Work in Progress - PRISM: A Portal with a Purpose

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**Abstract** – Accomplishing change in education must start where learning begins: with the classroom teacher. The “Report to the Nation from the National Commission on Mathematics and Science Teaching in the 21st Century” was unequivocal in its message (Before It’s Too Late, September 2000). The way to improve learning in science, mathematics, and technology is to improve teaching. And better teaching can be achieved through better preparation, professional development, and working conditions for our nation’s teachers. Rose-Hulman Institute of Technology, with support from the Lilly Endowment, is constructing a Web portal dedicated to improving middle school science, mathematics, and technology (SMT) instruction. Essentially, this gateway emulates emerging corporate practices of knowledge management (KM) and process re-invention through information technology (IT).

**Index Terms:** portals, professional development, process re-invention, organizational change, educational partnerships, instructional technology

**Connecting with the Future**

“We cannot expect the task of science and math education to be the responsibility solely of K-12 teachers while scientists, engineers and graduate students remain busy in their universities and laboratories. There is no group of people that should feel more responsible for science and math education in this nation than our scientists and engineers and scientists- and engineers-to-be.” Thus, Dr. Rita Colwell, current Director of the National Science Foundation, challenged higher education and private enterprise to share their knowledge and talents to alleviate the disturbing drop off in student abilities and career aspirations in mathematics and science.

Since 1998, Rose-Hulman has had a partnership with six local middle schools, helping to transition appropriate IT into their classrooms. The opportunity to work closely with our pre-collegiate colleagues has given us a significant knowledgebase, including understanding of Indiana’s state curriculum requirements, awareness of critical issues in professional development, and powerful insights into the “pipeline” issue of enabling young people to pursue careers in mathematics, science, engineering, and associated technologies. For example, emerging instructional technologies are enticing, but middle schools face two major hurdles: (1) building a systemic infrastructure to provide access for all, and (2) re-investing in human potential in the form of teacher training for technical skills and pedagogical renewal.

**PRISM: Portal Resources for Indiana Science and Mathematics**

With PRISM, we expand the notion of “professional development” to include not only training in computer competency (explicit knowledge) but also mentoring in the higher-order understanding (tacit knowledge) necessary for meaningful integration of instructional technologies into the classroom.

**Why? New Demands and New Opportunities for Educators**

The past decade brought unprecedented changes for public school teachers in the United States. Two issues seem to be especially pressing.
- New reform guidelines – both state and national – call for less dependence on stock lessons, lectures, and de-contextualized lab experiences. Instead, these new guidelines emphasize inquiry-based learning centered in a real-world context.
- The ever-widening gap between the flood of quality, digital instructional materials and the time most middle school teachers can devote to preview, evaluate, and meaningfully integrate such resources into classroom activities.

**What? PRISM as a Knowledge Management Tool**

PRISM integrates the digital learning space for Indiana’s 6th – 8th grade teachers of science and mathematics. Essentially, our website merges a large, complex, and dispersed physical entity into a virtual, web-delivered representation that is much easier to manipulate. As Figure 2 indicates, PRISM acts as an integrated knowledge repository and manages the overabundance of information available to our target audience. At the center of the virtual information space, the individual user can access highly-organized and annotated libraries of information, can participate in special online events, and can pose questions to our digital librarian, as well as find “kindred spirits” among colleagues throughout Indiana.

As its premier service, PRISM provides a library of links to educational software, boasting these important features:
- Indexed using the Indiana Academic Standards, and cross-indexed using learning concepts, sorted by subject and by grade level.
• All catalogued electronic resources are evaluated, using uniform standards. A board of trained reviewers provides cogent, candid, and to-the-point commentary. Pluses and minuses are noted to ease classroom implementation.
• Additional peer-reviews, provided by Indiana colleagues who have used the item, add a real world dimension to the annotations. These “reports from the field” may also include adaptations and supplemental materials to extend the usefulness of the digital materials being reviewed.
• PRISM members can submit titles (even self-authored software). New entries to the database are added on a routine basis, creating a growing and up-to-date collection.

HOW? Importance of Colleagues and Knowledge Sharing in Education

Most organizations today – including businesses, government, and education – face the classic organizational problem of a knowledge gap: what to do when new methods and opportunities advance more rapidly than members of the organization can meaningfully put into practice. This climate of change makes professional development more critical than ever for today’s educator.

However, traditional “in-service” training (such as periodic afternoon workshops) may no longer serve. PRISM offers teachers a “learning environment” – a self-paced environment for professional renewal that encourages the reinvestment in human talent necessary for quality teaching.

PRISM uses information technology (IT) to create a virtual “community of practice.” This dynamic learning space for middle school teachers across Indiana mediates the sharing of experiences and helps participants to harvest the remarkable opportunities for improved learning through Web-delivered simulations, visualizations, modeling, access to live data, and to enable new collaborations, interactive learning, and alternative pedagogical approaches.

WHO? The People in the Portal

Despite its focus on technology, the designers of PRISM firmly believe that portals don’t create community; people create community. Thus, we have included expert human guidance within the portal.

• Digital Librarian: Manages a clearing house for existing, web-delivered materials. Using the Indiana Academic Standards for learning objectives and course competencies, the librarian oversees a current and highly-refined collection of classroom resources. Additionally, she is available (through email and through a toll-free phone number) to answer questions or to provide advice.
• Teacher-Leader Partners: Each year, the PRISM team names 20 teachers from across the state to serve as advisors and advocates. This cadre provides a liaison to our most important constituency: the classroom teacher. They serve to promote the portal within their district, and they provide valuable feedback and assessment.
• Portal Webmaster: A computer specialist, well-versed in state-of-the-art portal design and implementation works to keep the various components of the integrating website functioning. Though much of this work is transparent to the user, crafting and maintaining a complex Internet site are demanding tasks.
• Rose-Hulman Faculty Partners: Each year, approximately five collegiate-level faculty facilitate activities that help our middle school participants develop their skills with advanced technologies in the classroom.
• Board of Advisors: A group of six individuals, drawn from organizations influential in Indiana education provide guidance for the project. The group meets in the fall of each academic year to review progress and to suggest improvement.

In the search for methods of renewal, information technologies that enable and empower have been instrumental in re-inventing the process by which many companies and corporations accomplish their mission. At the forefront are networking applications because they (1) keep a constant flow of knowledge moving through the enterprise (2) make possible a “community of practice” among individuals and groups no matter what geographic or organizational boundaries separate them. For models of process re-invention, education might well borrow some of the lessons learned by private enterprise in the last decade.

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