Developing Performance-Centered Systems for Higher Education

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The experience in developing performance-centered systems for higher education has improved significantly, and practitioners have made considerable progress in elaborating a methodology. This paper discuss the convergence of thinking among various disciplines in analysis and design methodologies, and describes the key elements of the new-emerged performance support engineering development methodology. These are important for designing web-based systems, information systems, and knowledge management systems in higher education.

Keywords: *performance-centered systems, web-besd systems, information systems, knowledge management systems, methodology, higher education.*

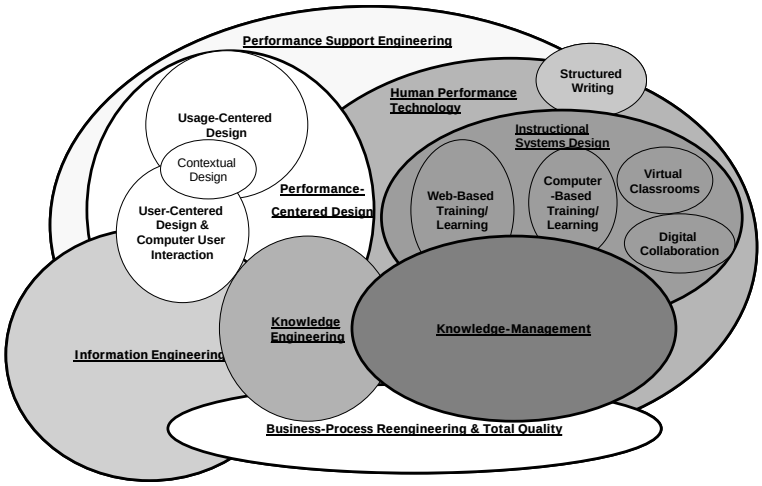
Introduction

With the rapid rise of the Internet, web-based systems are becoming a major focus of software professionals and human performance technologists. Typical compensatory mechanisms for poor systems design such as learning, training and human support systems are becoming unacceptable from an economic perspetive. Competitive pressure to provide superior education services, and give students the knowledge and skills they need to survive in an information-based global economy, means that students and other end users must achieve competency in much shorter time frames. Therefore, the ability to design software systems from a performance-centered perspective is a critical success factor in web-based, information systems, and knowledge management systems. Just making knowledge available electronically is not sufficient. The major question facing universities today is not whether to do performance-centered design, which is adecvately addressed, but how to get it done. This is because our paper discusses the convergence of thinking among various disciplines in analysis and design methodologies, and describes the key elements of the new-emerged performance suport engineering development methodology.

2. The characteristics of the methodology

Over the past 15 years performance support development has progressed from the art to a more structured methodology [Marion, 1997; Raybould, 2000; Ho, 2001]. Also, the Human Computer Interaction has been close to performance support concepts and away from user-centered design toward usage-centered design [Constantine, 1995], and contextual design [Bayer & Holzblatt, 1998; Hietpas, 2003; Kaplan-Leiserson, 2006]. Figure 1 present the relationships between performance support enginering and various other professional disciplines.

The design process is therefore data-driven according to the work and performers rather than suppositions by the design team. The rule of three actuals applies: a) observe actual work; b) observe actual performers, and c) observe the actual work place. Observing this rules ensures that barriers to performance are exposed; it also prevents from making erroneous assumptions about the nature of the work (didactic, research or management) that might lead to inadecquate design. Barry Raybould considers the model of a generic performance support engineering development cycle as shown in Figure 2 [Raybould, 2000][Pham, Dimov, Setchi et al, 2004]. We must note that, actually four-phase method evolves not only around the deliverables, but raw data from university performers and subject matter experts. The basic techniques for interface design and testing are described in the Human Computer Interaction literature.



Adapted from [Raybould, 2000, 33]

Figure 1 *Relationship Between Performance Support Engineering and Other Professional Disciplines*

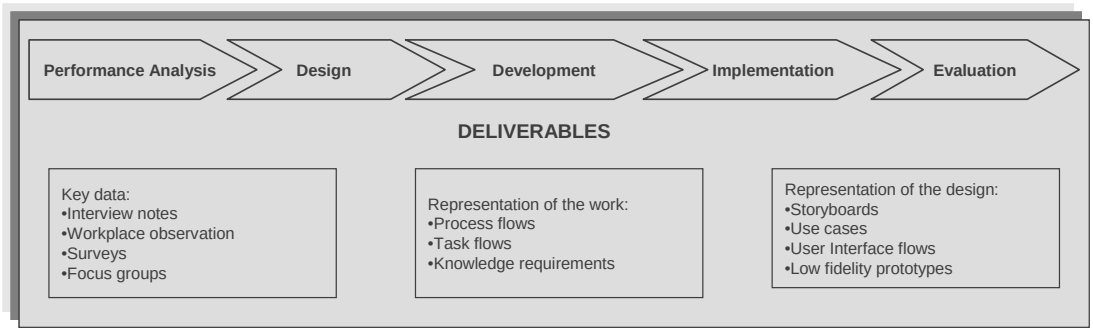


Figure 2 *The model of generalized methodology*

3. Performance support Continuum and Group Processes

These are two consequences of integrating disciplines in performance support engineering. The scientists has been states that support needs to be provided in a continuum [Raybould, 2000]. The most efficient way to develop a support strategy is to start by building those structures on the right (see Figure 3) and progressivelly move to the left when a particular structure proves infeasible. There is the performance-centered design approach proposed by Raybould, and this is direct conflict with traditional approaches that start with interventions at the left and move towards the right (if there is sufficient budget and time).

