



Educational Innovation Management. A Case Study at the University of Salamanca

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Outline

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Once upon a time

<https://pixabay.com/es/%C3%A9rase-una-vez-escriitor-autor-719174/>

1. Introduction





Introduction

Making a conceptualization of the knowledge with the aim of transferring and using it usually generates significant advantages in the organizations (Nonaka et al., 2008)



Introduction

This work is devoted to present how the University of Salamanca (Spain) shares its educational innovation knowledge base throughout a knowledge management system

A process has been applied that is based on the Nonaka's knowledge spirals (Nonaka & Takeuchi, 1995) integration and theoretically defined in (Fidalgo et al., 2014)

Introduction

- The method of the knowledge spirals is used to create organizational knowledge from the individuals of the organization
- There are two types of spirals
 - The first one is the epistemological spiral, which means interaction between types of knowledge, i.e. transformation between tacit and explicit knowledge (Sein-Echaluze et al., 2013)
 - The second one is the ontological spiral, which means interaction between knowledge of persons and the organization (Fidalgo et al., 2015)



Introduction

Educational innovation tries to improve the competitiveness of the teaching process itself and the necessary transformation of the knowledge created by faculty into organizational knowledge and integrate it with external knowledge deriving from other universities

Introduction

The followed process may be summarized in these steps

- Adaptation to the University of Salamanca context of an applicable ontology to the educational innovation at the university level
- Inclusion of a continual methodology that integrates the ontologies of knowledge generated in the epistemological and ontological spirals, with a KMS, as a driving force for the ontological spiral at the university level
- Choice of a KMS which, based on the previous contributions, enables the classification, organization and application of knowledge deriving from the educational innovation experiences carried out on behalf of the University of Salamanca faculty



<https://static.pexels.com/photos/73669/startup-photos.jpg>

2. Ontology definition



Previous works

This experience starts from the previous works done in this area by means of a project financed by the Ministry of Education, Culture and Sport of the Spanish Government, as a public and competitive call (Fidalgo, 2012)

These previous works had caused an ontological spiral produced by more 300 teachers with educational innovation experience (Fidalgo et al., 2014; 2015)

The ontology base is presented to twenty-five researches of the University of Salamanca that refines the ontology with a first epistemological cycle to adapt the starting base to the reality of the University of Salamanca scope

At the end of this cycle, an adapted ontology for the University of Salamanca was defined. But, after that, a refinement cycle was developed using thirty selected educational projects that were classified applying the ontology

Ontology structure

To define the University of Salamanca ontology the focus has been centered on the Learning context in order to produce a classification system organized into four characteristics

1. Activity
2. Technology
3. Methods and Techniques
4. Outcomes

Activity

- Academic works (course work, module, etc.)
- Assessment
- Collaboration among teachers
- Collaboration with external professionals
- Collaborative writing tools
- Creation and evaluation of materials
- Decision making
- External practices
- Field trips
- General dynamics of the degree
- General dynamics of the subject
- General information management
- Implementation of information systems to improve the coordination, monitoring and quality assurance
- Laboratory practical classes
- Master classes
- Microworks
- Outreach activities
- Relationship with companies or other bodies (professional practices, etc.)
- Software applications development
- Troubleshooting, cases, seminars, workshops, etc
- Tutoring, mentoring and coaching
- Virtual practices

Activity characteristic refers to the key element of the educational process that is addressed by a specific educational innovation project

Technology

- Another specific software
- Audiovisual devices
- CAD/CAM/CAE
- Collaborative work environments
- Collaborative writing tools online (blog, wiki, Google Drive, etc.)
- Concept mapping software
- Data analysis
- Database
- Digital whiteboards
- Geographical software
- Hardware devices
- Learning objects
- LMS (Learning Management Systems)
- Mathematical Software
- Mobile devices
- Open software
- PLE (Personal Learning Environments)
- Presentation Software
- Repositories
- Simulators
- Social networks and communities of practice
- Software for questionnaires and surveys
- Software project management
- Technological ecosystems
- Virtual worlds
- Without technology

Technology characteristic refers to the main technologies used in the educational innovation project

Methods and techniques

- Academic and learning analytics
- Active participation of students in the assessment process
- Adaptive methods
- Assessment rubrics
- Autonomous learning
- Case based learning
- Case method
- Competences assessment
- Cooperative/collaborative learning
- Debate and discussion groups
- Diagnostic evaluation
- Formative assessment
- Game-based learning (role games, serious games, etc.)
- Gamification
- Learning agreement
- Logical framework approach
- Methods of data collection
- Online methodologies
- Oral exposition
- Organizational learning
- Problems/projects based learning
- Role playing
- Self-assessment
- Student participation in teaching
- Teaching portfolio
- Texts, works and projects analysis

