

# A Paradigm for Selecting an Institutional Software

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## Abstract

This paper proposes a paradigm for selecting an institutional software. The proposed paradigm includes finding an applicable theoretical framework for guiding the integration of the software into the institution, customizing this framework to suit the institution, considering institutional guidelines and policies relevant to selecting proper software, selecting the appropriate software product according to specific evaluation criteria, and evaluating the entire selection process for future reference. This paper documents the use of the proposed paradigm using a Canadian university's selection of an on-line courseware as a case study.

Keywords: institutional software selection, software integration, Web-based courseware

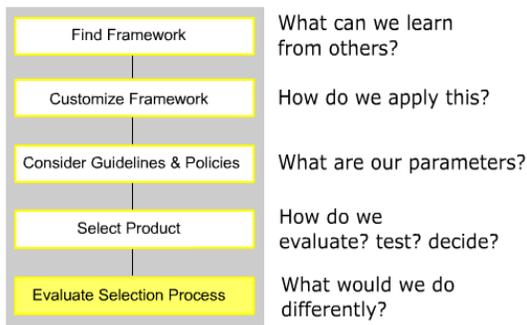
## 1. Introduction

Proper selection of institutional software has become essential to the success of any organization. An institution should not merely base their selection on the features and capabilities of an institutional software; instead, the selection process should be strategy driven rather than technology driven. Although institutional software selection is exercised by many organizations everyday, there is lack of research and theoretical frameworks to guide practitioners through the complex selection process. The main focus of this paper is to propose a paradigm for selecting software that meets the needs of an institution. The proposed paradigm includes finding a suitable theoretical framework to guide software integration, customizing this framework to suit the institution, considering institutional guidelines and policies relevant to choosing proper software, selecting the appropriate software product according to specific evaluation criteria, and evaluating this entire selection process for future reference.

## 2. The Paradigm

In this section, we propose an approach which can be used for selecting an institutional software. This paradigm outlines several phases as depicted in Figure 1: (i) finding (a) theoretical framework(s) relevant to choosing a particular type of software; (ii) customizing the framework to suit the needs of the institution; (iii) considering relevant guidelines and policies developed by the institution; (iv) selecting the appropriate software product; and (v) evaluating this entire selection process for future reference. These five phases are likely to be iterative rather than linear. The paradigm can be applied to any institutional software, such as e-mail, telecommunications, presentation, and Web service. In this paper, we will use an example of choosing an on-line courseware in a university to explain the five phases of the paradigm.

**Figure 1. A proposed paradigm for selecting an institutional software.**



**(i) Finding a Theoretical Framework**

A primary concern in selecting an institutional software is that the selection process be strategy driven rather than technology driven. In other words, an institution should not merely base their selection on the features and capabilities of an institutional software. The institution should consider available resources, stakeholder needs, and the goals that the software will help the institution to fulfill (cf. Washburn, 1999; Latham & Raggett, 1998). It is helpful to look to the literature in order to determine which elements should be considered when selecting a particular type of software because essential issues may have already been discussed in a related context. These issues and concerns are often presented by researchers in the form of theoretical frameworks. Even if there isn't a theoretical framework that is directly related to the software being considered, one can often find relevant frameworks that can be applied by searching the literature and networking with colleagues.

A synthesis of several frameworks may provide a good starting point when devising a selection strategy. The selection of the framework should be conducted by an evaluation team or steering committee that includes representatives from various stakeholder groups such as the computer centre and upper-level management. The committee should also include other appropriate decision leaders and technologists from within the institution. To avoid unnecessary roadblocks, the committee members should be those who frequently experiment with new products (innovators) as well as those who can easily envision and promote to others the benefits of new products (early adopters), rather than those who are distrustful of new technology (laggards) (Rogers, 1983). It is important that stakeholders other than technologists are involved in the decision making as the technology is only the tool that allows users to achieve their goals (Latham & Raggett, 1998).

“Stakeholder groups should speak for themselves, lest we assume we know them better than we do” (G. Fawcett, personal communication, February 11, 2000).

