Value Chain	Expert Group	R&D&I Group	Journal Group	Keywords Group	Educational innovation practices group
Development Resources	Emerging techno-logy	Human and technolo-gical resources		Emerging techno-logy	Emerging technology
Development Method		Scientific methods	Scientific methods	Techni-ques	Techniques
				Compe-tences	Competences
Results Context	Subject		Value of the generated knowledge		
	Degree				
	University				
Results Impact		External impact			
Results Characteristics		Innovation characteris-tics			
Dissemination /accreditation	Conferen-ce Journal				

3.3 Research for obtaining indicators of good educational innovation practices based on the context and target group

The research was conducted in three phases; the first two used empirical methods, while the third used a descriptive one. The first and second phases were conducted in a two-days seminar (September 10-11, 2012) and the third through a questionnaire. The first and second phases were called 2.p activity as it was aimed at both the speaker (micro-conferences) and the attendances (cooperative work) [4].

Phase 1. Indicators from the organizational point of view in educational innovation related contexts.

A six-expert group suggested innovation-related indicators both in the education area (university, non-university and training in workplace) and in a generic way (technological innovation, quality indicators in scientific journals and scientific conferences).

Experts presented their conclusions through half-hour conferences and a curator organized and related the knowledge provided by them.

Phase 2. Indicators from faculty point of view

In this second stage 54 teachers from different universities were met. They were organized in four parallel working-groups. Each group also counts with two experts/researches from the project staff, one with the moderator role and other with the aim to boost the group's discussions.

The work session began with the intervention of a speaker introducing various aspects related to the educational innovation value chain (motivation, characteristics of the innovation, development and result). Each group had the task of identifying characteristics or indicators for each of the value chain categories. The working sessions were organized so that each group has 25 minutes for discussion of each category and, once consumed, the group representative set out the conclusions to all attendees.

One curator made an organization work of all the group expositions representing the knowledge into a conceptual map (http://www.mindomo.com/es/view.htm?m=6896bd5017504f158f6847a9ea028039).

Phase 3. Questionnaire about educational innovation. Measurement of the indicators

From the conceptual map obtained at the seminar, a twenty-question questionnaire was developed. The first eight questions were devoted to identify the participant's profile and experience, the other twelve ones were about the educational innovation measuring.

This questionnaire was sent to 600 university teachers with experience in educational innovation, which participated as speakers in at least one of the following conferences:

- CINAIC 2011 (http://www.cinaic.com/).
- CITEC 2012 / CIE 2012 (http://www.uned.es/infoedu/CIE-2012/).
- XXCUIEET (http://www.eiic.ulpgc.es/xxcuieet/).
- *VI Jornadas de Innovación Docente* (http://www.unizar.es/innovacion/jornadas12/).

426 people answered the questionnaire, 228 completely answered the questionnaire and 198 left any questions unanswered. The analysis presented in Table 3 and Table 4 is derived from the 228 full responses collected.

Table 3 presents the question 1 (Q1) answers distribution. This question wondered to the surveyed that selected all the option related to his/her previous experiences with educational innovation.

Table 3. Surveyed type linkage with educational innovation

Relationship with educational innovation (Q1)	Response rate
Application in your subjects	90.50
Research and studies	60.18
Funded educational innovation projects	75.57
Educational innovation trainer	31,.22
Innovation management responsibilities	10.86

Respondent's years of experience mean was over 9 years (9.4). The 50.68% of the participants were female and 49.32% male.

Some of the most valued indicators by the respondents are summarized in Table 4.

Table 4. Most valued indicators

Question	Options and rates
Q2. Educational innovation characteristics	– Effective in learning outcomes (85.07%) – Sustainable and transferable (78.28%) – Intentional, planned and purposeful improvement change (75.57%) – Using methodologies that involve an increased activity by students (67.42%)
Q3. Motivation	– Official recognition (57.47%) – Capturing student's interest (45.25%) – Responsibility and challenge (33.94%) – Cooperation (29.86%) – Being updated (27.45%)
Q4. Facilitators	– No institutional technology resources (46.15%) – Support for student (46.15%) – Experience (41.18%) – Support for the faculty (38.46%) – Institutional technology resources (37.56%)
Q4.1. Where have you found useful information	– Conference, workshops and seminar papers (78.025) – Journal papers (68.13%)
Q5. Barriers	– Lack of indicators (56.56%) – Development effort (54.30%) – Weak institutional recognition (52.49%)
Q6. Educational innovation success	– Active participation of the students (88.24%) – Student's motivation (87.33%) – Academic performance improvement (81.90%)
Q7. Aspects to improve educational innovation	– Technical and human (85.97%) – Faculty training (78.28%) – More institutional recognition (78.28%) – Promotion of the educational innovation culture (76.92%)

Question	Options and rates
	– Ease of access to other teachers' experiences (67.42%)

4. RESULTS

The main results of this research projects are the following ones:

1. A set of educational innovation indicators.
2. The technological ecosystem for educational innovation good practices searching.

The indicators allow measuring the educational innovation result from the point of view of both institution and faculty as it is shown in Table 5.