The Methods and Techniques refer to the educational methodology that is used in the educational innovation projects

Outcomes

- Approach to the professional practice
- Setting the student workload
- Increase of the student motivation
- Interdisciplinary and multiculturalism
- Improvement of the student autonomy
- Improvement of the teachers' skills
- Improvement of the specific skills
- Improvement of the generic or transferable skills
- Improvement of student recruitment
- Improvement of the coordination among teachers
- Improvement of the efficiency (success rates and performance)
- Improvement of the learning process
- Improvement of the assessment process
- Improvement of the quality assurance system
- Improvement of the management system for educational innovation
- Active participation of students in teaching
- Penetration and technology acceptance
- Recognition of informal learning

The Outcomes characteristic refers to the expected results at the end of the educational innovation project

BRACO

BUSCADOR DE RECURSOS ACADÉMICOS COLABORATIVOS

Entrada al sistema ✕

Usuario:

Clave:



3. BRACO



BRACO

- BRACO is a specific repository oriented only to support educational innovation experiences in which the previous described ontology may be used for resources classification purposes
- BRACO consists of a KMS (to which faculty contribute with educational innovation projects) and an adaptive search engine (used by teachers to locate the educational innovation projects)
- The result of the system is a browser in which a user may search educational innovation projects according the structure of the developed ontology

BRACO searching panel



BUSCADOR DE RECURSOS ACADÉMICOS COLABORATIVOS

Búsqueda

CRITERIOS DE BÚSQUEDA

Contextos: [# Configurar](#)

APRENDIZAJE

ACTIVIDAD ▾

TECNOLOGÍA ▾

MÉTODOS Y TÉCNICAS ▾

RESULTADOS ▾

COMPETENCIA GENERÍCA

LUGAR Y MATERIA

TIPO

Texto a buscar:

Con la **frase exacta**.

Con **todas** las palabras.

Con **alguna** de las palabras.

Buscar en Todos ▾

[Buscar](#) [Nueva búsqueda](#)

BUSCADOR SEMÁNTICO

- Para realizar una búsqueda debe seleccionar los contextos marcando las casillas en las que tenga interés.
- Puede realizar búsquedas por textos y combinarlas con las búsquedas por contextos.

Selected labels within Activity characteristic

Búsqueda

CRITERIOS DE BÚSQUDA

Contextos:
Configurar

APRENDIZAJE

ACTIVIDAD ⌵

- Actividades de divulgación
- Clase Magistral
- Clases prácticas de Laboratorio
- Colaboración de profesionales externos ?
- Colaboración entre profesorado
- Creación y evaluación de materiales
- Desarrollo de herramientas software
- Dinámica general de la asignatura
- Dinámica general de la titulación
- Gestión de información general ?
- Herramientas de escritura cooperativa
- Implantación de sistemas de información para la mejora de la coordinación, seguimiento y garantía de calidad
- Microtrabajo
- Prácticas de campo
- Prácticas externas
- Prácticas virtuales
- Pruebas de evaluación
- Relación con empresas u otros organismos (profesionales, prácticas, etc.)
- Resolución de problemas, casos, seminarios, talleres, etc.
- Toma de decisiones ?
- Trabajos docentes (trabajos de asignatura, de módulo, etc.)
- Tutorización, mentoring y coaching

TECNOLOGÍA ⌵

MÉTODOS Y TÉCNICAS ⌵

RESULTADOS ⌵

BUSCADOR SEMÁNTICO

- Para realizar una búsqueda debe seleccionar los contextos marcando las casillas en las que tenga interés.
- Puede realizar búsquedas por textos y combinarlas con las búsquedas por contextos.

RESULTADOS DE LA BÚSQUEDA - SU SELECCIÓN

- ▶ ACTIVIDAD: Toma de decisiones , Implantación de sistemas de información para la mejora de la coordinación, seguimiento y garantía de calidad y Actividades de divulgación .

