

USING OPEN BADGES AS CERTIFICATION IN A MOOC

Joan Albert Laso¹, Pedro Pernías Peco¹, Sergio Luján-Mora²

¹ *Institute of International Economy, University of Alicante (SPAIN)*

² *Department of Software and Computing Systems, University of Alicante (SPAIN)*

Abstract

MOOCs (Massive Open Online Courses) are online courses with the option of free and open registration that are usually followed by thousands of students from all over the world at the same time. MOOCs need new kinds of certification and accreditation.

On the other hand, Mozilla Open Badges provides a method to create verifiable certifications of knowledge, skills, and achievements, no matter where they are learned or obtained. Nowadays, people learn things online and out of school all the time. Mozilla Open Badges helps to solve the problem of certification in the digital society, making it easy for any organization to issue and manage digital badges, and to any student to display them across the Web. Moreover, badges can be used to “gamify” education.

In this paper, based on our experience in the creation of some MOOCs, we show how Mozilla Open Badges can be integrated with a MOOC to show progress and learning achievements.

Keywords: Certification, accreditation, credential, recognition, MOOC, assessment, innovation.

1 INTRODUCTION

MOOCs (Massive Open Online Courses) have been around us since 2008, when around 2,300 students took part in a course called “Connectivism and Connective Knowledge”, organized by the University of Manitoba (Canada). However, 2012 was widely recognized as “The year of the MOOC” [1], because some MOOC initiatives, such as Coursera, Udacity, or edX, gained a world-wide popularity. Many experts consider MOOCs a “revolution in education” [2]. However, other experts think it is too soon to make such a claim and MOOCs still have to prove their real value [3].

MOOCs (Massive Open Online Courses) are online courses with the option of free and open registration that are usually followed by thousands of students from all over the world at the same time. MOOCs are usually created and offered by higher education institutions, such as universities. The structure and content of MOOCs usually mimics traditional online courses: a syllabus, a calendar, educational materials (mainly videos), some activities or projects, quizzes (usually multiple choice questions) to assess students’ learning, and a forum to discuss with instructors and other students. MOOCs are the natural evolution of OpenCourseWare (OCW), but in contrast with them, MOOCs offer the opportunity to interact with other students and instructors, and they typically provide a sort of certification at the completion of the course. Despite its novelty and the use of some new educational methods, MOOCs’ certifications do not show any kind of innovation. If MOOCs boast to be the biggest revolution in education for the last 500 years, they should incorporate new kinds of certification.

On the other hand, Mozilla Open Badges, also known as Open Badge Infrastructure or OBI, is a project sponsored by Mozilla and launched in September 2011. The objective of this project is to create a system to recognize and verify learning. OBI is not proprietary, it is based on open standards and it is completely free. OBI can be used as a method of recognising and rewarding skills and knowledge learned both in face-to-face or virtual classrooms in the Web. OBI helps to solve the problem of certification in the digital society, making it easy for any organization to issue and manage digital badges, and to any student to display them across the Web. Basically, a badge is an image in PNG format that contains metadata. This metadata links back to the issuer of the badge, to the criteria (the description of the badge and the requirements for earning the badge) and to the verifying evidence (the information about how the individual earner earned the badge). In OBI, the badges are collected into the user’s Backpack, a repository hosted by Mozilla. By default, the badges are not public, but the user can use privacy controls to decide which badges wants to display and where. OBI relies on Mozilla Persona, an identification system for the Web. Mozilla Persona allows users to sign in to websites using an email address from a list of emails attached to the Persona user. In this way, a

user only needs to remember one username and one password, but can use different emails (identities) in different websites.

Some Learning Management System vendors, such as Blackboard, are working together with Mozilla to support and promote the use of badges in education [4]: Blackboard Learn allows students earn and faculty assign Open Badges to signal the completion of a course or that key learning milestones have been met. More recently, President Bill Clinton announced a Clinton Global Initiative Commitment to Action “to massively expand access to a new method of academic and technical skills assessment known as Open Badges – online representations of earned knowledge and skills – to improve the futures of two million students and U.S. workers” [5].