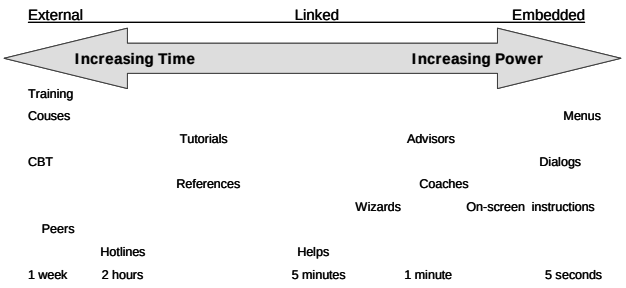


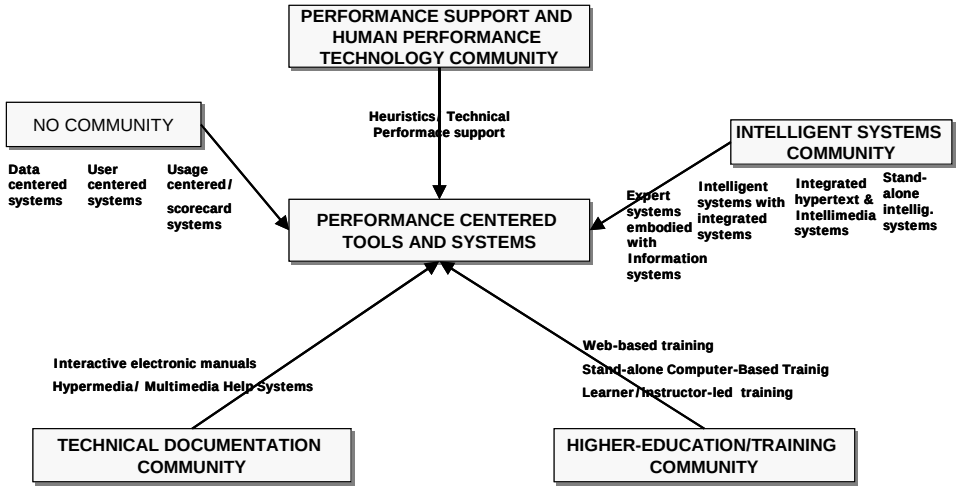
Figure 3 *Performance Support Continuum*

Actually, there are some phases in the development methodology in which group processes are important. A key element of the performance support engineering process is to align the goals of all stakeholders. Group processes such as brainstorming, affinity dia-

gramming, interrelationship digraph, and fishbone analyses have proved particularly useful in gaining this alignment. Alignment within as well as external to the project team is also critical to success, and also alignment of understanding of the university work. The only solution to these problems has been effective knowledge sharing during the design process by the separate analysis teams using group processes. The most important and difficult problem is how to involve university management and performers in the design process. In practice it is impossible for performance support engineers to gain a full understanding of the knowkledge domain of a faculty, or a department, or a researh unit, and of management concerns during a knowledge management project.

4. Knowledge's integration into special software tools

As we easily observe, university's information systems are moving from data managemnt age into the knowledge management age, in which the foundation of most information systems - the database - is being augmented by a knowledge base accessible via performance-centered interface. The human computer interaction field, intelligent systems field, and technical documentation fields have all been moving closer to those approaches advocated by the performance support community (Figure 4).



Adapted from [Raybould, 2000, 37]

Figure 4 *Convergence to performance-centered tools and systems in higher-education*

Technical/ professional books for the learning disciplines have become interactive electronic manuals, stand-alone expert systems have been embedded in information systems, and tutor/instructor-led training courses have become web-based training modules integrated with hyperlinked background reference information very usefuly for students. The pattern clearly shows an increasingly close integration of knowledge and support resources into tools that professors, researchers and students use. The knowledge bases are maintained and enhanced via knowledge management systems (Figure 5).

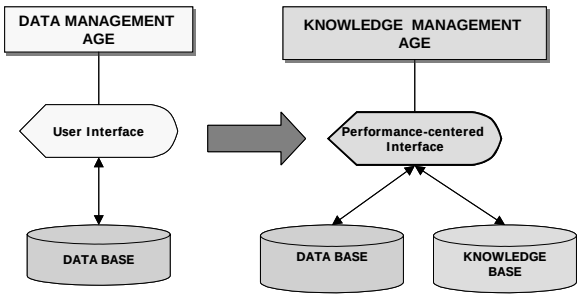


Figure 5 *Integration of knowledge and support resources*

The focus for deciding which tools and which specific areas and domains of knowledge to integrate into the performance-centered tool or system is determined through an good understanding of university strategic priorities and goals.