AGRUPACIÓN DE LOS RECURSOS SELECCIONADOS

- ▶ [Proyecto de Innovación](#) [5 recurso(s)]

PORTAFOLIO

[Generar](#) [Vaciar](#)

Recursos de Proyecto de Innovación

[Recogida y análisis de evidencias de aprendizaje en el contexto de Studium](#)

[Editar](#) [Porfolio](#)

[Proyecto Oria 2.0. La construcción de la identidad digital a través del retrato fotográfico](#)

[Editar](#) [Porfolio](#)

[I Jornadas culturales y científicas de la Escuela Universitaria de Educación y Turismo: "La Universidad de Salamanca en Ávila". "+Escuela, +Educación y +Turismo"](#)

[Editar](#) [Porfolio](#)

[Gestión de la identidad digital del investigador como medio de coordinación y seguimiento en el Programa de Doctorado de Formación en la Sociedad del Conocimiento](#)

[Editar](#) [Porfolio](#)

[Desarrollo e implantación de un programa de formación continuada de profesores y alumnos de la Facultad de Farmacia con recursos propios.](#)

[Editar](#) [Porfolio](#)



Results of the performed search

New searching settings

CRITERIOS DE BÚSQUEDA

Contextos:
* Configurar

APRENDIZAJE

ACTIVIDAD ?

- Actividades de divulgación
- Implantación de sistemas de información para la mejora de la coordinación, seguimiento y garantía de calidad
- Toma de decisiones ?

TECNOLOGÍA ?

MÉTODOS Y TÉCNICAS ?

RESULTADOS ?

- Acercamiento a la realidad profesional
- Ajuste de la carga de trabajo del estudiante
- Aumento de motivación del estudiante
- Interdisciplinariedad y multiculturalidad
- Mejora autonomía del estudiante
- Mejora de competencias del profesorado ?
- Mejora de competencias específicas ?
- Mejora de competencias genéricas o transversales
- Mejora de la captación de estudiantes
- Mejora de la coordinación entre el profesorado
- Mejora de la eficacia (Tasas de éxito y rendimiento)
- Mejora del proceso de aprendizaje
- Mejora del proceso de evaluación
- Mejora del sistema de garantía de calidad
- Mejora del sistema de gestión de la innovación
- Reconocimiento del aprendizaje informal
- Participación activa del estudiante en la docencia
- Penetración y aceptación tecnológica

COMPETENCIA GENERICA

BUSCADOR SEMÁNTICO

- Para realizar una búsqueda debe seleccionar los contextos marcando las casillas en las que tenga interés.
- Puede realizar búsquedas por textos y combinarlas con las búsquedas por contextos.

New searching result

RESULTADOS DE LA BÚSQUEDA

RESULTADOS DE LA BÚSQUEDA - SU SELECCIÓN

- ▶ ACTIVIDAD: Toma de decisiones , Implantación de sistemas de información para la mejora de la coordinación, seguimiento y garantía de calidad y Actividades de divulgación .
- ▶ RESULTADOS: Mejora del sistema de gestión de la innovación y Mejora del sistema de garantía de calidad .

AGRUPACIÓN DE LOS RECURSOS SELECCIONADOS

- ▶ [Proyecto de Innovación](#) [1 recurso(s)]

PORTAFOLIO

Generar
Vaciar

Recursos de Proyecto de Innovación

Gestión de la identidad digital del investigador como medio de coordinación y seguimiento en el Programa de Doctorado de Formación en la Sociedad del Conocimiento

✎ Editar
📁 Porfolio



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<http://www.deviantart.com/>

5. Conclusions



Conclusions

- It has been presented a pilot experience in the University of Salamanca about the management of the educational innovation projects, with the aim of the Government Team of the University has a starting point to change and improve current practices in the institutional Programme of Educational Innovation
- A repository has been proposed in which these projects may be stored and classified, according to the developed ontology for the University of Salamanca scope
- Moreover, taking into account the defined characteristics of the learning context (Activity; Technology; Methods & Techniques; Outcomes), the University could redefine its own procedure for educational innovation projects application
- This way an easier control process might be implemented that will guarantee a more quality in the institutional Programme of Educational Innovation and more reusability of the selected projects by the faculty



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References



References

- Al-Husseini, S., 2015. Knowledge Sharing Practices as a Basis of Product Innovation: A Case of Higher Education in Iraq. *International Journal of Social Science and Humanity* 5, 2, 182-185. DOI= <http://dx.doi.org/http://doi.org/10.7763/IJSSH.2015.V5.449>.
- Cheng, M.-Y., Ho, J.S.-Y., and Lau, P.M., 2009. Knowledge sharing in academic institutions: a study of Multimedia University Malaysia. *Electronic Journal of Knowledge Management* 7, 3, 313–324.
- Fernández-Pampillón Cesteros, A.M., Domínguez Romero, E., and Armas Ranero, I., 2013. Análisis de la evolución de los Repositorios Institucionales de material educativo digital de las universidades españolas. *RELATEC. Revista Latinoamericana de Tecnología Educativa* 12, 2, 11-25.
- Fidalgo-Blanco, Á., 2012. Desarrollo de un sistema de gestión de conocimiento para facilitar la aplicación, en contextos formativos, de las mejores prácticas de innovación docente.
- Fidalgo-Blanco, Á., Sein-Echaluce Lacleta, M.L., Lerís, D., and García-Peñalvo, F.J., 2013. Sistema de Gestión de Conocimiento para la aplicación de experiencias de innovación educativa en la formación. In *Actas del II Congreso Internacional sobre Aprendizaje, Innovación y Competitividad, CINAIC 2013* Á. Fidalgo Blanco and M.L. Sein-Echaluce Lacleta Eds. Fundación General de la Universidad Politécnica de Madrid, Madrid, Spain, 750-755.
- Fidalgo-Blanco, Á., Sein-Echaluce, M.L., and García-Peñalvo, F.J., 2014. Knowledge Spirals in Higher Education Teaching Innovation. *International Journal of Knowledge Management* 10, 4, 16-37. DOI= <http://dx.doi.org/10.4018/ijkm.2014100102>.