However, despite the rapid expansion of Open Badges [6], some authors have criticized the use of badges in education [7]. The main concern is about spoofing and faking badges. But this concern also exists about traditional real-life certifications and accreditations.

In this paper, based on our experience in the creation of some MOOCs, we show how OBI can be integrated with a MOOC to show progress and learning achievements. We explain how to use OBI, both from the perspective of an issuer and an earner: we show some technical details about how badges can be implemented, and we present how badges can be displayed in different places, such as social networks or personal home pages.

2 GAMIFICATION

“Gamification” is the use of game thinking, game strategies, and game mechanics to engage users in solving problems in contexts not related with games. Although the term gamification has been around for many years, it didn’t start to gain popularity until 2010.

Some studies proof that gamification is a powerful technique for building addictive web sites, and in some cases it has raised the number of return visitors by 20 percent [8].

Gamification can be used as an educational strategy [9, 10]. This is not new: students usually “get points” for completing assignments correctly or for passing a test. These points are commonly known as grades. Besides, students are also rewarded for desired behaviours and punished for undesirable behaviours. At the end of the course, if students perform well, students will “level up” to the next course.

These grades can be translated into badges and students may compete with each other to achieve more badges. Making the badges visible to other students or providing student leader boards are ways of encouraging students to compete each other. This “game mechanic” may contribute to motivate the student for further challenges.

Badges can be provided by the teacher, but some educational strategies can also allow students to reward each other with badges.

There are different ways to “gamify” education with badges:

- Provide badges when some tasks are completed.
- Define badges to be given out after a criteria is met, e.g., performing harder tasks.
- Earning of badges can be tied to unlocking higher levels.

3 MOZILLA OPEN BADGES

Mozilla Open Badges, also known as Open Badge Infrastructure or OBI¹, is a project launched in September 2011 by Mozilla Foundation. The main objective of OBI is to provide a neutral system that issues digital badges to recognize skills and achievements across the Web. It is an open system, so that anyone can use these services free of charge. The goals of OBI are [11]:

- Develop badges as an alternative accreditation/credentialing system.
- Develop badges as a micro-accreditation/micro-credentialing system.
- Avoid silos; ie badges stuck in one learning system.

¹ <http://openbadges.org/>

- Truly support learners learning everywhere: support badges issued from multiple issuers across the Web.
- Optimize the value of those badges: make badges remixable and shareable with different audiences/sites.
- Develop a supporting infrastructure to standardize the process and support each learner collecting badges from multiple issuers and sharing sub-collections out across various displayers.
- Create an infrastructure that is open and as decentralized as possible to give learners control and support of the entire ecosystem.

The badges can be used to display real-world achievements and skills in digital environments as the Internet and the Web. However, the badges can also be used to display achievements and skills obtained in digital environments.

A badge in this Mozilla system is an image of a medal with some metadata that have been added. This metadata is information concerning the badge's issuer, the earner of the badge, and information of the own badge.

In creating badges with Mozilla there are two elements: the image and the assertion. The image is representative of the achievement reached and must be hosted on the Internet and be housed in a public URL. On the other hand, the assertion is a JSON with a certain format (specified in the standard) that contains all information of the badge (image, criteria, issuer, earner, etc.) and it is also available on a public Internet address.

The assertion must have a particular structure and, therefore, it becomes necessary to validate it. To this task of validation, Mozilla offers a free online service² where an assertion can be validated.

To create a badge there are two possibilities. The first possibility is to create the badge using the service provided by Mozilla. This service, called Badge Baking [12], works very simple: first of all you have to build the corresponding assertion and house it in a public URL, and then access the URL provided by the Badge Baking service with the URL of the assertion as a GET parameter. Once it is done, the badge is downloaded automatically. Then, the earner of the badge has to access their Backpack and upload the badge (Fig. 1). This is the least used manner to create a badge, and it is not very recommended because it does not ensure it will work in the future.

