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Submitted by (Name):

Fernando J. Mortera-Gutierrez, Ph.D
Full time Professor at Tecnológico de Monterrey, Virtual University, Graduate School of Education.

J. Vladimir Burgos-Aguilar, MTI, M.Sc
Educational Innovation Liaison Officer at Innov@TE, Center for Innovation in Technology and Education, and part time Professor at the Graduate School of Education (EGE) in Tecnológico de Monterrey (ITESM).

Address:

Mail Address:
Eugenio Garza Sada 2501
64849 Monterrey, N.L., Mexico

Phone: +52/81.8358.2000 ext. 6619 / ext. 6776

E-Mail: fmortera@itesm.mx, vburgos@itesm.mx

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Innovative Applications Using New Technology: The Case of the Knowledge Hub Search Engine and Open Educational Resources Building Communities of Practice.

***Abstract:**

The movement of Open Educational Resources (OER) is one of the most important trends that are helping education through the Internet worldwide, and it's a term that is being adopted every day in many

educational institutions. "Tecnológico de Monterrey" in Mexico has proposed and developed an important educational initiative, named: "**Knowledge Hub**" (KHUB). The initiative is conceived by the faculty's needs to find effective materials in teaching and learning and with the certainty that the resources found respects intellectual property and legal rights from their original authors. It is a public catalog that provides a multilingual search engine that allows the user to discover selected Open Educational Resources (OER) using metadata enriched by experts and enhanced by librarians, using Web 2.0 such faceted searching and social networking tools. The KHUB is for free use available on the Internet for teachers, professors and self-learners of all levels, from higher education to K12 (<http://khub.itesm.mx/>). This paper presents experiences on a project about innovative applications and the use of new technologies using OER which allowed building communities of practice among Mexican educational institutions during year 2009. The "Knowledge Hub for K12 Education Project" was funded by the *Corporación de Universidades para el Desarrollo del Internet* (CUDI) and by the *Consejo Nacional de Ciencia y Tecnología* (CONACYT) of Mexico and hosted by *the Tecnológico de Monterrey*, in Mexico. The main goal of this project was to generate and enrich a catalog of Open Educational Resources for basic or elementary education (K12) for Mexico and Spanishspeaking countries in Latin America, and the rest of the world; within the field of innovative education and technology, through the work and community of practice of K12 teachers and university faculty participants. Other goals of this project were to improve educational processes, faculty development, reduce educational gap, and to foster equity access of educational resources at K12 level. Six Mexican higher education institutions (universities and colleges) participated in this project, and this paper presentation will talk about their faculty experiences on how was build a community of practice to use innovative applications and new technologies. Also, this paper describes how Open Educational Resources (OER) were used in the K12 educational level through the "Knowledge Hub", the academic search engine developed by *Tecnológico de Monterrey* to help teachers in the design and instruction of their courses. The paper will comment and describe, also, how KHub has been working and its characteristics.

Introduction

The movement of Open Educational Resources (OER) is one of the most important trends that are helping education through the Internet worldwide, and it's a term that is being adopted every day in many educational institutions, from Higher Education to K12; especially those which have embraced distance education (e-learning) and information and communication technologies (ICT) as one of their major institutional and teaching efforts, such as "Tecnológico de Monterrey" (ITESM) has done in Mexico. *Tecnológico*

de Monterrey is a private, non-profit academic institution with 65 years of experience. It is composed of 33 campuses across Mexico that offer high-school programs, undergraduate and graduate degrees, continuing education, as well as social programs. Through technology-based distance programs, Tecnológico de Monterrey is a pioneer in distance education with more of 20 years of experience through its Virtual University, reaching 29 countries; at present time, the Virtual University offers totally online undergraduate, postgraduate, continuing education, and social programs

Tecnológico de Monterrey is one of the most competitive private higher education institutions in Mexico, has implemented for more than 20 years videoconferencing, TV satellite and online instruction to deliver distance education courses and programs, and also more than 10 years using different e-learning platforms (LearningSpace, BlackBoard, FirstClass, BSCW, WebTec) to enhance its traditional face-to-face and distance education programs at undergraduate and graduate level (Master and Doctoral programs). Through these e-learning electronic delivery educational platforms *Tecnológico de Monterrey* has reached all its 33 campuses around Mexico. Blackboard is its major e-learning platform, and it is widely used both locally (each campus has certain autonomy in its use) and through its Virtual University.