Table 5. Result indicators to measure the quality of an innovative education practice

University oriented indicators	Faculty oriented indicator
Kind of R&D&i • Basic • Applied • Experimental development Funding source (competitive call) • University • Regional project • National project • International project Kind of practice • Experience • Study • Research • Development • Innovation Participant human resources	Impact on the methodology • Existing methodology improvement • New methodology • Methodology identification Impact on the learning • Active participation of the students • Effort reduction • Resource adaptability to students' necessities • Student's motivation improvement • Learning outcomes improvement Technology used (not necessarily emergent) Learning technique used

Other elements have also been obtained that, in the opinion of the respondents, are helpful for dynamizing of educational innovation. The main indicators, whose inclusion would facilitate the innovation, the sources of experience attraction, or eliminating barriers that hinder the innovators, are included in Table 6.

The searcher for best practices is a system that uses some of the indicators obtained in this research project as search criteria and partly as classification criteria. Currently the searcher is a prototype with 130 innovative educational experiences. The main searcher screen may be seen in Figure 1.

Table 6. Indicators that influence educational innovation promotion

Question	Main indicators obtaining in the survey
Resources that facilitate educational innovation	• Support for the students • Open/free technological resources (non-institutional) • Other teachers' experiences
Sources for obtaining experiences	• Conferences, workshops and seminars • Paper journals
Educational innovation barriers	• Lack of indicators • Faculty effort • Shortage of available supporting resources • Weak institutional recognition (external to the university)

Figure 1. Searcher main screen

5. CONCLUSIONS

Educational innovation is one of the pillars of the teaching dimension or mission in the XXI Century University. Web 2.0 philosophy [2] and an institutional commitment to open knowledge [8] in the most of the universities [7] must improve the innovative teaching practices, as well as an active exchange of knowledge to avoid the effect of reinventing the wheel over and over again [6]. This work goes in this direction proposing both a methodological instrument based on indicators to classify innovative education experiences and practices and a technological ecosystem for sharing and finding out them.

The sustainability of the work is guaranteed because of we work with several conferences that provide good educational innovation practices and experiences that are classified and measured taking into account the defined set of indicators. The work finished in 2012 with the contribution of good practices from 4 conferences, also in 2013 other 3 new conferences have been added. Authors of this work will start offering the knowledge management system to educational innovation scientific conferences from 2014.

The transferability of the experience occurs internally and externally.

Internally, the system is able to adapt itself to any are of knowledge, university, degree or specific subject, whether exist or not similar experiences.

The external transferability is based on the use of the results of this work in other contexts. As a first successful case, the outcomes of this research work are already being implemented both at he Polytechnic University of Madrid and the University of Zaragoza for classifying and measuring educational innovation practices produced in these universities.

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7. REFERENCES

[1] ADRION, W.R., 1993. Research methodology in software enginering: summary of the dagstuhl workshop on future directions on software engineering. *SIGSoft Software Engineering Notes 18*, 1, 36-37.

[2] BERLANGA, A.J., GARCÍA PEÑALVO, F.J., and SLOEP, P.B., 2010. Towards eLearning 2.0 University. *Interactive Learning Environments 18*, 3, 199-201. DOI= http://dx.doi.org/10.1080/10494820.2010.500498.

[3] BOE, 2011. *Proyecto EA2011-0035. Desarrollo de un sistema de gestión de conocimiento para facilitar la aplicación de las mejores prácticas de innovación docente.*

[4] FIDALGO BLANCO, Á., 2012. Title. In Innovación Educativa, http://innovacioneducativa.wordpress.com/2012/09/29/actividades-2-p/.

[5] FIDALGO BLANCO, Á. and PONCE, J., 2011. Método CSORA: La búsqueda de conocimiento. *Arbor: Ciencia, pensamiento y cultura 187*, No Extra_3, 51-66. DOI= http://dx.doi.org/doi:10.3989/arbor.2011.Extra-3n3128.

[6] GARCÍA-PEÑALVO, F.J., 2011. La Universidad de la próxima década: La Universidad Digital. In *Universidad y Desarrollo Social de la Web*, C. SUÁREZ-GUERRERO and F.J. GARCÍA-PEÑALVO Eds. Editandum, Washington DC, USA, 181-197.

[7] GARCÍA-PEÑALVO, F.J., GARCÍA DE FIGUEROLA, C., and MERLO, J.A., 2010. Open knowledge management in higher education. *Online Information Review 34*, 4, 517-519.

[8] GARCÍA-PEÑALVO, F.J., GARCÍA DE FIGUEROLA, C., and MERLO, J.A., 2010. Open knowledge: Challenges and facts. *Online Information Review 34*, 4, 520-539. DOI= http://dx.doi.org/10.1108/14684521011072963.

[9] NISO, 1979. Preparation of Scientific Papers for Written or Oral Presentation. ANSI Z39.16-1972. National Information Standards Organization.

[10] OECD, 2002. *Frascati Manual 2002: Proposed Standard Practice for Surveys on Research and Experimental Development, The Measurement of Scientific and Technological Activities*. OECD Publishing.

[11] OECD, 2005. *Oslo Manual: Guidelines for Collecting and Interpreting Innovation Data*. OECD Publishing, Luxembourg.

[12] OECD, 2012. *Main Science and Technology Indicators, Vol. 2011/2*. OECD Publishing.

[13] TOMASEVSKI, K., 2006. *The State of the Right to Education Worldwide. Free or Fee: 2006 Global Report.*

[14] UNESCO, 2011. *Criteria for the selection of best policies and practices in literacy.* OREALC /UNESCO.

[15] UNESCO, 2013. *Alfabetización y Educación. Lecciones desde la Práctica Innovadora de América Latina y el Caribe*. OREALC/UNESCO, Santiago de Chile, Chile.