

Remote Experimentation Network

Yielding an Inter-University Peer-to-Peer e-Service

Abstract

The goal of this presentation is to discuss the benefits and challenges of yielding an inter-continental network of remote laboratories supported and used by both European and Latin American Institutions of Higher Education. Since remote experimentation, understood as the ability to carry out real-world experiments through a simple web browser, is already a proven solution for the educational community as a supplement to on-site practical lab work (and in some cases, namely for distance learning courses, a replacement to that work), the purpose is not to discuss its technical, pedagogical, or economical strengths, but rather to raise and try to answer some questions about the underlying benefits and challenges of establishing a peer-to-peer network of remote labs. The case of peer-to-peer networks, characterized by the empowerment of each node rather than the network in itself, is transposed to the suggested scenario: an inter-university free e-service where each university acts both as a supplier and as a client in relation to the other universities. A key aspect of that empowerment is the social involvement of the teacher(s) willing to provide access to an existing remote experiment (provider) and of those willing to use it within a certain course. Any inter-institutional link must be first established through the social interaction of teachers from both sides, so that students may, later on, feel confident enough to:

- a) use a remote accessible physical resource (the case of a remote lab);
- b) ask for tutor support from any of the two sides;
- c) work in collaboration with students from the other university to perform a given remote experiment that calls for group work.

The inter-institutional links are to be explored by each partner in the following manner:

- the contact person (lecturer) of one institution seeks for remote experiments useful for his/her course. If a match is found then contact the partner responsible for that remote experiment.
- the contact person of one institution seeks for courses - offered by his/her institution - that could benefit from a remote experiment made available by the contact person of a partner institution. If a match is found then contact the colleague responsible for that course and if he/she evidences interest then mediate the establishment of a link.
- the contact person of one institution seeks for remote experiments - supported by his/her institution - that could serve a course lectured by the contact person of a partner institution. If a match is found then contact the colleague responsible for that remote experiment and if he/she shows interest to make it available then mediate the establishment of a link.

[Note: insert “inter-institutional-links.jpg” here]

In our view, the social involvement of at least one player highly motivated to and deeply involved in remote experimentation, is a key aspect for guaranteeing the success of such a peer-to-peer network. It is precisely the human (or social) factor that ultimately makes the difference – if users know that the system is open to a large community where the chance of interacting with people from other countries (and cultures) is high, while also knowing that there is a common basis for understanding, namely the subjects addressed by the practical work associated with a given remote experiment, then motivation increases and the level of scepticism towards a remote approach (in direct comparison to using a real lab) decreases. The combination of these two factors (higher motivation, lower scepticism) undoubtedly increases the educational value of remote experimentation, namely if users are able to practice their social skills while cooperating to achieve a certain learning objective. The passage to such a scenario comes from the underlying social relations -

already established through the RexNet project - among the providers of remote experiments and the contact persons of the potential client institutions, who are responsible for mediating the all process, i.e. seeking for potential users within their own institutions, explaining the benefits of remote experimentation, initiating the dialogue between client and provider and then carefully following the established connection for any possible troubleshooting. Besides this social intervention, all partners are encouraged to promote the development of new remote experiments addressing real needs identified within the consortium – a concerted effort that brings in additional benefits:

- the initial quantity of potential users is multiplied by the number of institutions belonging to the network.
- reduces the effort to set up remote experiments, especially if using free and/or open-source tools already in use within the consortium (e.g. Learning Management Systems, synchronous communication tools, among others).

Besides the benefits pointed out, there are several challenges associated with a peer-to-peer network of remote labs, namely:

- The effort required to harmonize the interface to each remote experiment (or lab), namely of those already available. Considering the additional requirement of multi-lingual support, such effort considerably increases.
- Increasing the number of potential users also increases the potential demand for tutor assistance. Even if the number and availability of tutors is reinforced by setting-up an international tutors' pool – taking advantage of the different time zones, e.g. time distance between Germany and Mexico is 7 hours – pertinent questions like the language and the level of demand will always arise.
- Additional costs associated with the short-term bilateral visit between the remote experiment provider and the institutional client, which should precede every newly established link. Although one could argue that 'breaking-the-ice' is also possible through video or audio-conference, the advantages of presential, face-to-face first acquaintances are generally well understood and accepted by all.

Summing up, one may accept the benefits to balance the challenges, as well as regard such a network as a constructive mechanism to help students gain the working and social skills often valued by multinational/global companies, while also providing awareness of local cultural aspects.

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