280 days ago by Iván Pérez Blanco

1 point was for the creator of the question.
There is no closing date for the question.
tcp, error

Show Answers (3) Answer question Comment (1) Edit Question Delete Question Highlight Question

Efectos de protocolo UDP sobre TCP

Sent 313 days ago by Francisco Fariña Fernández

1 point was for the creator of the question.
There is no closing date for the question.

Show Answers (1) Comment (1) Edit Question Delete Question Highlight Question

Tasa media en enlaces TCP

Sent 318 days ago by Santiago Conde Camacho

1 point was for the creator of the question.
There is no closing date for the question.

Show Answers (1) Answer question Comment (0) Edit Question Delete Question Highlight Question

Split Horizon y Poison Reverse

Sent 332 days ago by Santiago Conde Camacho

1 point was for the creator of the question.
The question was closed 281 days ago

Show Answers (1) Comment (0) Edit Question Delete Question Highlight Question

Posibles colas indefinidas en conexiones a Internet

Sent 335 days ago by Jaime Alonso Lorenzo

1 point was for the creator of the question.
The question was closed 281 days ago

Show Answers (1) Comment (1) Edit Question Delete Question Highlight Question

Mi dirección IP

Sent 337 days ago by Héctor José Martínez Guardado

1 point was for the creator of the question.
There is no closing date for the question.

Show Answers (2) Comment (1) Edit Question Delete Question Highlight Question

Mensajes DHCP

Sent 337 days ago by Héctor José Martínez Guardado

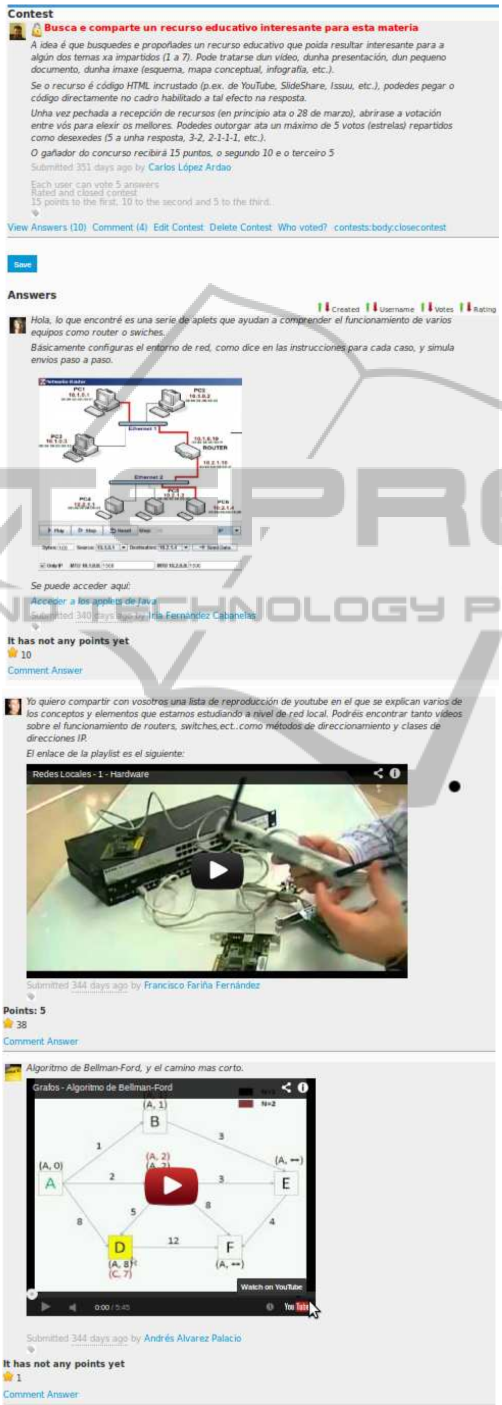
1 point was for the creator of the question.
There is no closing date for the question.