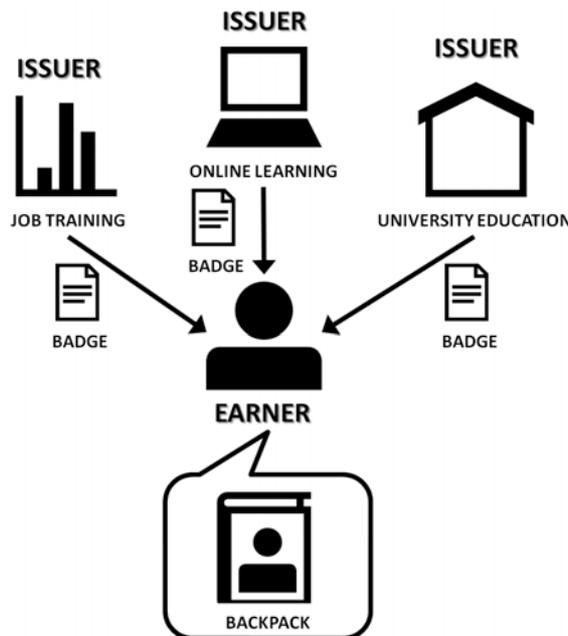


Fig. 1 Issuer and earner relationship

² <http://validator.openbadges.org/>

The second way is the most commonly used and works by creating and issuing the badge in one step. This option is based on using the Issuer API of Mozilla Open Badges [13]. In order to use this way, the JavaScript library provided by Mozilla must be integrated in your code and the function `OpenBadges.issue` has to be called with the assertion of the badge as a GET parameter. After this JavaScript function is called, the earner will have to identify themselves through their account on Mozilla Persona or through their Gmail account associated with the Backpack. If the identification is correct and matches the badge receiver, it will display a dialog box to accept or not the badge (Fig. 2). Once the badge is accepted, the badge is automatically stored in the earner's Backpack. With this way any issuer interested in accrediting knowledge or skills through the Internet, can do it so simply. It is not necessary to implement a complete system of accreditation, only to include in the web code a call to a JavaScript function.

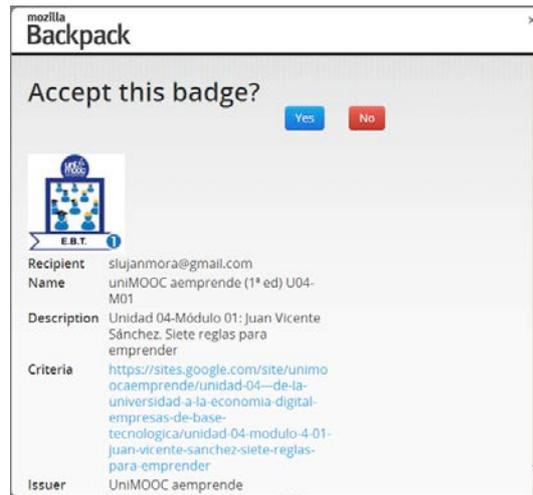


Fig. 2 Adding a badge to the Backpack

The earner can collect badges and curate them in their Backpack (Fig. 3). The Backpack is a storage service provided by OBI. The Backpack is the virtual place where each earner can store their badges (Fig. 3). Badges from any issuer can be pulled into the Backpack and then shared from it.