References

- Fidalgo-Blanco, Á., Sein-Echaluce, M.L., and García-Peñalvo, F.J., 2015. Epistemological and ontological spirals: From individual experience in educational innovation to the organisational knowledge in the university sector. Program: Electronic library and information systems 49, 3, 266-288. DOI= <http://dx.doi.org/http://dx.doi.org/10.1108/PROG-06-2014-0033>.
- Fidalgo-Blanco, Á., Sein-Echaluce, M.L., García-Peñalvo, F.J., and Conde-González, M.Á., 2014. Learning content management systems for the definition of adaptive learning environments. In Proceedings of 2014 International Symposium on Computers in Education (SIIE), Logrono, La Rioja, Spain, 12-14 Nov. 2014, J.L. Sierra-Rodríguez, J.M. Dodero-Beardo and D. Burgos Eds. Institute of Electrical and Electronics Engineers, USA, 105-110. DOI= <http://dx.doi.org/10.1109/SIIE.2014.7017713>.
- 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>.
- García-Peñalvo, F.J., Merlo-Vega, J.A., Ferreras-Fernández, T., Casaus-Peña, A., Albás-Aso, L., and Atienza-Díaz, M.L., 2010. Qualified Dublin Core Metadata Best Practices for GREDOS. Journal of Library Metadata 10, 1 (January 2010), 13-36. DOI= <http://dx.doi.org/http://dx.doi.org/10.1080/19386380903546976>.
- Krishnamurthy, M. and Kemparaju, T.D., 2011. Institutional repositories in Indian universities and research institutes. Program: Electronic library and information systems 45, 2, 185-198. DOI= <http://dx.doi.org/http://doi.org/10.1108/00330331111129723>.
- Nonaka, I. and Takeuchi, H., 1995. The knowledge creating company. Oxford University Press, New York, NY.
- Nonaka, I., Toyama, R., and Hirata, T., 2008. Managing flow: A process theory of the knowledge-based firm. Palgrave Macmillan, New York, NY.

References

- Rosales López, C., 2013. Análisis de experiencias de innovación educativa. *Enseñanza & Teaching* 31, 2, 45–68.
- Sein-Echaluce Lacleta, M.L., Fidalgo-Blanco, Á., García-Peñalvo, F.J., and Conde-González, M.Á., 2015. A knowledge management system to classify social educational resources within a subject using teamwork techniques. In *Learning and Collaboration Technologies. Second International Conference, LCT 2015, Held as Part of HCI International 2015, Los Angeles, CA, USA, August 2-7, 2015, Proceedings*, P. Zaphiris and I. Ioannou Eds. Springer International Publishing, Switzerland, 510-519. DOI=http://dx.doi.org/10.1007/978-3-319-20609-7_48.
- Sein-Echaluce, M.L., Fidalgo-Blanco, Á., and García-Peñalvo, F.J., 2016. Students' Knowledge Sharing to improve Learning in Engineering Academic Courses. *International Journal of Engineering Education (IJEE)* In Press.
- Sein-Echaluce, M.L., Lerís, D., Fidalgo-Blanco, Á., and García-Peñalvo, F.J., 2013. Knowledge management system for applying educational innovative experiences. In *Proceedings of the First International Conference on Technological Ecosystems for Enhancing Multiculturality (TEEM'13)* F.J. García-Peñalvo Ed. ACM, New York, USA, 405-410. DOI=<http://dx.doi.org/http://dx.doi.org/10.1145/2536536.2536598>.
- Zapata, A., Menéndez, V.H., Prieto, M.E., and Romero, C., 2013. A framework for recommendation in learning object repositories: An example of application in civil engineering. *Advances in Engineering Software* 56, 1-14. DOI=<http://dx.doi.org/http://doi.org/10.1016/j.advengsoft.2012.10.005>



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