Show Answers (1) Comment (0) Edit Question Delete Question Highlight Question

**Fig. 1.** Questions Listing.

### 3.3 Quizzes and Exams

More traditional assessment and grading of the students is naturally included in SocialWire. This is exactly the task of the quizzes and exams plugin. Both quizzes and exams are, basically, sets of questions that must be answered in limited timed in the most exact and concise way. Maybe the main novelty in SocialWire comes from the fact that a quiz or exam can be proposed to the entire group (or a subgroup of it). Grading of exams and quizzes is automatically computed by the plugin, but the authors can distinguish



Contest

**Busca e comparte un recurso educativo interesante para esta materia**

*A idea é que busquedes e propoñades un recurso educativo que poida resultar interesante para a algún dos temas xa impartidos (1 a 7). Pode tratarse dun vídeo, dunha presentación, dun pequeno documento, dunha imaxe (esquema, mapa conceptual, infografía, etc.).*

*Se o recurso é código HTML incrustado (p.ex. de YouTube, SlideShare, Issuu, etc.), podedes pegar o código directamente no cadro habilitado a tal efecto na resposta.*

*Unha vez pechada a recepción de recursos (en principio ata o 28 de marzo), abrirase a votación entre vós para elexir os mellores. Podedes outorgar ata un máximo de 5 votos (estrelas) repartidos como desexedes (5 a unha resposta, 3-2, 2-1-1-1, etc.).*

*O gañador do concurso recibirá 15 puntos, o segundo 10 e o terceiro 5*

Submitted 351 days ago by Carlos López Ardao

Each user can vote 5 answers
Rated and closed contest
15 points to the first, 10 to the second and 5 to the third.

Answers

*Hola, lo que encontré es una serie de aplets que ayudan a comprender el funcionamiento de varios equipos como router o swiches.*

*Básicamente configuras el entorno de red, como dice en las instrucciones para cada caso, y simula envios paso a paso.*

*Se puede acceder aquí:*

*Acceder a los applets de Java*

Submitted 340 days ago by Iria Fernández Cabanelas

**It has not any points yet**

10

*Yo quiero compartir con vosotros una lista de reproducción de youtube en el que se explican varios de los conceptos y elementos que estamos estudiando a nivel de red local. Podréis encontrar tanto videos sobre el funcionamiento de routers, switches,ect..como métodos de direccionamiento y clases de direcciones IP.*

*El enlace de la playlist es el siguiente:*

Submitted 344 days ago by Francisco Fariña Fernández

**Points: 5**

38

*Algoritmo de Bellman-Ford, y el camino mas corto.*

Submitted 344 days ago by Andrés Alvarez Palacio

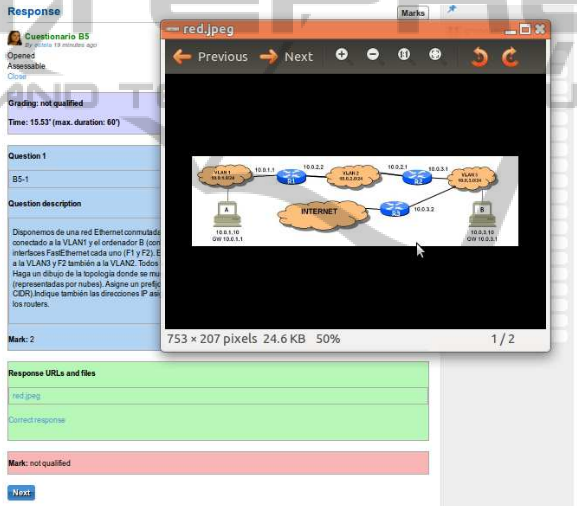
**It has not any points yet**

1

**Fig. 2.** View of the challenge module.

between grading a qualification (with a weight, if this exam is part of a sequence, for example), and rewarding the answers with points, like in other plugins. Though assigning points to an exam may seem useless or counterintuitive —what incentive would a student have to undertake it?—, one should keep in mind, first, that self-assessment allows a student to compare his/her progress with that of other classmates. Relative performance is usually a very strong feedback for the students, especially in the lowest and highest extremes of the range. And secondly, SocialWire is designed to build a ranking or reputation upon the users' activity. Solving exams is a direct way to measure global comprehension and particular abilities, if desired.

Regarding the interactions with other plugins, part of the design in this case is also common to the questions and answers plugin, as expected. Due to the dual nature of assessment (grades or points), the outcomes of this plugin are submitted to the ranking plugin or to the gradebook plugin, as needed. For ease of use, the composition of an exam relies on the existence of question pools (by topic and level of difficulty), which are described next. To finish, Figure 3 displays the appearance of this plugin in a typical example case.


Response

Cuestionario B5
By estela 19 minutes ago
Opened
Assessable
Close

Grading: not qualified
Time: 15.53' (max. duration: 60')

Question 1
B5-1
Question description

Disponemos de una red Ethernet conmutada
conectado a la VLAN1 y el ordenador B (con
interfaces FastEthernet cada uno (F1 y F2). E
a la VLAN3 y F2 también a la VLAN2. Todos
Haga un dibujo de la topología donde se mu
(representadas por nubes). Asigne un prefijo
CIDR).Indique también las direcciones IP asi
los routers.