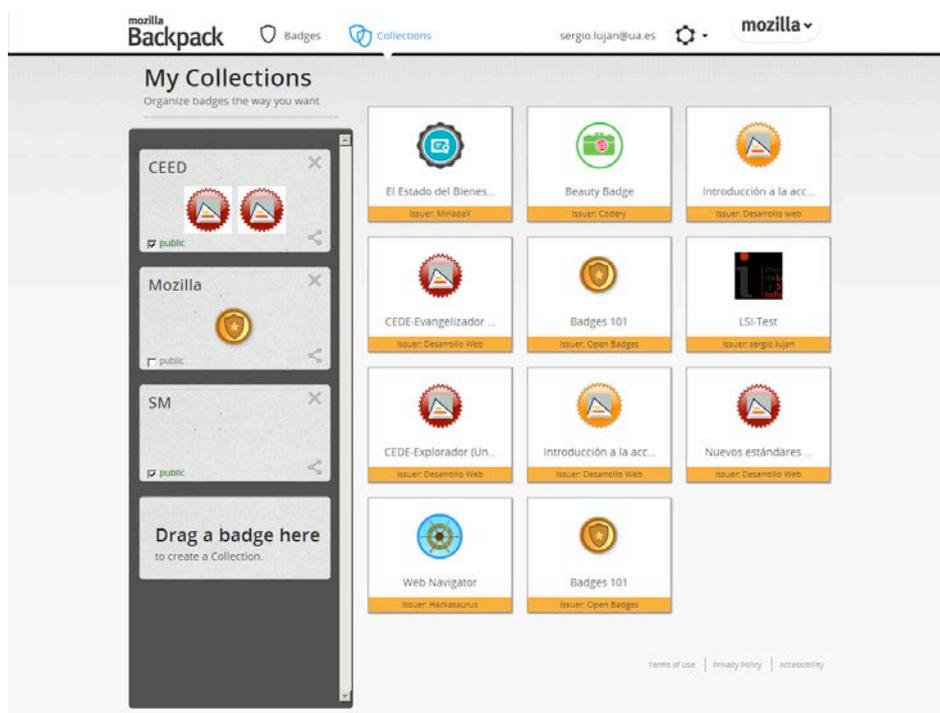


Fig. 3 Mozilla Backpack

In the Backpack, badges can be classified in collections according to the desired criteria. Collections can be declared as public to be showed on the Internet using any displayer. Mozilla provides an API which is offered for the displayers to access only the badges classified in public collections by the earner.

In the Backpack, all the collected badges can be browsed and the information about each badge can be displayed. The main information of a badge is (Fig. 4):

- Issuer Details: the name, the URL, and the organization.
- Badge Details: the name, the description, the criteria, and the issued date.

The criteria is an URL of a web page that hosts the criteria for earning the achievement. Besides, a badge can also have an evidence, the URL of the work that the earner did to earn the achievement, and an expiration date that indicates when a badge should no longer be considered valid.



Fig. 4 Badge information

The earner can share earned badges and display them on their social networking profiles or personal web pages (Fig. 5). In the future, it will be possible to display badges in job search sites, such as LinkedIn.

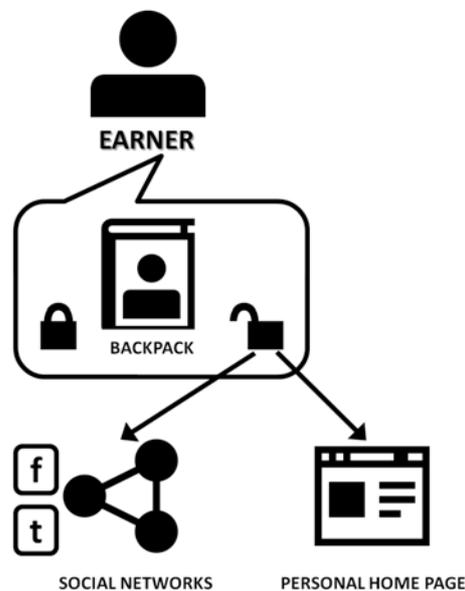


Fig. 5 Displayer

The privacy controls of the Backpack allow one to set a collection as public to be shared on the Internet with everybody. Mozilla Backpack provides a standard displayer for the public badges (Fig. 6). However, a displayer site can send a request to the Backpack to pull a JSON message from the badge earners backpack to display their badges. This JSON message can represent one or more badges from within the backpack.

