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Transfer Course Evaluation and Applicability System: A Joint-Development Project

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Abstract: Two states, Arizona and Ohio, entered into a joint-development project to design and prototype a "Course Applicability System," with a goal to provide a statewide decentralized electronic transfer and advising system building upon four basic functions:

- Facilitate the development of inter-institutional course transfer agreements
- Determine transferability of courses from one institution to another
- Demonstrate the applicability of courses to specific academic programs
- Make the system available via the WEB

The challenge of the project is to accomplish this goal with staff located in two states. The paper will address how to manage such a project; how it was organized; what was successful; what the obstacles were and how they were overcome.
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Business Problem

In the state of Arizona, transfer course articulations are agreed to prior to the student's taking the courses. Two separate paper publications provide transfer information regarding course acceptance and the applicability of courses to programs of study: the Course Equivalency Guide and the transfer guides.

The Course Equivalency Guide describes how each Arizona public university evaluates each Arizona public community college courses. And the transfer guides, produced by each public university, indicate how the community college transfer courses apply toward specific university degree requirements.

These publications are word processing documents which are produced, updated, and distributed annually. The process to produce the documents and the process used to reach transfer articulation agreements across institutions are labor-, time-, and paper-intensive.

These manual processes limits the usefulness of the publications. The guides are:

* out of date before they are printed because equivalency decisions are not published as they are made
* distributed too late for timely and accurate transfer information used in transcript evaluation, transfer admission, and academic program planning
* not readily accessible to students because printed copies are cost prohibitive and the format is complex and confusing
* multiple documents must be consulted to evaluate course work taken in more than one academic year

Looking for a Solution

In September, 1995, the Arizona Board of Regents and the State Board of Directors for the Community Colleges of Arizona issued a Request for Proposal (RFP) to enter into a business venture to develop jointly a Course Applicability System (CAS) for Arizona’s community colleges and universities. The goal of this initiative was to replace both the paper publications and to produce an online system to be used by students, counselors, academic advisors, transcript evaluators, faculty, staff, and others to determine how courses taken at one institution may be applied toward degree programs at another.
Then in February of 1996, Ohio's Miami University Degree Audit Reporting System, (Miami-DARS), was selected for further discussions due to the robust nature of their software and their ability, over the WEB, to produce degree audits that would not only show a student how their transfer courses would apply to a particular academic program, but also which courses they could still take at their current institution before officially transferring. After selection for further discussion, Miami University saw the benefits that could be offered to the State of Ohio and presented the concepts to the State Transfer Articulation Committee. In May of 1996, the State Transfer Articulation Committee recommended to the Ohio Board of Regents that they support this development effort.

As a result of the RFP process, a Memo of Understanding between Arizona and Ohio's Miami-DARS was signed in June, 1996. This document described the agreement to engage in a joint development project to design and prototype CAS. It outlined the basic understandings, the scope of the work, resource responsibilities, disposition of new products created, and implementation decision check points. Also in June of 1996, the Ohio Board of Regents released development funds to help support the project in exchange for the right to use the system by the state assisted colleges and universities in Ohio when it was developed.

Once the Memo of Understanding was drafted, Arizona placed a "Call for Funding and Personnel Commitments" to support the design and prototyping of CAS within the state. This request, which went to the presidents or chancellors of each community college district and public university within the state of Arizona, asked each institution to contribute funds and staff. The "Call" document identified the skills needed for business and technical staff and requested nominees be available to the project full time for a period of six to eight months. The responses to the request lead to the designation of two development sites and a part time team of business and technical analysts to support the prototype from July, 1996 through February, 1997.

**Next Step**

The joint development project, which was initiated in July, 1996, utilized the Miami-DARS software, which can also accept EDI transcript information, to articulate courses into their equivalents and to monitor student progress toward degree completion, while applying Arizona’s experience in developing transfer articulation agreements between institutions and in working with transfer students.

The focus of the joint Arizona-Ohio project is to build a prototype computer system known as the Course Applicability System - Prototype (CAS-P). Using the World Wide Web, CAS-P will assist students, advisors, faculty, and administrators from community colleges and universities in obtaining consistent and accurate information about transfer courses and their applicability toward degree completion. In addition,
CAS-P will employ the Web to enhance communication between faculty and staff who are responsible for making transfer articulation decisions. The result will be a more efficient, more accessible, and --ultimately-- a virtually paper-free process to help transfer students move from school to school and earn their degrees in a timely manner.

