Statewide collaboration in information technology: The implementation of the (Arizona) Course Applicability System

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Abstract:

This paper focuses on one successful example of statewide collaboration among public, post-secondary institutions in a new system implementation. The system, the Course Applicability System, was implemented in a production environment in the state of Arizona in July, 2000. The paper focuses on five key principles gleaned from the implementation process. These principles are:

- Principle 1. A collaborative project must allow all institutions to succeed regardless of their technical or other limitations, and must respect the disparity in starting points among varying institutions.
- Principle 2. Collaboration is reinforced when project success for any institution benefits all institutions.
- Principle 3. Intra-institutional collaboration is reinforced by increasing interdependence between business and technical units within a school.
- Principle 4. The pressures of real-time data publication, when shared by all institutions, motivate collaborative and cooperative problem resolution and can lead to system-wide business process re-engineering.
- Principle 5. In a collaborative environment, respect for institutional diversity is essential, as is institutional ownership of data and processes.

Concluding data about CAS use and user satisfaction will be included.
Statewide collaboration in information technology: Moving from paper to the WWW with the (Arizona) Course Applicability System

Introduction

This paper focuses on one successful example of statewide collaboration in a new system implementation. A brief background of the Arizona Course Applicability System Project is first offered, and then five principles of cooperation and collaboration in this context that manifested themselves during the implementation effort are identified. These include:

- Principle 1. A collaborative project must allow all institutions to succeed regardless of their technical or other limitations, and must respect the disparity in starting points among varying institutions.
- Principle 2. Collaboration is reinforced when project success for any institution benefits all institutions.
- Principle 3. Intra-institutional collaboration is reinforced by increasing interdependence between business and technical units within a school.
- Principle 4. The pressures of real-time data publication, when shared by all institutions, motivate collaborative and cooperative problem resolution and can lead to system-wide business process re-engineering.
- Principle 5. In a collaborative environment, respect for institutional diversity is essential, as is institutional ownership of data and processes.

The authors believe that these principles may be instructive for others who are participating in system implementations involving collaboration among a variety of disparate groups. They are also instructive for those who are attempting to initiate change from paper processes to web-accessible, database-driven means for doing business.

The Project

The mandate for the Arizona Course Applicability System project came from the Arizona state legislature in reaction to issues that had arisen around fairness and equity in the treatment of transfer students from rural and urban community colleges to the Arizona public universities. The perception was that transferability and applicability of coursework was not necessarily handled in an equitable and open manner for all Arizona community college students transferring to all three universities.

In an effort to avoid legislative interference in matters of curriculum, the Arizona public post-secondary institutions proposed a means of self-regulation. The Arizona Transfer Articulation Support System was created as a multi-dimensional, multi-functional organization for ensuring the seamless transfer of all Arizona public community college students to all Arizona public universities. This system is comprised of a number of administrative committees, and two technology components. This paper focuses on one of these technology components, the Arizona Course Applicability System (CAS). CAS is primarily aimed at ensuring that students and advisors have access to the most timely, accurate and complete information possible about issues relating to the transferability and applicability of students’ coursework.

The Course Applicability System application (which is a web-based, database-driven, transfer articulation and degree audit system) was created via a collaborative effort beginning in 1996 between the state of Arizona and the Degree Audit and Reporting System team at Miami University of Ohio. CAS is a product of Miami DARS, and is also being implemented in other states. The vision for CAS is that it will allow students to access information about transfer to and from community colleges and universities throughout the U.S.
In Arizona, the mandate was for CAS to replace an annual paper publication called the Arizona Course Equivalency Guide (CEG). The Course Equivalency Guide had been generated annually in Arizona since the 1970s, and reflected the equivalency values for all community college courses numbered 100-299 at the three Arizona public universities. This publication was provided to administrators, faculty and advisors at all public post-secondary institutions in Arizona. The information in the CEG was not stored in a database, but was maintained as a word-processing document with periodic updates recorded by institutional transfer articulation business rule experts, and then forwarded to a centralized CEG Editor, who formatted the document for publication.

During the summer of 2000, the Course Applicability System officially replaced the paper Course Equivalency Guide as the official repository of course equivalency information for the state of Arizona. The successful transition to the Course Applicability System reflects the active and ongoing commitment of each of the participating institutions to a collaborative, cooperative means of doing business.

Arizona is fortunate to have had for many years a collaborative and cooperative business model for developing, implementing and policing transfer articulation policy and practice. The implementation of a statewide computer system supporting transfer has built on this model, and reinforced it in many ways. As a result of this project, we can identify a number of principles relating to inter-institutional cooperation and collaboration towards a single technology project.

**Principles of a Statewide Collaborative Effort**

*Principle 1. A collaborative project must allow all institutions to succeed regardless of their technical or other limitations, and must respect the disparity in starting points among varying institutions.*

All public, post-secondary institutions in Arizona were mandated to participate in CAS. However, not all schools were ready to participate at the same level. One strategy for handling this was to create an outline of various acceptable levels of participation, depending upon the institution involved. Schools with the least access to technical resources could successfully enter at “Level 1”, which involved the creation of a single, relatively simple data file providing course information relevant to that school. Schools with most access to resources could participate at “Level 3”, which involved the creation and maintenance of numerous, complex data files based on courses, general education requirements, and degree programs. Schools falling somewhere in the middle could participate at “Level 2”, which involved providing information on courses and on their requirements for completion of the Arizona General Education Curriculum (AGEC) transfer module.