Mark: 2

Response URLs and files
red.jpeg
Correct response

Mark: not qualified

red.jpeg
753 × 207 pixels 24.6 KB 50% 1 / 2

**Fig. 3.** View of the quizzes and exams module.

### 3.4 Question Pools

It is a tedious task to compose exams, which tend to be similar across years, once and over. The plugin question pools allows the authors to store past questions (and their answers) in a database, so that could be reused later for other purposes. A complex database (e.g., relational) is not needed at all, hence the name "question pool". Questions in the pool are internally organized by means of tags describing the question topics and the difficulty level. Using these tags, a simple search engine can easily find and classify subsets of questions in a given pool.

Only the instructors of a course can populate the pool of questions. Note that this plugin is basically a supporting backend for other plugins, like the quizzes and exams discussed above.

### 3.5 Tasks

Tasks are the objects handled by the tasks plugin. Apart from tautological, this statement intends to mean that, in SocialWire, a task is a supervised activity, i.e., an activity that unfolds during a given timeframe and receives feedback from the instructors. The feedback has the purpose of heading the students learning in the right direction, paving the way so that they can acquire the knowledge by themselves. Therefore, tasks differ from questions in that the former are inherently sequential over time, and more importantly, in that tasks may have partial deliverables: pieces or parts of work that deserve examination prior to the complete fulfillment of the task. Simply stated, tasks have a history of development that ordinary answers lack.

For the same reasons exposed in other plugins, tasks can be used either to grade the students or to give them some share of (ranking) points. Correspondingly, this plugin does not work isolated, but it interacts with the ranking plugin and the gradebook. In addition, tasks can be incorporated to the e-portfolio of the student, as a demonstration of its abilities, its performance and knowledge of a topic. See Figure 4 for a screenshot of the current implementation of this plugin.

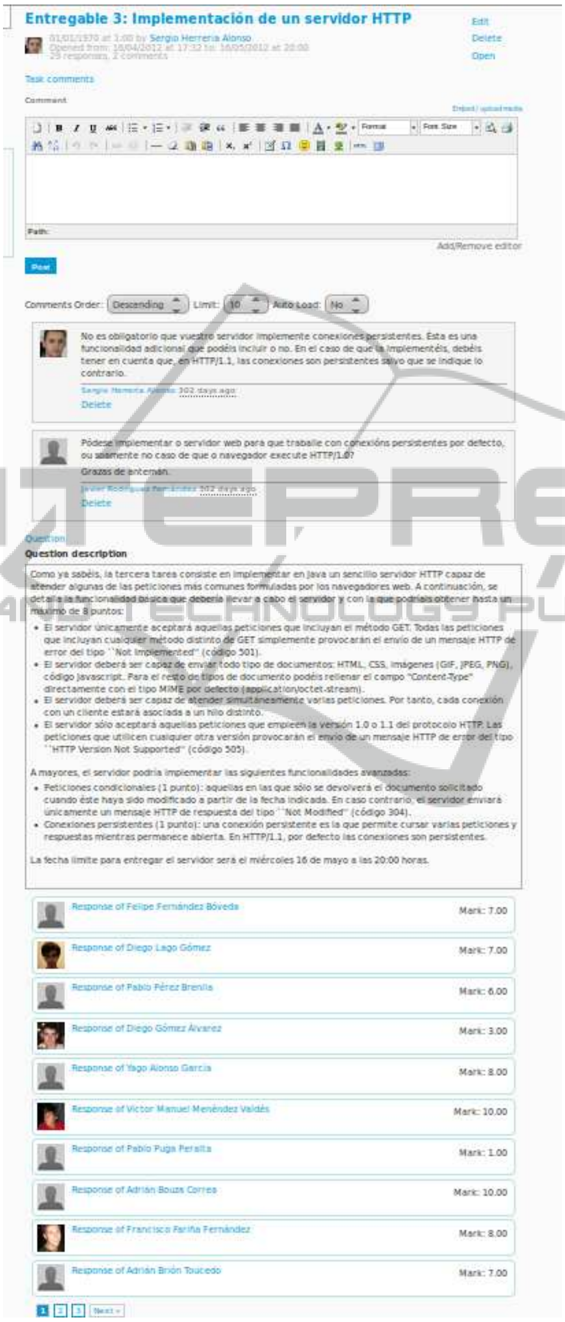
### 3.6 e-portfolios

The concept of a portfolio aims at gathering all the outputs produced by students, whatever their form, contents or support, in a single place. When evaluated as a joint effort, they provide qualitative information about the personal learning paths followed. Thus, a portfolio offers a double value. On one hand, teachers are able to identify the whole learning process that the student unfolds, with its achievements and pitfalls. On the other side, the student can demonstrate to others his personal achievements in the discipline, showing the results of every activity conducted within the curriculum (projects, examinations, complementary work, self-study, etc.).