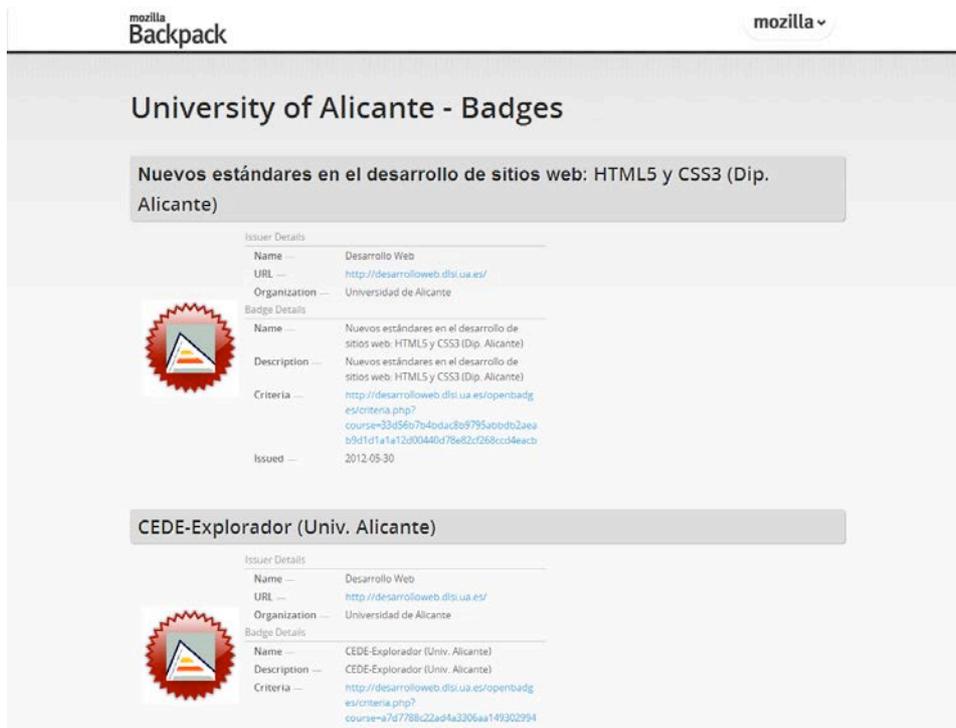


Fig. 6 Standard displayer provided by Mozilla Backpack

4 BADGES IN A MOOC

UniMOOC aemprende is a MOOC oriented toward the fostering of entrepreneurship. UniMOOC aemprende provides students a vision of the keys to success that others entrepreneurs have applied in order to create their projects in the new digital economy.

UniMOOC aemprende is not a traditional course with a fixed calendar. Students are allowed to start at the moment they desire and to follow all the lessons available until the end of the course. UniMOOC aemprende is offering new educational content continuously, with lectures, assessment, and other activities. If a student finishes successfully the course, he or she can obtain a digital certificate or even to pass a proctor assessment to obtain a certificate issued by a university.

After reviewing most of the existing MOOC platforms, we chose Google CourseBuilder³ (GCB) [14] as the most suitable platform for the requirements of our MOOC. Besides, our MOOC makes use of different components (YouTube, Google Docs, etc.) that engage our students and help them to succeed in the course.

GCB is an open source project of Google, not a Google product. GCB offers a lightweight way to publish course material online, track student engagement, and evaluate students' performance. An international community of GCB users is growing rapidly. GCB is a suitable solution for institutions looking for an in-house platform. Besides, as the source code is available and can be modified, institutions can develop their own customizations.

To handle the administrative relationship about accreditation with the users, the UniMOOC developing team designed a specific module to connect with the virtual secretary. This approach allows us to externalize the possibility of obtaining an accreditation of the learning progress. Therefore, different accreditation formats can be used in the same course.

At the present moment, there exists two ways of obtaining accreditations:

- By using Mozilla Open Badges infrastructure.
- By using the UniMOOC aemprende accreditation model.

Both methods are used to offer students a recognition of their advancement in the course.

³ <https://code.google.com/p/course-builder/>

In order to support the accreditation, instead of creating an accreditation system inside GCB itself, we designed a module that communicates to an external accreditation system that keeps a record of student's achievements. Thanks to this approach, it is possible to obtain a copy of the accreditations even in the event that the GCB that provides support to UniMOOC aemprende would be closed in the future.

The accreditation system has two components:

- The external service in the virtual secretary.
- The internal accreditation module in GCB.

The accreditation module in GCB sends messages in JavaScript Object Notation (JSON) format to the external virtual secretary with updates of the accreditation information (e.g., new badges issued). These messages include all the information needed to update a record of accomplishment or certificate with information about all the students and their achievements. These messages are encrypted for security reasons.

The external virtual secretary is hosted in a web hosting service and it can be accessed by sending messages to a web service. Also, other future courses could use the API we have developed for the same goal.

4.1 The virtual secretary

The virtual secretary acts as a neutral and independent record of the achievements of students. Because it is an independent system of GCB, it can be used for many courses based or not based in GCB.