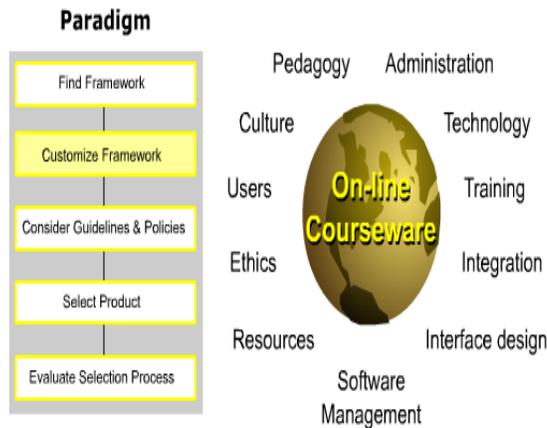
*An example of synthesizing & customizing theoretical frameworks*

In this example, we will demonstrate how several frameworks originally developed for a Web-based learning environment were modified and synthesized into a new framework for selecting an on-line courseware within an educational institution.

The work of Bannan and Milheim (1997), Hansen and Frick (1997), and Khan (2000) was proposed for a Web-based learning environment, and the work of Latham and Raggett's (1998) for on-line education in general. Bannan and Milheim suggest that Web-based instructional materials can be analyzed and described according to their overall design, instructional methods, and instructional activities. Hansen and Frick find it useful to think about Web-based instruction in four areas: presenting information, providing human interaction, assessment of learning, and course management. Khan's framework consists of eight sets of issues related to Web-based learning which encompass those of Bannan and Milheim as well as those of Hansen and Frick: pedagogical, technological, interface design, evaluation, management, resource support, ethical and institutional. Latham and Raggett's model outlines the stages of decision making when designing and delivering an on-line course (pre-design, pedagogical design, delivery design, implementation, evaluation and feedback), as well as the issues that educators should consider during each stage (organizational, pedagogical, technological and evaluative). Most of Latham and Raggett's decision issues overlap with the issues identified within Khan's model.

We applied a synthesis of these four frameworks to the selection of the on-line courseware -- the software supporting the design, development, maintenance and use of Web-based course-support environments by instructors and students (Collis, 1998). The new framework for on-line courseware selection is depicted in Figure 2. The framework includes 11 sets of institutional factors that should be considered when selecting an on-line courseware. The factors discussed within these 11 categories can be used for deciding who to include on the steering committee, developing software policies for an institution, and evaluating particular on-line courseware products.

**Figure 2. Framework for selecting on-line courseware.**



1. **Pedagogy.** This category addresses teaching and learning issues (Khan, 2000) related to on-line courseware selection, such as whether the courseware can be used effectively for on-line discussion, testing, and grade distribution.
2. **Administration** includes top-level decision makers as well as any guidelines and policies relating to the selection of an on-line courseware.
3. **Technology** refers to the infrastructure, hardware, software, planning, guidelines and expertise (Khan, 2000) that are available to support the on-line courseware.
4. The **training** capability of the potential on-line courseware should be considered, such as how difficult it is to learn and whether it includes sufficient documentation (Hansen & Frick, 1997), built-in tutorials, or vendor support.
5. **Integration** should be considered when selecting an on-line courseware, because it is important for the courseware to be able to communicate with other institutional databases and to import and export to other software, internal and external to the university, as necessary. Industry standards should also be taken into consideration.
6. **Interface design** is another element that must be considered during software selection, that is, the overall look and feel (Brandon, 1997 in Khan, 2000) of the courseware, including how intuitive it is to the user, and whether it is customizable, easy to navigate and adheres to cross-application norms.
7. Before selecting a particular courseware, the institution should also consider **software management** issues, that is, how instructional developers and IT staff manage the courseware to ensure that faculty and students can create, access, and exchange information easily. This includes providing secure access and back ups, and arranging for software maintenance and upgrades.

