COLLABORATION ENVIRONMENTS WITH FEDERATION TECHNOLOGIES: AN EXPERIENCE IN THE IBEROAMERICAN SPACE OF HIGHER EDUCATION
José A. Accino, Manuel Cebrián

Summary
Initiatives focused on the development of new collaboration frameworks among academic institutions are growing in number around the world. In this development, identity technologies play a crucial role. However, even when these technologies have been among us for some time now, not so many implementations are used in real working environments; that is why knowing more about their application in educational practice scenarios becomes necessary. It is also important to collect data about its usability, working flows changes or the best practices. The current essay describes a project that has been realized along with thirteen universities from Argentina, Brazil, Chile, Ecuador, Mexico and Venezuela. The project has been coordinated from the University of Málaga by the Ágora Sur group. The project’s aim was to try out a pilot collaboration program based on federation technologies, in which resources and services would be distributed among the institutions. This environment, originally consisting of several basic tools spread out among the core universities, provides a platform for discussion and analysis of educational and teaching techniques used by the various participants.

Keywords: identity, federation, collaboration, communities of practice

1. Introduction
There has been a recent increase in the number of initiatives focused on the development of new collaboration frameworks among academic institutions globally. In a traditional scenario and from the point of view of mobility, access to shared resources or services requires of a registered identity for each of the users in each of the institutions. This process is linked to many well-known problems related to usability and security. Nowadays, however, identity federations allow us to establish trusting relations among institutions in order for their members to have access to shared resources, having just one authentication point in their own institution. This model is naturally connected to most updated approaches about Personal Learning Environments (PLE). It could be said that identity and access management technologies are the necessary base for an effective implementation of this type of environment.

Virtual platforms literature shows certain unanimity in establishing the birth of the PLE concept in 2005, from Wilson contributions onwards [1]. Since then, the list of references has not ceased to grow, as an evidence of the general interest to find the most appropriate technological solution for a personal learning. [2, 3]. There are several reasons for this shift from learning management systems (LMSs) to personal learning environments (PLEs). Firstly there is a growing perception that traditional platforms condition the learning model excessively without providing any truly innovative element, since they work as closed silos [4]. That’s why it is not surprising that the majority of complaints regarding LMSs are from advanced users (registered members) who are accustomed to a regular and personalized use of technology [5], i.e. those complaints are from those who are expected to have a higher innovative ability. Secondly there is increasing interest towards lifelong learning and this arises several distinct problems related to virtual platforms because by definition, platforms are centered on the institution.

There is a clear relationship (connection) between identity and learning environments [7, 8]. Students have a life beyond school, and PLEs help to integrate (incorporate?) that outside world into formal education [9]. Identity integration is precisely one of the patterns that are identified in the use of PLEs [10].

Oddly enough, the use of personal environments based on identity management does not isolate individuals, quite the opposite: by facilitating them to manage their own identity PLEs can
encourage their participation in other groups and networks, if they stayed in a traditional all-in-one LMS system those networks would be beyond their reach. Thus participation in shared domains of interest is favored, and engagement in group activities and discussions, typical of communities of practice, is stimulated [11]. The concept of ‘communities of practice’ has its analogous technological form in virtual organizations. The main challenge is, from now on, to integrate different learning configurations, diverse groups and sources, something that monolithic LMS tend to hinder [12].

As it has been explained in a previous text [13], these principles have determined the path of Agora Virtual® towards an environment of experimentation and group management based on weakly connected tools, which are integrated using identity and access technologies. Even if those technologies have been present for some time now, most implementations are directly linked to use by technical staff. It is therefore necessary to find out more about their application in scenarios which are closer to the teaching practice. Collecting data about its usability, or knowing more about workflow changes and best practices also becomes crucial.