An accreditation is a record with the following information:

- Name of the accreditation.
- Issuer name.
- Date of issue.
- URL of the main page of the course.
- URL of the criteria of the accreditation: the criteria is an external web page with information about the meaning of the accreditation. Usually, it is hosted in the course web site. However, in UniMOOC aemprende we have created a set of web pages in Google Sites to keep all the information about the criteria.
- URL of the image (icon) of the accreditation. This image has to follow the guidelines of the specification of Mozilla Open Badges. In UniMOOC aemprende we use Google's Picasa Web Albums to store those images.
- The list of students' emails who have earned the accreditation.

The virtual secretary provides some web services in order to:

- Update the list of students who have earned an accreditation.
- Allow students to claim a badge from Mozilla Open Badges and to include the badge in the student's Mozilla Backpack.
- Allow students to claim a specific accreditation (offered by the course administration) with all the individual accreditations aggregated.
- Check if a student has or has not right for an accreditation.

At the present moment, the virtual secretary does not provide an interface for students to directly claim for an accreditation. It only provides services to course systems connected. The course platform has to handle the relationship with their users and accreditations on their own using the web services provided by the virtual secretary.

4.2 The internal accreditation module in GCB

When a student passes an assessment that has an accreditation, the accreditation module in GCB sends an update message to the virtual secretary using a web service in the form of a JSON encrypted message, as it is shown in Fig. 7.

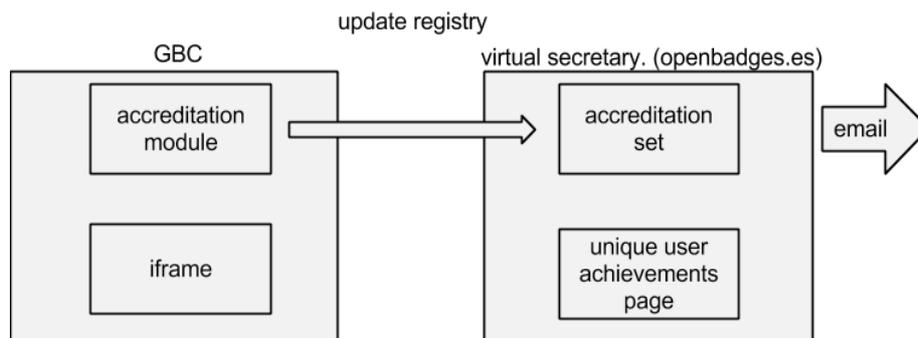


Fig. 7 Update message from the course to the virtual secretary

After the message has been received, decrypted, and checked, if everything is correct, the virtual secretary sends a notification message to the student with the information about the new accreditation and the instructions to claim the corresponding accreditation compatible with Mozilla Open Badges or the own UniMOOC aemprende accreditation.

Also, when students ask for a report of their progress and want to receive a specific accreditation, the GCB accreditation module connects to the virtual secretary to request the information using another web service, as it is shown in Fig. 8.

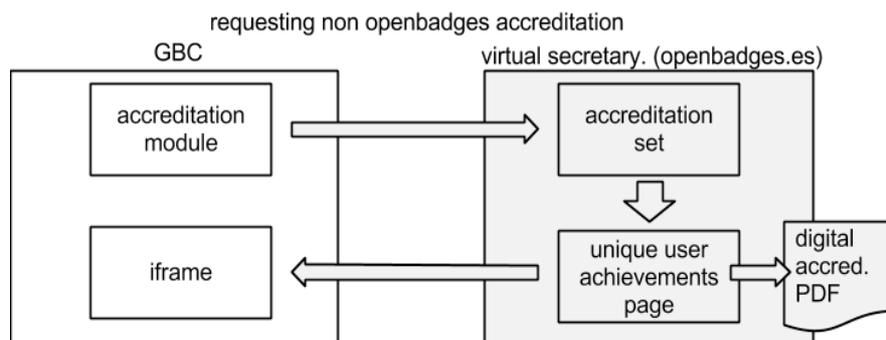


Fig. 8 Request of information about a student

Thanks to the use of an HTML iframe, the result is displayed in the personal profile page of students in GCB. The HTML iframe that is displayed allows students to receive a digital accreditation in PDF format or to go to another personal profile web page to request the appropriate badge compatible with Mozilla Open Badges infrastructure.