8. **Resources** affecting on-line courseware selection might include budget availability, facilities, computer equipment and infrastructure, availability of technical support, human resources, and intellectual resources.
9. **Ethics** encompasses the legal aspects of adopting an on-line courseware, as well as sensitivity to the diverse needs of the users, including accessibility to information and attention to the needs of disabled users (Khan, 2000).
10. User involvement is the key factor in any software selection process. The software will not be accepted unless it adequately fulfills the needs of the **users**. It is important to identify primary and secondary user groups who have different needs and requirements and, accordingly, will need to be involved in the courseware selection process in different ways.
11. The unique university **culture** plays a key role in successfully implementing an on-line courseware. When selecting a courseware, one must consider cultural issues such as faculty attitudes toward and experience with technology, and the university's attitude toward change (Latham & Raggett, 1998).

#### (ii) Customizing the Framework

It is necessary for the steering committee to customize an ideal framework to fit the institution's environment by recognizing that some components will require more emphasis than others. For example, institutional culture might not be an important consideration for adopting a new software in a young technically-advanced institution, whereas cultural impact could be a very important issue when dealing with an institution that uses traditional methods with employees who resist technological changes.

#### (iii) Considering Guidelines and Policies

When selecting an institutional software, it is important to consider any relevant guidelines and policies developed by the institution as these will suggest criteria to look for in a product. This also creates an opportunity to recommend policies for future software integration. The recommended guidelines and policies should encompass the dimensions of the customized theoretical framework. One policy of the university in the case study was the mandate to address the need for effective training and support for those faculty and students facing technological change (this addresses the pedagogical, cultural, and resource support dimensions of the sample theoretical framework in Figure 2).

#### (iv) Selecting a Product

##### *Step 1. Evaluate products.*

Selecting a product often involves narrowing to several suitable choices. To help with this elimination process, the committee should look for existing evaluation tools that can be used or adapted, such as the checklist developed by Sheridan College in collaboration with Confederation College and with support from The

NODE that provides a set of criteria that educators can use to evaluate on-line courseware products (<http://www.sheridanc.on.ca/~bobj/guidelines/>). The theoretical framework developed earlier can help the committee choose or modify a tool appropriately; that is, the tool should address all factors identified as important within the framework. An institution should be careful in adopting the recommendation of existing studies because of institutional differences among the factors depicted in Figure 2.

Often, it is necessary for the committee to conduct another round of evaluation that emphasizes those factors in addition to the capabilities of the software that are unique to the particular institution, such as cost issues and software integration. This list of internal evaluation criteria will help to narrow the candidate software to two or three finalists. More detailed information can be made available through vendor presentations to key stakeholders and through discussions with other institutions who have implemented the candidate software products.

*Step 2. Test product finalists.*

To evaluate how easy it is to use the candidate products and how likely it is that certain features and capabilities will be used (Washburn, 1999), it is essential that the products be tested by potential users from all stakeholder groups. Depending on time and resources constraints, this can range from comprehensive studies where the different software are tested and evaluated systematically by groups of users over several weeks or months, to brief task analyses and evaluations conducted by individual users. It is important that the testing involve users who are computer savvy as well as those who “barely know how to use a mouse” (Washburn, 1999). User feedback should be incorporated into the final selection of a product.

*Step 3. Make the final decision.*

The steering committee should base the final selection on evaluation criteria that are considered most important and weighted appropriately. A decision matrix could look like that in Figure 3. The four dimensions shown in this decision matrix are based on our case study, and can be changed according to the circumstances of any institution. The criteria to be chosen and the weight assigned to each criterion should be determined by the committee.

The evaluation of the selection process could start by comparing the selection activities to the framework that was outlined in this paper (Figure 2). When applying the framework, some procedural steps may have been inappropriate due to the unique circumstances within the organization. These discrepancies and the lessons learned should be documented by the committee as references for future software selection.