2. Background

Our research group is well experienced in the development of collaboration projects between Spain and Ibero-America, funded by the Spanish Agency for International Cooperation (AECID), on issues mostly regarding the use of Information and Communication Technologies (ICT’s) in education, learning and cooperation for development. An example of this is the project that took place among different indigenous communities of the Amazon region about the social use of their language [14, 15].

![FIGURE 1. Website of the Amazon region project.](image)

It has been sensible to take this particular experience as a starting point for a collaboration project, also funded by AECID, which is devoted to the creation of a ‘community of practice’ among different Ibero-American university schools, departments and services whose main responsibilities are ongoing university teacher training and the promotion of educational innovation in their institutions [16].

The main goal of this community is to share experiences and best practices about the changes that
are taking place in the participating institutions and centers, especially regarding the processes of educational innovation, and particularly related to teaching and learning techniques implemented with technologies and virtual spaces. Therefore, virtual learning environments are the key issue of the project and are analyzed from a double perspective:

- As a technological tool that allows collaboration among the institutional services that deal with educational innovation. Those services have the responsibility to promote changes in education and be original in their use of ICT.
- As a research field for institutions, especially in analyzing how to train educators in the use of ICT to stimulate a more significant and autonomous learning among students.

These two aspects of virtual environments—as tools and as objects of analysis—have been approached from a variety of actions focused on different issues such as: teachers skills in distance learning, e-tutorials, the design and assessment of virtual material in university teaching, formative evaluation models with e-rubrics, and the strategies used in the development of technological platforms.

The project has been developed in two phases. In the first one (2007-08) conventional technological resources were used: --virtual platform, video conferences— that were used in combination with on-site seminars in which the contents that teachers should train in were defined. In these meetings e-learning models, strategies and methodologies were also discussed.

The second phase of the project (2008-09) has followed current trends in training systems, which have been previously mentioned. This phase has been focused in bringing the activity of the community of practice that was established in the previous step towards a truly distributed environment based on identity technologies. The goal of this shift is to move forward taking a further step in the technological support of the community, and also to know the teachers’ (and the institutions’) response to this type of environments.

3. Description

In its second year the main goal of the project was to practice with several Ibero-American universities a collaboration model in a scientific network based on federation services and mechanisms as a conceptual evidence that can contribute to the development of the Common Latin American-Caribbean-European Space of Higher Education (ALCUE) [17].

It has tried to prove the idea that identity and access technologies can be used to develop and establish a new model of collaboration environments in which resources and services are truly distributed among different institutions. Each of the universities can thus make a clear contribution to the group working environment: with a cutting edge tool, or a service that can be of common interest, thus preventing the rest of the institutions from having to reinvent the wheel. This would imply saving time and economic resources, and what is more important, it would encourage synergy among them.
The project has been coordinated by the work group Ágora Sur, from the University of Málaga (Spain), and a total of fourteen universities and institutions from Latin America have participated.

- Catholic University of La Plata, UCALP (Argentina)
- Business and Social Sciences University, UCES (Argentina)
- Belgrano University UB (Argentina)
- Higher Education Center on Exact Sciences CAECES (Argentina)
- Casa Grande University (Guayaquil, Ecuador)
- Autonomous University of Baja California, UABC (México)
- Colima University, Center for the Production of Didactic Methods (México)
- Guadalajara University (México)
- National Polytechnic Institute (México)
- Federal University of Paraná (Brazil)
- University of Santo Tomás, UST (Chile)
- Central University of Venezuela (Venezuela)
- Zulia University (Venezuela)
- Puerto Ayacucho Apostolic Vicariate, Amazonas (Venezuela). Stereo Radio Station 82.9 FM
3.1. Technology and tools

The technological infrastructure of the Project is based on a SimpleSAMLphp, an implementation in PHP language of SAML developed by Uninett, the Norwegian academic network. It is important to note that not all the institutions have the same technological level, nor have they the same level of involvement in the project. This is why there is a distinction between those institutions which constitute the project core, which have contributed with:

- The installation of an identity provider to authenticate users that belong to each institution.
- A user database source (LDAP directory or similar) for authentication through the aforementioned identity provider.
- A federated service that will be accessible by all project members.