The development of a web-based knowledge management tool is a step forward, for the university who would implement it, toward a leader position in the educational area. In order to determine the model, a survey within the campus should be conducted. Both the students and professors should be included in the survey. After conducting the survey and determining the model, based on the results, the market (of such products) should be analyzed in order to identify a product that matches the user's requirements. If a product is identified, then a decision, based on costs and benefits, should be made regarding the purchase or development of such a solution.

At this point, FEAA had made several small steps toward the development of such a specific tool. Basically there is available, for the professors and staff, both a Portal and a web site which are used for communication reasons within the institution (between students and staff: the FEAA Portal) and also between the institution and other outside entities/students (the FEAA website). There is also developed a small web-based application (included into the website) meant to help the professors manage several activities like: 1) admitting/cancelling students application for their dissertation project, 2) viewing the results of professor's evaluation process by students, 3) editing the course curricula for the taught disciplines, 4) updating the personal information from the institution website. The main screen of the above described application can be seen in the figure 6.

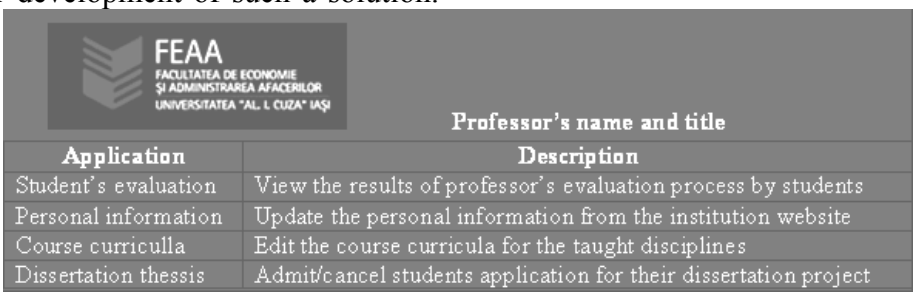


Figure 6 *The main screen of FEAA web-based knowledge management tool*

What we can expect from a web-based knowledge management tool for higher education: to put value in the end user empowerment; to play a major role within the web unification project of a institution; it will allow to maintain a visual consistency while allowing the content to be published easily and seamlessly; to increase the quality of the work of people inside the institution;to be a tool that can be used to keep the message current;to be a cost-effective solution for the institution, meaning that from a financial point of view its cost should be within the budget of institution;to be easy to use by all members of the institution; they should be able to update their information in a smooth way, without going through the programming technique as part of it; publish the information in a timely and accurate fashion; to have a very easy implementation: once the product is developed/purchased the institution should be able to use it without paying specific training course for the employees; the tools should be integrated into the institution's web design very quickly and smoothly by using open standards. Without such tool, the employees should send their web page content to the technical staff and they should be integrating it into the institution web site. Therefore a lot of time and efforts are wasted and sometimes errors may occur. With such a tool, the employee, without having any knowledge in web programming, can update/create/erase theirs webpage and its content. Moreover, for smoothing the process, there should be a certain degree of integration between the web content management tool and the office product that the institution is using. Thus, people should be able to export the information from the word document

program that they are using directly into the web site (there can be said that a web site is only as good as its content). Also, such tool should allow a certain degree of customization as not all institution following the same pattern. A model it is illustrated in the figure 7.

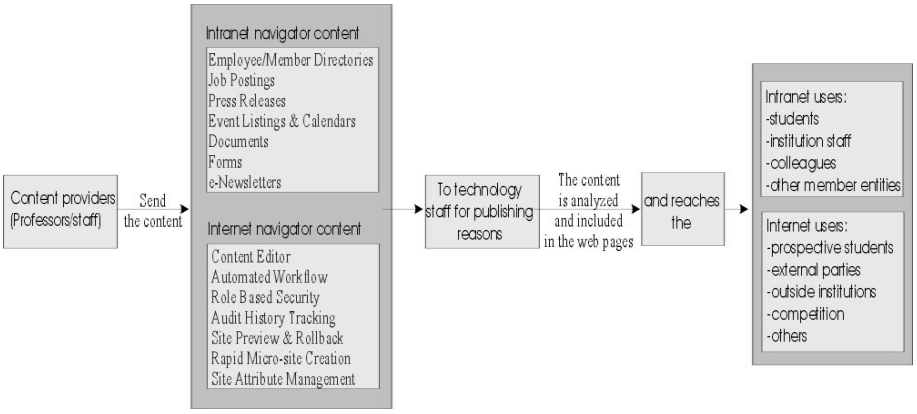


Figure 7 *A model of knowledge management tool and its functioning*

5. Conclusion

This analysis and design process, refined over many performance support projects is a hybridization of techniques from multiple disciplines and results in a series on integrated interventions in a performance support continuum. Since the project team draws together skills from multiple disciplines and integrates performers and subject matter experts from university' departments into the analysis and design process of knowledge management system, group processes are particularly important. Performance-centered design uses a wider range of design heuristics that take into account both this systems viewpoint and the needs og knowledge management in higher-education.

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