Preface

At the AAHE, American Association of Higher Education, Summer Institute on Teaching, Learning, and Technology in the summer of 1997, William M. Plater, the Executive Vice Chancellor and Dean of the Faculties at Indiana University Purdue University Indianapolis, IUPUI, defined his vision to present all of the IUPUI course syllabi on the Web. His request cultivated my thinking toward the conceptualization and design of Internet portals and planted the seed for my first portal project. The initial solution proposed to Dean Plater was the development of a new personal and dynamic Web environment. This dynamic environment requires that every student and instructor automatically receives access to some teaching and learning tools upon authentication through a single Website. Such methods of packaging classroom resources and tools into a single, centrally managed Web environment are now known as course management software (CMS) systems. Dynamic, role-based Web environments tailored specifically to selected groups of users (or members of an institution) are now known as Internet portals.

At that time, I was the Director of the WebLab and Associate Professor of Purdue School of Engineering and Technology at IUPUI. WebLab was a research and development laboratory initiated to explore and develop new Web-based educational technology solutions for the university. I was working with Amy Conrad Warner, the Executive Director of Community Learning Network to develop one of the very first "Web-based" distance-learning courses at IUPUI. Our initial beta-test environment included redesigning an existing video-based introductory Chemistry course into a Web-based course. Establishing a defined set of functional requirements enabled us to develop a tool set that would not only meet the needs of Chemistry 101 instructors and learners, but serve virtually 100% of the courses offered on the IUPUI campus and throughout the Indiana University enterprise. In less than six months, I assembled a team of enterprising innovative students, including an undergraduate student who had developed an online testing software solution that would become part of our tool set. Together, David Mills and other students working in the WebLab developed a complete course man-

agement system loaded with a message board, chat rooms, email and many other tools. We called the system Oncourse.

Linked to the university student enrollment database, Oncourse holds the distinction of being one the first enterprise course management portals implemented at an educational institution (Jafari, 1999, 2000). Today, Oncourse serves all eight Indiana University campuses, dynamically creating a course management site for every course being offered in the university. Oncourse remains a good example of a system that is both dynamic and enterprise-wide. Dynamic because it automatically enables and disables students' and faculty access to courses and other resources based on the course registration data which resides in the university databases. Enterprise-wide because it offers dynamic services to the entire population of the university through direct connectivity to the university database systems providing up-to-date access to relevant course enrollment data.

As the principal architect of the Oncourse learning environment design, I assumed many roles in the development of the project. I played the role of a conceptual thinker and architect to invent, design and sell a new complementary environment for teaching and learning. Recall that in 1997, the notion of CMS was very new and only a small portion of faculty members had a working knowledge of the capacity of the Web and its applications in teaching and learning. Therefore, my biggest challenge was to sell the concept of the Web as a new useful teaching and learning tool, and to articulate how this new technology would revolutionize information management while fueling learning on demand.

To launch the concept, the environment must be easy to use, require little or no training and enable faculty members to learn at their own rate. Therefore, the top three functional requirements became: ease of use, ease of use and ease of use. Oncourse offered new Web-based tools and resources that made it very sticky—the stickiness would invite learners back time and time again for current up-to-date information otherwise not available to them seven days a week and 24 hours a day. Among the faculty, the early adopters of Oncourse began to instantaneously introduce the concepts of distance learning and Web access into their classroom teaching environment. With faculty embracing the technology, Oncourse provided a vehicle through which I could define the distinct advantages and need for portals in educational institutions.

The Oncourse navigation system was conceptualized in much the same manner a typical portal environment is conceptualized today. All users--students and course assistants and faculty--go to a single website, http://oncourse.iu.edu. Each user is authenticated into the Oncourse environment using the same university network ID required to access e-mail and other campus-wide IT services. Students and faculty depend upon their Network ID to conduct a number of university transactions, so an additional unique user ID need not be established. Once

users enter their username and password, they automatically receive an updated list of their registered courses on the following page. Students view a list of courses in which they are currently enrolled and faculty view a list of courses that they are assigned to teach. Each course listing appears as a hyperlink taking users to the course management portion of Oncourse. Oncourse offers dynamic role-based services. For instance, the faculty member of record automatically receives authoring privilege to create and edit syllabi, course contents, etc., but these authoring rights are automatically blocked from student users. With this notion, we managed to create a portal environment offering dynamic and role-based services to the entire population of the university.