The rest of the involved universities participated by using the environment of the proposal, and by elaborating and discussing the contents. In these cases, the University of Málaga has supplied an identity provider so that all participants could access the shared environment and could collaborate with the rest of the group under the same conditions.

Given the project characteristics, which were new to most participating institutions, the choice of tools has been determined by the availability of fully functional versions or adaptations. Institutions’ capacity to make the necessary installations in a reasonable period of time has also conditioned the choice because this process should not slow down the second phase, regarding content, which is after all the one that justifies the project.

The tools that have been installed are:

- A wiki to elaborate course content in collaboration, based on Dokuwiki software, ready for federated use with SimpleSAMLphp, provided by UCES (Business and Social Sciences University, Buenos Aires, Argentina).

- Foodle, developed by UNINETT, and whose installation was conducted by the Catholic University of La Plata (UCALP), also in Buenos Aires.
- Forum, a custom-made tool for discussion and file exchange which had been previously developed by the CEUPROMED of the University of Colima, Mexico. It has been adapted for federated use with SimpleSAMLphp by means of a specific plug-in.

- Surveys, designed with LimeSurvey software, adapted by the team from the University of Málaga, Spain to use SimpleSAMLphp. It has been used to assess the environment usability through SUS surveys (System Usability Scale)
We should add a Project Task tool (Collabtive), provided by the Autonomous University of Baja California at Ensenada, Mexico (UABC), but it has not been used because the technical group had to withdraw from the adaptation process due to reasons not related to the project.

Regardless of this unforeseen event, the IdP installation and the different services were conducted as planned. The technical experts from the universities of UCES, UCALP and Colima, despite not having experience in federated systems, in just a few days prepared their equipments and implemented their respective services—including the custom-made SimpleSAMLphp authentication processing filters that were done for the access control. The Colima team developed a plug-in for their IdP so that authentication was done contrasting with their e-mail server.

3.2. Methodology, roles and contents

The methodology that has been used is quite simple and adapted to the selected tools. An Agenda of potential issues was devised by each university within the dates that were selected mainly with Foodle. Forums were discussion and reflection spaces for all the participants. The results of this experience exchange were recorded in the wiki. And finally at the end of the project, the teachers involved had to answer a usability survey to assess it.

To manage the project all participants agreed on assigning several roles.

- Tool coordinator: Each of the institutions that provided a service to the environment was in charge of keeping the corresponding technical system and to support the other participants when training to use the tool.

- Topic Coordinator: Each university that felt the need to do so, proposed a discussion topic within the initial three that had been established (see below). The coordinator’s task was to organize and manage that topic within the community. How that task would be developed depended on the topic itself or on the coordinator’s choice. Even so, the following outline had to be followed:

  1) From Foodle, a discussion topic would be posted with several dates to choose from. Each topic had to be discussed in a short period of time, in a week, for instance.

  2) Once the best date has been selected the coordinator would confirm it, and would announce in advance the methodology and resources needed.

  3) As the discussion is taking place, clear forum regulations and dynamics would be maintained and...
enforced. The moderator would make a summary of the posts.

4) Even though participation in the wiki is open to all members of the community, the topic coordinator should incorporate in the wiki a summary of all the forum discussions. This summary should include the URLs, resources and materials that were shared or created for the discussion. The wiki has a structure that is offered as a starting point, but each moderator may re-structure it as often as necessary within their section.

- Participants: can post in any of the discussions within the three possible units.
- Compilation of the results and design of the final report: The Project manager will supply the results obtained in the usability surveys, and will offer a draft of the final report for discussion.

The project has been focused on three main topics following the methodology above. About each of those topics one or more discussions have been brought about:

- **Best Practices in the use of ICTs for distance learning:**
  1. Learning Objects Assessment, coordinated by the University of Colima.
  2. E-tutorials coordination, coordinated by the University of Belgrano.
  3. Formative evaluation with E-portfolios and E-Rubics, coordinated by the University of Málaga.