**Goals**

The goal of the Course Applicability System - Prototype is to provide a statewide decentralized electronic transfer and advising system. It will provide support for the development and maintenance of the transfer articulation agreements and offer convenient access to all users (administrative, students, and anyone else who has WEB access) to view timely, accurate and reliable information about course equivalencies. Also, it will provide a place into which transcripts can be entered or fed electronically for evaluation and produce a degree audit which will let the student not only know what courses they still can take at their institution prior to transferring, but also where they stand with respect to obtaining a degree from the transfer institution. It will provide more timely and accurate data for administrative functions such as transcript evaluation, transfer admission and student advisement for their academic program plan and allow more time for the analysis of the transfer data. Ultimately, it will facilitate students transferring among institutions allowing them to personalize their academic experience.

**Development Method**

The project team used a three-phased approach to build the prototype:

**Phase 1 - Artist Rendering**

The outcome of this phase was a storyboard available through the Web. Just as with an artist’s rendering of a building, the storyboard provided a sketch of the features available in the system.

This phase of the project took approximately one month, during which the requirements were gathered through brainstorming sessions held throughout the state of Arizona and with joint project team members. Participants ranged from administrators in the Registrar’s Office to faculty advisors.

**Phase 2 - Blueprint**

This phase produced a model of the processes involved in articulation, including the acceptability, equivalency, and applicability of courses. In addition, the data needed to support the processes was modeled.
Taking approximately two months, this phase included reviews of the current processes, discussions of changes in them, and an anticipated plan for a new way of doing business.

Phase 3 - Construction

The construction phase of the project began with a review of various products available to assist in building a Web application. In reviewing the products, the team recognized the software was still maturing and that any choice might well be outdated within months. However, in keeping with the development approach of making the application as vendor independent and cross-platform flexible as possible, three construction methods were chosen. The application construction was then split into three teams based on their expertise, that maintained weekly interaction with each other in order to keep modifications to the blueprints in sync.

The first team focused on developing the application that would be used by the articulation and curriculum offices to write the rules on which all other features would be based. The second team worked on making the rules and their application available through a Web interface. The third team took on the task of developing a communication and approval process supported through the Web.

In each of the different phases, there were several challenges/opportunities that had to be met. The project’s nature - multiple states (Arizona and Ohio), multiple institutions (Arizona State University, Miami University, University of Arizona, Pima Community College, Maricopa Community College, etc.) and multiple institution types (two and four year institutions) - contributed heavily to each of the challenges as the project was not contained within one institution. The challenges have been broken out into three categories: Human Challenges, Technical Challenges and Institutional Challenges.

**Human Challenges**

1) Getting people to think outside of their institutional boundaries

The business analysts assigned to the team had very different perspectives of articulation. Initially, discussions had two focal points:

- my institution (the right way) vs your institution (the wrong way)
- community colleges vs universities

By reminding ourselves our role on the project was to serve the students of the states (not our own institutions), we broke through these barriers and came to work in a truly collaborative spirit, which resulted in:

- taking fresh perspectives back to our home institution and initiating change
beginning off-line collaborative discussions to support other initiatives

The team used the analogy of a baseball all-star team or Olympics dream team. In each of these cases, the players have a home team that sponsors them. However, during their participation on the all-star or dream team, the players are all on the same team and must put aside their parochial views and work together to achieve success.

2) Juggling responsibilities
   - The Ohio staff assigned to the project also had to support other ongoing initiatives
   - The Arizona staff received only part-time release time that was secondary to home institution responsibilities

Calendars were planned on a monthly basis and participants gave 24 hour notice of changes. Team members were respectful of each other’s responsibilities and substituted for each other where possible.

3) Ensuring all participants in conference calls were “on the same page” in terms of what was being referenced (documents, drawings, etc.)

When speaking face-to-face, you are able to read a person's body language in order to know if they are following the conversation, questioning ideas, or trying to form a question or alternate idea. We found it too easy to assume the people on the other side of the phone were in agreement and feared some of us were not being heard.

Agendas and handouts were faxed to participants at least one day prior to the meetings. Minutes from the meetings and revised documents were distributed within 24 hours. In addition, the facilitator attempted to poll all participants at decision and transition points. The use of video conferencing was tried and found to be a better alternative to phone conferencing. However, the logistics involved in setting up a video conference made it more difficult to do on a regular basis.

4) Managing conflicting priorities between the state project and institutional projects, resulted in:
   - reduced hours on the project for most team members
   - new team members joining the team

Transitions among team members in terms of participation and responsibilities resulted in lost time, rework and contributed to the anxiety of completing the project on time.
As the project moved through the phases, additional support was required from both the business and technical community. While not allowing the scope of the project to expand, the transitions were viewed as an opportunity to gain fresh perspectives and to add depth to our knowledge base.

**Technical Challenges**

1) Setting up multiple development sites

   By dividing the assignments functionally, it was not necessary for each site to be a mirror image of the others. Attempts were made to make use of the environments as they existed at the development sites in order to keep costs at a minimum and to "get the project moving."