In SocialWire, an e-portfolio is a container object that stores evidences about the work a student did along a given timeframe. The evidences collected in his/her e-portfolio are not limited, of course, to the grades received as a result of his/her learning. It includes all types of deliverables produced as a result of participation in any of the plugins described up to this point: questions and answers, tasks, challenges, even its position in the ranking system. E-portfolios are individual, per student, since the notion of an e-portfolio for groups does not make sense in this context. We emphasize that e-portfolios are simple containers, the implication being that e-portfolios do not bear direct relationship to a specific assessment procedure. In other words, how to valuate a student's e-portfolio is a matter pertaining to the examiner. To aid in this process, e-portfolios can be linked or associated in some way to a rubric (see the next subsection), which is a description of the rules to evaluate an evidence. It is not mandatory that this association exists, however.

### 3.7 Rubrics

Generically, a rubric is a set of clear criteria to assess any learning activity, published in advance so that the community of students is aware of the requirements their output



**Entregable 3: Implementación de un servidor HTTP**

01/01/1970 at 1:00 by Sergio Herrería Alonso
Opened from: 18/04/2012 at 17:32 to: 16/05/2012 at 20:00
29 responses, 2 comments

Comments Order: Descending Limit: 10 Auto Load: No

No es obligatorio que vuestro servidor implemente conexiones persistentes. Ésta es una funcionalidad adicional que podéis incluir o no. En el caso de que la implementéis, debéis tener en cuenta que, en HTTP/1.1, las conexiones son persistentes salvo que se indique lo contrario.

Sergio Herrería Alonso 302 days ago

Pódese implementar o servidor web para que traballe con conexións persistentes por defecto, ou soamente no caso de que o navegador execute HTTP/1.0?

Grazas de antemán.

Javier Rodríguez Fernández 302 days ago

**Question description**

Como ya sabéis, la tercera tarea consiste en implementar en Java un sencillo servidor HTTP capaz de atender algunas de las peticiones más comunes formuladas por los navegadores web. A continuación, se detalla la funcionalidad básica que debería llevar a cabo el servidor y con la que podríais obtener hasta un máximo de 8 puntos:

- El servidor únicamente aceptará aquellas peticiones que incluyan el método GET. Todas las peticiones que incluyan cualquier método distinto de GET simplemente provocarán el envío de un mensaje HTTP de error del tipo ``Not Implemented'' (código 501).
- El servidor deberá ser capaz de enviar todo tipo de documentos: HTML, CSS, imágenes (GIF, JPEG, PNG), código Javascript. Para el resto de tipos de documento podéis rellenar el campo "Content-Type" directamente con el tipo MIME por defecto (application/octet-stream).
- El servidor deberá ser capaz de atender simultáneamente varias peticiones. Por tanto, cada conexión con un cliente estará asociada a un hilo distinto.
- El servidor sólo aceptará aquellas peticiones que empleen la versión 1.0 o 1.1 del protocolo HTTP. Las peticiones que utilicen cualquier otra versión provocarán el envío de un mensaje HTTP de error del tipo ``HTTP Version Not Supported'' (código 505).

A mayores, el servidor podría implementar las siguientes funcionalidades avanzadas:

- Peticiones condicionales (1 punto): aquellas en las que sólo se devolverá el documento solicitado cuando éste haya sido modificado a partir de la fecha indicada. En caso contrario, el servidor enviará únicamente un mensaje HTTP de respuesta del tipo ``Not Modified'' (código 304).
- Conexiones persistentes (1 punto): una conexión persistente es la que permite cursar varias peticiones y respuestas mientras permanece abierta. En HTTP/1.1, por defecto las conexiones son persistentes.