- **ICTs and Multiculturality:**
  1. Indigenous development and intercultural bilingual education (Linguistic E-niche): coordinated by the University of Zulia and with the participation of the Central University of Venezuela.

- **Community consolidation:**
  1. Proposal of a Specific Agreement: After the experience in the second year, it is clear that there is a need to extend the collaboration framework towards a formative project proposal, and a program certification among the participating universities.

### 3.4. Usability

The ever-growing presence of web-based virtual environments based has given rise to a great number of publications about the usability criteria of platforms and modules, and also about the application of different assessment techniques in e-learning. In fact, simplicity of use is one of the factors that is most mentioned among the criteria that guide the selection of a virtual environment. However, apart from the purely academic exercises, few usability studies are conducted about our universities virtual working environments [18].

Several circumstances have come together in this project that encourage a usability evaluation: on the one hand, the fact that the assessed environment is not a traditional LMS, which arises questions about the possible response of users who are used to performing in closed platforms, with the inertia that is implied in this; on the other hand, project participants’ profile, who are teachers with some experience in virtual environments, but with no previous practice in federated services.

There are many usability analysis models and techniques, but most of them are focused on the assessment of software in its traditional sense, or they study e-learning platforms. This is why, and given the circumstances of the environment to be assessed, that the SUS (System Usability Scale) tool has been chosen [19]. This instrument has several features that would make it eligible to analyze usability in general [20]:

1) It is technologically agnostic, which makes it flexible enough to assess a wide range of products and technologies.
2) It is particularly simple and fast, with only 10 questions, as opposed to other tools (CSUQ, PSSUQ, USE).

3) It provides a single score in a specific rating, so its meaning is easy to understand.

4) It can be freely used, as opposed to SUMI or WAMMI which are privative.

According to different studies it reaches a reliability that ranges from 0.85 to 0.91 despite its simplicity. This places it among the most reliable in the market, even when analyzing samples of several sizes in clear contrast to other tools that would require a specific size [21].

The original Brooke scale has been slightly modified for this project: on the one hand, it was because of the need to adapt to a context in which participants do not speak English as a native language [22]. On the other hand, it was done to simplify the interpretation of the original rating of 0-100. Following Bangor et al. [23] an eleventh question was added (Would you assess the simplicity of use of this environment as…) introducing an adjective-anchored Likert scale with seven items: The worst ever—bad—poor—OK—good—excellent—unbeatable. Bangor et al. have shown that using this type of adjective-anchored scale would provide results that would coincide with the general SUS scale. This means that a label summarizing the meaning of the global score could be easily obtained.

At the time of writing the present essay some participants had yet to fulfill their surveys, thus, the detailed statistical analysis of the results will have to be conducted in the future. However, some partial data can be provided:

The profile of most of the participants is a professor (79%), a few of whom also belong to the university management (5.2%), and the rest are training courses designers and administrators (15.8%). Therefore, managers and administrators would add up to 21% of the sample. None of the participants is an ICT technical expert. The professors teach in the following fields: Science 16.6%, Technology 29.16%, Social Sciences 50% and other fields 4.24%. Regarding their level of experience, 22.72% are beginners, 18.18% have an intermediate level, 54.54 % are advanced users and only one participant 4.54% is an expert user.

As a first approach to the assessment of the collaboration federated environment, the answers to the adjective anchored scale are: “poor” (9.52%), “OK” (14.28%), “good” (52.38%), and “excellent” (23.80%). There are no answers for the extremes on the scale (“the worst ever”, “bad”, “unbeatable”).

4. Results and evaluation

Several materials have been generated because of the project. They are a series of documents that describe the work process and the final results that deal with the issues that have been discussed. Among others they are:

--Research results of E-tutor’s best practices, coordinated by UB and UCES. These documents mention skills, E-tutor’s responsibilities and roles.