Consistent with the functional requirements for ease of use, I was strongly convinced to offer a fixed template interface instead of letting each faculty member design his/her own course management Website. This offered two major important roles in making the Oncourse project a success: the usability advantages or ease of use and little or no additional investment in user-support services (i.e., helpdesk). Not permitting faculty members to design their own course template created a comprehensive branding feature providing a consistent student-centered user interface. Once a student learned the navigational and user interface of a course, he/she can apply the learning toward other courses created by other faculty members. Second, I was not convinced that all faculty members knew about the fundamental design requirements of creating a quality user interface. Additionally, eliminating the opportunity to create a new template for each course, faculty could focus their innovations on learning objectives rather than tinkering in the world of user interface design and navigational differences that would detract from students' ability to focus on learning. Students, for instance, may not easily find the location of the syllabus, message boards and other resources if each course were developed by a different faculty member with a different learning style. Having more than one template would also complicate central support services delivery or reduce the complexity of providing helpdesk services in a timely manner. With this notion, Oncourse offered a fixed course management template with a fixed menu including categories for Syllabus, Lessons, In-Touch, Tools and Help. The notion of using a fixed course template was later offered by commercial course management systems.

Technically, the course portal was designed as an enterprise system to offer services to all campuses of Indiana University with little or no customization required. With this notion, certain design principles had to be selected while preserving technical requirements such as scalability, performance, load-balancing, integration and maintenance.

After handing over the Oncourse project from the R&D environment of the WebLab to the University Information Technology Services for the system-wide

implementation in 1999, I began my next portal project called ANGEL, A New Global Environment for Learning. With seed funding received from the School of Engineering and Technology, and a commitment from David Mills, the lead developer from the Oncourse Team, we were able to further develop ANGEL in a new research and development laboratory called CyberLab located at the IUPUI campus. In contrast to Oncourse which was hard coded to work with the information technology framework of the university, ANGEL was designed to work with any system, to be easy to install and integrate with any infrastructure in any school. From the beginning, ANGEL was designed as a modular system, offering new features to enhance the portal environment. Additionally, the modular capabilities of ANGEL offered the feature of expandability and performance requirements of portals since various portals' tasks and services can be distributed among different servers.

In 1999, through some collaborative research with a colleague at Florida State University, I became increasingly interested in the conceptualization and design of intelligent agents to address teaching and learning needs. My interest intensified as I noticed that the teaching and learning environments, more specifically the CMS and campus portals, became more labor intensive to maintain while advances in technology continued to make portals easier to use at an exponential rate. Faculty colleagues who were teaching online courses, for instance, indicated that they were spending more time teaching an online course than teaching the same course in the traditional classroom lecture setting. While the increased time commitment required to engage learners at a distance has nothing to do with design of user interface or ease of use aspects of the environment, it has everything to do with the magnitude of tasks users were required to perform. There were many logistical matters and maintenance requirements in a Web environment that affects its ease of use. It became very clear to me that current CMS and portal technologies are "dumb," and are not designed to offer intelligent services. With this, I quickly saw the multitude of applications for intelligent agents in teaching and learning environments. Conceptually, the intelligent agents can act like a human agent offering personal services to users of a portal. Technically speaking, the intelligent agents can be integrated into a portal or CMS software environment to accept certain responsibilities and to perform certain tasks on behalf of its uses. The ANGEL environment from the ground up was designed as an agent-based portal environment where the third-party vendors or end-users' institutions can design and integrate Intelligent Agents into the ANGEL portal environment.

ANGEL was certainly another successful project. With financial support received from Indiana University Advance Research Technology Institute (ARTI), a small company was formed to commercialize the ANGEL CMS and portal software environment. In July of 2000, ANGEL was transferred from my aca-

demic IUPUI CyberLab into the newly formed company, CyberLearning Labs Inc. This migration enabled me to return to my passion to explore and develop new technology innovations.

In late 2000 right after my ANGEL project, I developed a white paper to conceptualize the design and development of an inter-campus educational portal to serve K-12 and higher education institutions (Jafari, 2001). The resulting paper, "Educational Portal White Paper," was submitted to the Indiana Higher Education Telecommunication System (IHETS). In contrast to a campus portal, which is meant to serve the community of a single campus, the educational portal is defined in my paper as a super portal environment, to be used by instructors and learners within a large number of educational institutions, such as all K-12 and higher ed institutions in a state or an entire nation. I saw tremendous value in the creation of a central educational portal environment that could be used for collaborative sharing of information, resources and learning objects among a statewide or national population of teachers and learners. For instance, a high school instructor developing a learning module for his chemistry class would be able to dynamically inform other chemistry teachers about his work, teachers who might be interested in integrating this module into their chemistry course. Similarly, the portal environment could offer opportunities for collaboration among learners with similar interests or similar learning disorders. State government could use this environment to offer teaching and learning resources to individual displaced workers, parochial schools and non-traditional learning providers. Anxious to build a strong workforce, state agencies can provide a powerful tool in attracting and retaining industry. The educational portal provides a single entry point to training and educational opportunities for the disenfranchised and often disengaged. Examples of resources included in the educational portal might include course management tools, state and community library resources, central file serving resources, and electronic portfolios. The educational portal was conceptualized as a profile-based intelligent portal environment using intelligent agents. The white paper explores many creative ideas for making the portal sticky, dynamic and easy to use. In the spring of 2002, IHETS received seed funding to further explore the educational portal project as a potential community service to educators and lifelong learners in the state of Indiana.