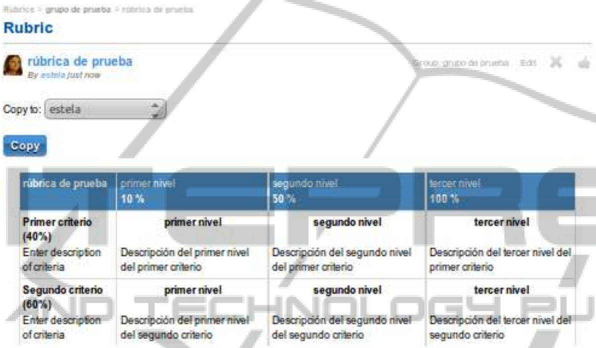
La fecha límite para entregar el servidor será el miércoles 16 de mayo a las 20:00 horas.

| | |
|---|---|
| Response of Felipe Fernández Bóveda | Mark: 7.00 |
| Response of Diego Lago Gómez | Mark: 7.00 |
| Response of Pablo Pérez Brenlla | Mark: 6.00 |
| Response of Diego Gómez Álvarez | Mark: 3.00 |
| Response of Yago Alonso García | Mark: 8.00 |
| Response of Víctor Manuel Menéndez Valdés | Mark: 10.00 |
| Response of Pablo Puga Peralta | Mark: 1.00 |
| Response of Adrián Bouza Correa | Mark: 10.00 |
| Response of Francisco Fariña Fernández | Mark: 8.00 |
| Response of Adrián Brión Toucedo | Mark: 7.00 |

**Fig. 4.** View of the tasks module.

should satisfy. Also, the rubric is a commitment to the instructors, who comply to judge the outcomes of the activities according to the principles stated in that rubric. Clearly, rubrics are particularly important in informal learning, in order to avoid any bias or subjectivism when the quality of the students' work is under evaluation.

In SocialWire, rubrics are implemented as a matrix of categorical dimensions, such as clarity, correctness, extent, etc. For each dimension, the matrix specifies a range and a scale of achievement (not necessarily linear), along with an optional description for every level in the scale (usually, the scale will be discrete, i.e., the range is divided into suitable intervals or buckets). Otherwise, rubrics may be defined freely, both in evaluated dimensions and type of measurement scale. To glimpse an example, Figure 5 displays part of the screenshot showing a hypothetical rubric, as seen by the user.



Rubrics > grupo de prueba > rúbrica de prueba

Rubric

rúbrica de prueba
By estela just now

Group: grupo de prueba Edit

Copy to: estela

Copy

| rúbrica de prueba | primer nivel<br>10 % | segundo nivel<br>50 % | tercer nivel<br>100 % |
|---|---|---|---|
| **Primer criterio (40%)**<br>Enter description of criteria | **primer nivel**<br>Descripción del primer nivel del primer criterio | **segundo nivel**<br>Descripción del segundo nivel del primer criterio | **tercer nivel**<br>Descripción del tercer nivel del primer criterio |
| **Segundo criterio (60%)**<br>Enter description of criteria | **primer nivel**<br>Descripción del primer nivel del segundo criterio | **segundo nivel**<br>Descripción del segundo nivel del segundo criterio | **tercer nivel**<br>Descripción del tercer nivel del segundo criterio |

**Fig. 5.** View of the rubrics module.

### 3.8 Gradebook

This plugin is self-explanatory. The gradebook is a compilation with the grades a student has received for his homework, exams or any other formalized test of knowledge. In SocialWire, without loss of generality, grades are always numeric, and the plugin provides functions to compute simple descriptive statistics for an individual or for a group: averages, medians/modes, histograms, ... Obviously, the gradebook plugin receives input from every other plugin where the students make their work, and does not generate output to any other plugin. Thus, the design of the gradebook is largely independent of the other system components.

### 3.9 User Ranking - Reputation

One of the main motivations for developing SocialWire was the belief that online social interaction between students promotes the effectiveness of learning. In online systems, where the users cannot hold face-to-face contact, the possibility to compare one's performance with that from other participants turns out to be of outmost importance for sustaining the students' engagement. One of the simplest and most effective ways to push the dynamics in groups is to use an understandable rank of members. The rank shows a number of things simultaneously. First, it exhibits the degree of achievement for every users, i.e. where I am vs. where are the others. Admittedly, a list is an oversimplification for measuring degree of achievements, but the implicit information contained in it is otherwise a good feedback that tells how well a student fulfilled the work compared to his colleagues. Second, it establishes a hierarchy within the group. Once known, the ranking operates unconsciously on the whole group: answers, outcomes or deliverables contributed by highly-rated members will probably be better esteemed by the rest. In the opposite direction, persons with high position in the ranking are likely to be compelled to deliver high-quality work in future activities if they aim to keep their rank.