--Formative assessment with E-portfolio and E-rubric, coordinated by the group from the University
of Málaga, regarding the supervision of skill-centered learning with a formative evaluation and a long-distance /or blended education.

-- Design of assessment ratings to evaluate teacher training courses and to assess the results of the research about the established communities of practice, coordinated by UCALP.

-- Theoretical and practical reflections about relaunching linguistic niches in Guainía-Río Negro, coordinated by Zulia University.

-- Learning objects Assessment tool, developed by Colima University and validated by the rest of the group.

Regarding the development process of the projects, i.e., its arrangements and implementation, great differences among the participating universities have been found. Most differences were mostly related to the level of institutional ‘inertia’. Thus, at relatively small but very dynamic universities, with a highly motivated group of teachers and technical experts, the meaning of the project and its purpose was easily understood. This was so, not only because of the project goals but also to encourage their own internal activity. Whereas in larger institutions, with plenty of material and human resources, reception was less important even when participating in the project.

Since all the universities involved include technological and pedagogical innovation among their immediate strategies, the differences mentioned above lead us to wonder what is the meaning of innovation. In fact, some universities not only reduce their innovation to simply choosing a well-known LMS, without bearing in mind the real practice that is achieved with that resource, but they also close the door to other more advanced technological alternatives. (There is no difference then with Spanish universities where the reasons that determine a particular selection about E-learning technologies usually range from the purely technical and simple imitation [24].) These type of conclusions has been a result in itself, however, given that it increases our knowledge of the implantation of real communities of practice in institutional environments.

Far more important, in terms of tangible results of the project, are the suggestions for future activities:

-- Community consolidation by means of a Specific Academic Cooperation Agreement, with all the participating universities. The agreement’s main goal will be to create the Scientific Network of the Ibero-American Space of Knowledge that will develop and strengthen experience and knowledge exchange among Ibero-American universities.

-- Joint design of postgraduate courses with certifications that are shared among several institutions.

These suggestions have sprung from the group’s performance and are directly related to the perception of a shared and de-centralized working space. This perception would not be possible in a traditional, directed and monolithic environment from a sole university.

5. Conclusion

Federation technologies are becoming widespread. The kind of environment that they facilitate may influence not only the way in which we learn, but also the way we work, what we participate in, and the way we interact both personally and institutionally. The current project focused on testing the pilot implementation of this type of distributed environments by a group of teachers involved in education technologies and teacher training.

The result has been highly positive, not only because of the material production, which is a record of the work that has been achieved, but also because of the multiplying effect it has had regarding suggestions for actions in the short future, particularly in the will to continue the community’s activity and the joint training projects that have been proposed.

In our opinion, these proposals are a good example of how the use of federated services, with an emphasis in collective involvement at all levels, can have a dynamizing effect that goes beyond the
technological to propose new working models for communities of practice, thus favoring synergy among institutions.

References


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[18] Prendes, Mª Paz (Dir.) Plataformas de campus virtual con herramientas de software libre. Comparative Analysis of the current situation at Spanish universities. Proyecto EA-2008-0257, Ministerio de Ciencia e Innovación. “the majority of those surveyed (72,1%) replies that they have not conducted any anlysis to know the assessment of the platform by the members of the university community.” [http://www.um.es/campusvirtuales/informe_final_CVSL_SF.pdf](http://www.um.es/campusvirtuales/informe_final_CVSL_SF.pdf)


[24] “Many of the Spanish universities have not conducted a previous research to decide which tool is the most appropriate” From 66.7% to 81.8% of their experts have declared that they know no solution other than the one they decided to install. See Prendes, Mª Paz. op. cit. n 18.

José A. Accino
accino@uma.es
Systems section- SCI (Chief IT Service)
University of Málaga

Manuel Cebríán de la Serna
(mcebrian@uma.es)
Education Sciences School
University of Málaga