**Figure 3. Final Decision Matrix.**

Product \ Criteria		A	B	C
Acceptance	%			
Investment	%			
Capabilities	%			
Integration	%			

1	2	3	4	5
poor	fair	average	good	excellent

**3. Case Study**

Since 1995, the Canadian university where this case was documented has used a Lotus Notes-based Web-publishing software to develop a platform for on-line courses. Changes in university policy mandated the instructional development department to compare this application to commercially-available on-line courseware and to make a recommendation as to which product should be adopted for the university’s on-line learning environment. The university had experienced difficulties with institutional software integration in the past because the selection process did not involve all stakeholders. As a result, decision makers felt it was important that the on-line courseware selection process consider the needs and resources available to all users, as well as incorporate the lessons learned from other institutions that had integrated an institutional software. The proposed paradigm for selecting an institutional software depicted in Figure 1 evolved from the efforts of the university’s administrative and academic stakeholders to plan a strategy-driven approach to identifying an appropriate on-line courseware. While this is an ongoing process, we will briefly explain how the first four phases of the proposed paradigm were applied at the university.

**(i) & (ii) Find and Customize Framework**

The evaluation team consisted of instructional development, design, informational technology, library and distance education staff, as well as faculty members experienced with on-line courseware and instruction. To guide the on-line courseware selection process, the evaluation team synthesized and customized the Web-based learning frameworks of Bannan and Milheim (1997) and Khan (2000).

**(iii) Develop Guidelines & Policies**

Various university guidelines and policies led to the creation of the evaluation team and helped to guide the team during the selection process. The university president recommended that an integrated and cost-efficient approach should be taken to support campus computing. This led to the establishment of a campus-

wide IT steering committee which recommended that the third-party application packages should be used whenever possible. In addition, an external consultant made recommendations for the university's on-line teaching and learning environment.

#### (iv) Select Product

Several existing on-line courseware evaluation tools used at other universities internationally were examined for bias, thoroughness and fit with the university's environment. The evaluation team selected Marshall University's (1999) Comparison of On-line Course Delivery Software Products (<http://multimedia.marshall.edu/cit/webct/compare/comparison.html>), which evaluates 14 on-line courseware products against 138 criteria. The team felt that this matrix reflected most closely the theoretical framework that they had customized earlier in the decision-making process.

Before applying the matrix, the team explored the vendor Web site for each product to confirm that the product was reviewed accurately and to make any changes necessitated by product upgrades since the matrix was developed. In addition, the team added currently-licensed Lotus products to the matrix as these products were used to develop the platform for the university's on-line courseware. The team also added several criteria that were inspired by criteria developed at the University of Twente, The Netherlands (Collis, 1998), one of the leading providers of on-line courses in Europe (Simonson, Smaldino, Albright & Zvacek, 2000). After applying the modified evaluation matrix, the team narrowed their choices to three products.

In an effort to choose among the three products, the evaluation team arranged for vendor presentations to key stakeholders. Following these information sessions, the evaluation team proposed that two products be further studied by the library as well as the information technology and instructional development departments, and that the resulting information be used in a final decision matrix (Figure 3).

#### 4. Conclusion

This paper proposed a paradigm to follow when selecting any institutional software. The iterative process begins with finding a suitable framework and customizing the framework to suit the institution's needs. Institutional guidelines and policies should then be incorporated into the customized framework, which would guide the development of software evaluation criteria. The actual product selection includes compiling the product evaluation results, testing the product finalists, and making a final decision. The paradigm concludes with a review of the preceding activities so that the lessons learned would be documented for future use.

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## Appendix: Tools for Evaluating On-line Courseware

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Washburn, C. (1999, October). Evaluating Integrated Course Management Products. Workshop presented at NAWeb 99, the Fifth International Conference for Web-Based Learning, Fredericton, New Brunswick. (Available from Carol Washburn, Center for Instructional Development and Distance Education, University of Pittsburgh, [washburn@pitt.edu](mailto:washburn@pitt.edu).) *The workshop package included faculty and student evaluation forms that were used to analyze the effectiveness of two on-line courseware products tested in several University of Pittsburgh courses.*