Tecnológico de Monterrey has worked in the past two years in several projects on the reuse of royalty free course materials from Carnegie Mellon University, Yale University, and the Massachusetts Institute of Technology, with the objective of identifying key critical factors to develop a model to effectively transfer OER. Capitalizing these experiences, Tecnológico de Monterrey proposed the creation of an important educational initiative, named “**Knowledge Hub**” (KHUB) at the World Economic Forum (WEF) in Davos, Switzerland, in January 2008 during a Global Universities Leaders Forum session (CNN, 2008).

Knowledge Hub is a public catalog that provides a multilingual search engine that allows the user to discover selected Open Educational Resources (OER) using metadata enriched by experts and enhanced by librarians, using Web 2.0 such faceted searching and social networking tools. The KHUB is for free use available on the Internet for teachers, professors and self-learners of all levels, from higher education to K12 (<http://khub.itesm.mx/>). It was created to assist teachers in the task of introducing innovations in the classroom which will improve the teaching-learning process, and by consequence, student retention, motivation and attention.

The main idea of KHUB is to have a unique index of open educational resources (include full courses, course materials, modules, textbooks, streaming videos, tests, software, and any other tools, materials or techniques used to support access to knowledge) available on the Internet to help students and teachers. KHUB objective is to assist professors and students in finding the educational resource that best suits their needs. To achieve this objective, KHUB uses metadata defined by experts, as well as specialized searching and social networking tools for sharing comments and rankings on the OER.

The Knowledge Hub it's a Mexican distance education initiative of the Tecnológico de Monterrey (ITESM) to the world. This initiative puts together the effort of both faculty and administrative staff of all its undergraduate and graduate programs to

create a website and academic search engine on the Internet and the World Wide Web, to offer indexed open educational resources (OER). These open educational resources are indexed and classified following a quality assurance process. “At the heart of the movement toward Open Educational Resources is the simple and powerful idea that the world’s knowledge is a public good and that technology in general and the World Wide Web in particular provides an extraordinary opportunity for everyone to share, use, and reuse knowledge. OER are the parts of that knowledge that comprise the fundamental components of educational content and tools for teaching, learning, and research” (Atkins, Brown, and Hammond, 2007, p. 6).

Knowledge Hub and Open Educational Resources for K12 Project Experience: Community of Practice

In the “Knowledge Hub for K12 Education Project” that was funded by the *Corporación de Universidades para el Desarrollo del Internet* (CUDI) and by the *Consejo Nacional de Ciencia y Tecnología* (CONACYT) of Mexico and hosted by *the Tecnológico de Monterrey*, in Mexico in 2009. Six higher education institutions were involved: Tecnológico de Monterrey (with 5 professors and 5 researchers), Universidad Regiomontana (with 2 professors), Comité Regional Norte de la Comisión Mexicana de Cooperación con la UNESCO, AC (with 3 researchers), Universidad de Montemorelos (with 4 professors), Instituto de Investigación, Innovación y Estudios de Posgrado para Educación, IIIPE (with 3 researchers) and Escuela Normal Miguel F. Martínez (with 5 teachers).

The group of 11 professors, 5 teachers and 8 researchers agreed to work virtually and locally with traditional face-to-face meetings using several communication mechanisms:

- A webpage (Blog) to centralize efforts of communication and documentation process (<http://khubk12.blogspot.com>)
- Web discussion forums to debate, argue and agree about several topics
- Electronic mail (email)
- Videoconference (Internet 2)
- Chat and web-conference
- Face-to-face local meetings

Also, the group agreed to have several training sessions through videoconference and recorded sessions through DVDs and power point slides. The training's sessions have had the objective to develop new skills and abilities about the use of web technology and information literacy. Also, the training sessions addressed the awareness about Open Educational Resources (OER) and the clarification about the use of resources and materials for teaching and learning purposes in the classroom.

In the group were identified access barriers for the use of Open Educational Resources (OER) in Mexico by teachers in K12 schools, such as technological infrastructure (lack of internet access, projectors and computers), legal issues (access of the resources in

terms of licensing), relevance about the content of the materials available on the Internet (resources mainly from other countries), lack of resources in Spanish (language issues), computer literacy gap in K12 schools and lack of awareness in the institutional level (lack of information in managerial levels).

The group coordinated 150 teachers in 20 schools using OER in basic education programs for learning and teaching in the classroom. The experiences were documented in the webpage (Blog) and critical topics were resolved in the discussion forums.

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