The web page that the HTML iframe displays is a unique web page for each user that shows all the accreditations that the user has earned. This page can be accessed directly using a web browser and it is connected with the PDF accreditation through a QR code.

Besides of this, all the accreditations may be claimed as badges using the Mozilla Open Badges infrastructure (Fig. 9). In that case, the GCB module displays a list of all the available achievements for a student (in the personal profile page) and links every achievement with the virtual secretary that makes possible to claim the badge compatible with Mozilla Open Badges Infrastructure.

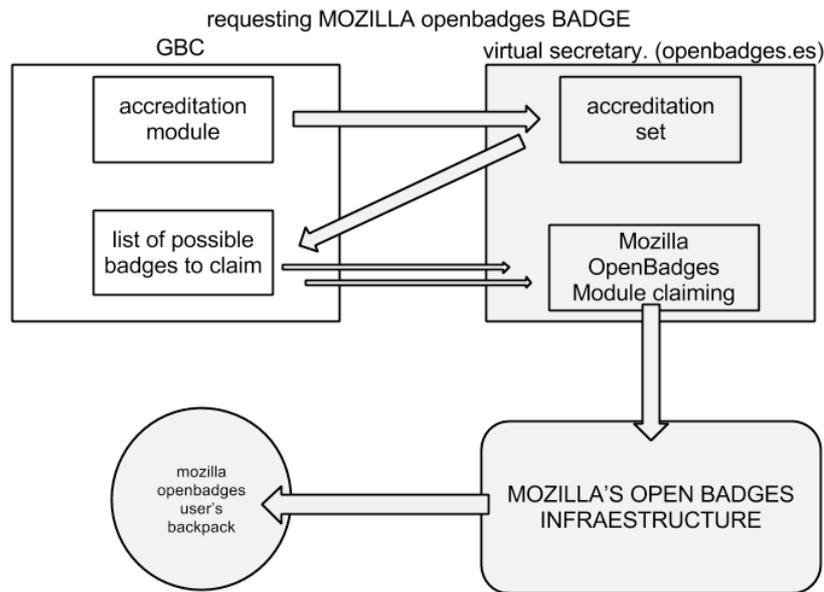


Fig. 9 Virtual secretary and Mozilla Open Badges

The course provides a list with all the badges earned by a student (Fig. 10). From this list, badges can be added to student's Backpack.

Módulo	Descripción	Insignia	Reclamar
UniMOOC aemprende (1ª ed) - U00-M01	Unidad 00 - Módulo 01: ¿Qué es un UniMOOC aemprende?		Reclamar
UniMOOC aemprende (1ª ed) - U01-M03	Unidad 01-Módulo 03: atrévete a actuar (Senén Barro)		Reclamar
UniMOOC aemprende (1ª ed) - U03-M01	Unidad 03-Módulo 01: El caso de Panoramio (Eduardo Manchón)		Reclamar
uniMOOC aemprende (1ª ed) U04-M01	Unidad 04- Módulo 01: Juan Vicente Sánchez. Siete reglas para emprender		Reclamar

Fig. 10 List of badges in the MOOC

5 CONCLUSIONS

Badges are records of achievements, skills, interests, affiliations, roles, etc. Mozilla Open Badges Infrastructure brings educational certification to 21st century, because it proposes the use of digital badges as an alternative to traditional certification systems.

Badges issued with the Open Badges Infrastructure are digital indicators of skills learned inside or outside the classroom. Badges can be used as a reward system of microcredentials. Badges can provide social credibility and recognition for academic and non-academic achievements, which might otherwise remain invisible with traditional accreditation and certification systems. Besides, badges are a new way to certify hard-to-measure skills such as creativity, communication, teamwork, and adaptability. Earned badges can show a complete view of a person's skills and achievements.

Our future work is aimed to explore some pedagogic issues that arise when badges are used in educational environments. Some questions, such as the integration of digital badges in traditional learning environments must be answered.

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