   Once the goals of each development site were documented, cross-site standards were setup for exchange of information. This standard configuration was then supplemented by the environmental entities needed for each site to meet its specific goals. Costs associated with the technical environments were absorbed by the host institutions.

2) Keeping the models in sync across three different development sites

   Although each development site had a specific area of responsibility, we worked with one data model. The division of labor attempted to ensure only one site would be updating specific data table structures through its development process. Occasionally, data model changes were recommended by a site using, rather than developing, the table structure.

   FTP sites were designated for the exchange of models. Exchanges took place in the form of DDL scripts and files used by the standard modeling tool.

3) Working with technology that is still emerging and constantly changing

   Selecting a development tool was difficult. The project schedule had little time for exploration and there were so many to choose from. The development platform was defined as the project began to get under way. Some team members relocated to an institution with an unfamiliar technical environment. Others found themselves working on a development platform that was new to their experience.
Eventually, three tools, Power Builder, Sapphire, and Java scripting on the server, were selected to provide the prototype with a variety of approaches that could later be evaluated in terms of scalability for implementation. Team members provided support for each other across sites where possible, but at other times, non-team members had to be brought in to work through a technical issue.

**Institutional Challenges**

1) Getting each state institution to buy-in to the project in terms of financial support and staffing

- Within the State of Arizona, each institution was asked to identify the manner in which it could support the project. Some responded with staffing, including salaries and travel money, while others responded with direct financial support. Not all institutions responded to the "Call for Funding and Personnel Commitments."
- The state of Ohio responded with a lump sum amount of money given to supplement Miami’s involvement in the project.

Regardless of the response to the "Call", all institutions were involved in the prototype project through
- monthly meetings of those involved in creating the paper documents being replaced
- focus groups held at three stages of the project (initiation, ongoing, wrap-up) to which each institution was asked to invite key stakeholders among their business and technical staffs

2) Managing the perception that the CAS-P was sponsored by specific institutions

As the project kicked-off within the state of Arizona, members of the community believed the project was being sponsored by specific institutions. It was not easily understood that this was a statewide project being housed at specific sites and staffed through the generosity of other institutions.

Project team members identified themselves to the community in terms of their role in CAS-P and down-played their home team role. In both private and public meetings, team members consulted with each other and used examples not related to their own institution when possible. One of the most telling comments of the success in this area was the comment, "You work just like a team!" By the end of the prototype, this was a comment heard at every meeting with non-team members.
**Approach for Success**

1) Working project plan, revised as needed

   Keeping track of our progress and identifying areas of change and improvement, helped us to achieve our goals.

   The project plan helped team members keep inter-related goals on track. Set backs were recorded and adjustments were reviewed by all team members.

2) Buy-in from community through focus groups and presentations to key constituents

   Considerable time was spent on change management. Traveling through the states, the team member worked with various groups on a repeated basis. Each meeting resulted in the participants understanding the project better. In addition, the repeated visits demonstrated the comments and concerns previously expressed were taken into consideration in the revised design.

   Involving the community in the project provided a forum for discussion and problem resolution. It also helped to guarantee the application will meet the needs of the community.

3) Financial and staffing support from all institutions involved

   Making a financial and/or staffing commitment to the project gave the institutions a vested interest in its success. In most cases, the institutions that did not directly participate on the project team, sought ways to be involved and to provide support.

   Institutions with staff involvement were publicly supportive of the project, which helped to move institutions along the change curve.

4) Access to the artist’s rendering through the Web storyboard

   It was important to get the project out in front of the community!

   The storyboard provides an effective way to communicate. It provides the opportunity for individuals to explore the system features at their own pace and it serves as a point of reference for discussions.

5) Standard team meeting times
Communication among team members was critical. With members working at various institutions and taking on independent assignments, it was important to stay in touch and to remain focused on our objectives.

Regularly scheduled meetings helped to ensure team members had the latest information and were aware of issues and concerns.

**Results**

The result of this cross-country team effort was a working prototype (located at "http://www.public.asu.edu/cas/"), delivered after six months of effort. The prototype resulted in:

A client application used by articulation and curriculum offices for recording the rules governing acceptability, equivalencies, and applicability of transfer courses.

Server software that marries the rules with courses a student has taken to produce a transfer guide customized for each student.

A Web application that provides the following features:

- View of transfer course equivalencies, showing how courses taken at one institution equate to courses or requirement categories at another institution
- View of course descriptions, including additional notes such as prerequisites, course outlines, course competencies
- View of academic programs offered at an institution and the program requirements
- Identification of courses taken at various institutions
- View of customized transfer guide, based on 1) courses the student has taken at various institutions, 2) identification of an institution to which the student may transfer, and 3) the optional identification of the institution at which the student plans to continue taking classes until a future transfer date.