The ranking plugin in SocialWire simply organizes all this information about the points received by every group member. In this respect, recall that the points awarded to a student in a particular task can come from the instructors or from votes from other group members, depending on the type of activity. The plugin just accumulates the ratings of each user and sorts the list appropriately. Whether the position in the ranking will affect the final grade of the student is an open issue, up to the instructors' decision. The plugin is designed to be agnostic about these concerns. Similarly to the gradebook plugin, this one is fundamentally a collector module that receives input from any other module in the system, organizes the information and renders the data in appropriate form.

### 3.10 Polls and Decision Trees

The last plugin allows SocialWire to conduct polls. More generally, the plugin implements a voting system, where users can choose their preferred options among a set of options, and about different questions (a poll may embrace several questions, related or not). Polls can be anonymous —SocialWire does not reveal the author of any opinions— or not, and the system carries out the simple accounting of responses, making a final report with the data. A variant of a pure poll, also implemented in this module, is that of a decision tree. It is well-known that decision trees are a common tool to solve complex decision-taking problems, after following a series of individual decision steps. Accordingly, in SocialWire a decision tree is essentially a sequential poll, where each step in the poll is a single question. The logic for advancing is the natural one, namely majority vote.

Polls and decisions are orthogonal to the rest of plugins. Although a decision tree could be used to solve a problem (formal or informal) within a group, probably the most realistic case will be to use it as a supporting tool in some of the plugins described so far. Similar considerations apply to the polls, in the sense that those object have been devised to take the opinions from the users, not to solve tasks by popularity.

## 4 Application

The tool has entered in a test stage during the previous academic year.

Initially it will be used in two subjects of the Communications Engineering Curriculum:

- Computer Networks (second year, obligatory).
- Advanced Computer Networks (third year, in a speciality).

These subjects represent a coherent thematic unity and develop with different levels of complexity the discipline of communications networks.

The sequential implementation will allow us to observe the response of our students to informal learning activities and to detect the possible improvement (in working habits, in participation) and the increase or decrease of previous social reputation.

Following, we summarize the methodology and results obtained the previous academic year in the subject Computer Networks.

These activities were carried out by means of the platform:

- Thirty questions proposed by students (opened during the whole term). Students received 1 point for each approved question, 2 points for the best answer and 1 point for other good answers.
- Two questions proposed by teachers. We rated them with 5 points for the first good answer.
- A challenge. Students looked for a resource related to the subject (video, presentation, ...) for two weeks. After this time, each student distributed 5 votes among the answers during a week. Finally, the three answers with more votes received 15, 10 and 5 points.
- A task. Programming a HTTP server (opened for a month).
- An assessed questionnaire (opened for a week).
- Practice tests during the two last weeks of the course.

The continuous assessment represented a 30% of the final grading (the task supposed a 10% and the questionnaire a 20%) and was not obligatory. The points obtained by means of the questions and challenge modules supposed an extra 10% of the final grading (each student received a grading proportional to the points obtained).

From the results obtained, we highlight that 85% of the 54% of the students that followed the continuous assessment and participated in the proposed games passed the subject (and with the best grades). Nevertheless, only 30% of the students that did not follow the continuous assessment passed the subject.

Other advantages of the informal learning activities proposed can be highlighted:

- Questions: The resolution of doubts and habitual problems helped to the joint comprehension of the subject.
- Challenge: Some students engaged in the search of interesting resources. Other students had to read the contributions of the companions in order to vote and to do reasoned comments.

This year we are repeating the experience, but we have introduced new activities and some changes in the methodology in order to motivate more students and to increase the level of participation in these informal activities. We plan to report the results obtained in the near future.

## 5 Conclusions

In this paper, we have described a software platform that sees online learning as a special social activity process. In this realm, it seems natural to embed informally-defined activities into the design of the LMS, and moreover, to revolve the design around an OSN instead of a LMS. That is precisely the novelty of SocialWire: start from an OSN engine and adapt it to become not only an online social network, but also a learning platform.

Preliminary tests of SocialWire in a real environment are being carried in our college, among undergraduate students. We are in the second year of the field experiment, and plan to report more results (degree of students engagement, participation, relationship between the ranking/reputation and the distribution of grades, observations related to the sequential implementation, etc.) in the near future.

As further work we are going to extend the functionality of the platform with new modules, as:

- Forms module: This module can be useful for example for implementing activities related to the detection of previous knowledge about a subject.
- Badges module: We think that badges assignment may generate positive emotions and can help to motivate students.

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