Besides my collaboration with Mark Sheehan writing this book in 2001, my attention was directed to a new R&D project. My third portal project provides yet another set of new requirements and interface design. At the time of writing this manuscript, this project does not have a given name. The project code name is DPP or Dynamic Personal Portal, being developed at the IUPUI CyberLab with collaboration with some other universities.

The DPP will invent a new interface and a new life-long teaching and learning portal environment for every learner. A learner may begin using the DPP environment from his or her freshman year in college, or perhaps attracted as high ability students even prior to high school graduation. The DPP environment follows students from high school to college, to graduate school and to their professional lives. The DPP offers many utilities including an electronic portfolio system that travels with students. It offers services like a personal home page (PHP), electronic portfolio and campus portal. It is conceptualized as a totally dynamic portal environment and offers a unique and life-long personal URL (Web address) to every student. The personal URL is based on the learner's email address. For instance if my email address is jafari@iupui.edu, my DPP address would be http://jafari.with.iupui.edu. Note the similarities between my email address and my personal URL. The only difference is the replacement of the "@" sign with a "with" word. This is logical, easy to use, easy to remember and enables learners to even make an educated guess to locate personal URLs for every member of an institution. If one knows my email address, he or she can guess my personal URL address. The "with" world within the domain name can be any word selected by an institution. The personal URL can stay with a student as a Web identity, letting him/her carry the "brand name" of his college throughout post-graduation professional and personal life (the inclusion of ".universityname.edu" in a personal URL). It would serve as the life-long personal URL that could appear on people's business cards.

As my new and current project, I am trying to further define, design, and develop the electronic portfolios system within the DPP framework through collaboration with other higher education institutions. In contrast with my Oncourse and ANGEL projects developed at IUPUI, the DPP and Electronic Portfolios will be designed and developed by a consortium of higher educations institutions and participating vendors. One of the most important requirements of DPP and Electronic Portfolios is the need for interoperability and transportability of learning accomplishments, therefore, it is very important that the DPP/Electronic Portfolios project be designed and accepted by more than one institution. With this notion, in late 2001, I initiated and founded the ePortConsortium. The DPP/Electronic Portfolios project is an open source initiative available to members of the consortium. The DPP framework holds a patent pending protection owned by Indiana University.

The more I reflect on our accomplishments and analyze emerging trends and opportunities for Internet portals, the more passionate I have become with respect to the development of intelligent portals for teaching and learning. We are in the infancy stages of conceptualizing and developing Internet portals, especially campus portals which optimize our teaching and learning needs. Every new day,

large amounts of data, information and resources reside within the World Wide Web. We must continue to create the perfect user interface and Internet portal system that intelligently filters and provides mass customization of information and resources to serve learners on demand. Our next generation of portals must have the capacity to think, to learn, to reason and to maintain a certain level of autonomy.

Ali Jafari
Purdue School of Engineering and Technology, IUPUI

REFERENCES

Jafari, A. (1999). Putting everyone and every course on-line: The Oncourse environment. *WebNet Journal,* 1(4), 37-43.

Jafari, A. (1999). The rise of a new paradigm shift in teaching and learning. *T.H.E. Journal*, 27(3), 58-68.

Jafari, A. (2000). *Development of a New University-Wide Course Management System, Cases on Information Technology in Higher Education.* Hershey, PA: Idea Group Publishing.

Jafari, A. (2001). Educational Portal, *Proceedings of the International Conference on Intelligent Agents,* Las Vegas, USA, July.

ADDITIONAL RESOURCES

Website of ANGEL Course Management and Portal Software: *http://www.cyberlearninglabs.com/Products/*

Website of CyberLab at IUPUI: *http://cyberlab.iupui.edu/*

Website of CyberLearning Labs Inc.: *http://www.cyberlearninglabs.com/Products/*

Website of the Dynamic Personal Portals project: *http://with.iupui.edu/dpp.htm*

Website of the Electronic Portfolio Consortium (ePortConsortium): *http://www.eportconsortium.org/*

Website of the Indiana Higher Education Telecommunication System (IHETS): *http://www.ihets.org/*

Website of the Oncourse Project at Indiana University: *http://oncourse.iu.edu/*