Participation levels, and expectations for participation, were created based on two types of criteria. One set of criteria had to do with the bare essentials for meeting the legislative mandate of providing an “electronic CEG”. This meant CAS needed at least enough data to be able to produce reports relating to course equivalencies for courses taken at an Arizona public community college, to an Arizona public university.

The other set of criteria had to do with the ability of institutions to provide the appropriate data and technical support to the project. It was important to define successful participation in CAS in a manner that would not *a priori* preclude any Arizona school from succeeding, regardless of the technical limitations on a campus.

While all participants understood that the fullest and most advantageous implementation of CAS would involve all institutions participating at Level 3, it was clear that successful participation for any institution did not depend upon it’s being able to meet the highest standard at the earliest point of the implementation process.

In working on this project, we learned that it is nearly universally true that institutions do not have enough technical resources to adequately support ongoing needs, let alone new projects. In light of this fact, the Arizona CAS project also provided some centralized technical and functional support for the implementation. At first, this involved the naming of a statewide project manager, who took on these duties in addition to her regular full-time commitments. As the project progressed, funding for a full time
technical analyst was secured. Lastly, a full time line for a function area support person was created and funded. While this small, centralized staff cannot fully compensate for any institutions’ lack of technical resources, we have been able to provide enough additional help to get many institutions through some basic roadblocks to participation.

Furthermore, the original funding model for CAS, as part of the ATASS initiative, involved some public monies allocated by the legislature, and an institutional ‘match’ provided by each of the public post-secondary institutions. The two full-time positions were funded in this way, as was the central hardware, software and infrastructure costs. This has meant that all of the participating institutions have taken an ownership role in the development of the system from the beginning. Although it is hoped that with the full implementation of the system, full legislative funding will come, there may have been an advantage in starting the process with every participating institution paying a part of the costs of the project.

Principle 2. Collaboration is reinforced when project success for any institution benefits all institutions.

First, the nature of this technology is to emphasize the interdependence of the participating institutions. Data maintained and provided by one school feeds reports needed by another. Every institutions’ data is delivered via the same interface, is presented in a consistent format, and supports business processes and student services at every other institution. In this way, CAS participation can be a win-win proposition for all participating institutions.

Second, we learned that as one institution becomes expert in a technology, they also become a resource to other institutions attempting to implement similar technologies. This builds on a spirit of collaboration and cooperation among institutions, and fosters increased understanding and awareness among institutions. On a purely practical note, we have developed a statewide help and support network among CAS participants, and count on this to alleviate some of the strains on our small, centralized support staff.

Third, we learned that technical success is contagious. One of the best ways to cultivate technical progress in a shared project at one institution is to provide a venue for publicizing the technical progress made toward that same project at another. The healthy rivalries and competitiveness among institutions can work to move all of the constituents forward, and the impetus can be a single advance by a single institution.

Finally, some Arizona institutions have been successful in parlaying the mandate for participation in CAS into additional technical resources for their campuses, and this has provided increasing motivation to participate fully in the project. Since CAS is a web-based application, computing systems are needed that allow campus constituents to speedily access the web using a suitably current browser application. Extremely antiquated equipment would be unsuitable, and so one institution, for example, was able to secure funds for large-scale hardware upgrades (in addition to other expenditures) to support on-campus use of the system. Of course, these upgrades will ultimately advantage campus users with respect to many other, unrelated, systems and projects.

Principle 3. Intra-institutional collaboration is reinforced by increasing interdependence between business and technical units within a school.

In many cases, the traditional means of maintaining data relating to student transfer required there to be parallel systems within each institution. One system was required for managing the business process related to making and recording equivalency decisions in the CEG. The other was required for encoding these decisions in the local student information system, and to do transfer evaluations for entering students. This was necessary because the CEG was not a functional document – it was maintained as a word-processing document, with

This has changed with the implementation of CAS. The relational database tables in CAS are capable of automatically evaluating students’ transcripts. The CEG is now a set of reports extracted directly from those functional tables. This means that those units who had been maintaining separate records for publication versus application no longer need to do so.
But this change, to be successful, requires cooperation and collaboration between those who have been responsible for maintaining the CEG (who are primarily business/functional experts), and those who have been responsible encoding and maintaining the rules and systems for doing transcript evaluation (who are primarily technical/systems experts). Previously, each group has had fairly free-reign to adapt their practices to the specific needs of processing or publication. Now all practices have to be balanced to support both of these outcomes. As a result, each group must develop an understanding and appreciation for the demands and requirements placed on the other.

As an example, one institution had been using the transfer articulation tables that would ultimately become a part of CAS to do automated transcript evaluation for incoming transfer students. In order to make the system work, those in charge of encoding the articulation rules into the system had created a number of rules that would handle certain kinds of data-entry errors that the group had found to be common. In the transactional system, then, there were rules written simply to expedite processing in light of imperfect data entry.

When these tables began to be used as the source of a published document, however, these rules were included in the display accessible to students, advisors, and the business experts who had maintained the paper publication. This was an unforeseen consequence of using transactional tables to create publications, and could be solved fairly readily. What happened as a result, however, was that the business experts gained an understanding about some of the realities dealt with by the technical unit in charge of encoding and maintaining the automated system. Similarly, the technical experts learned about some of the issues involved in trying to maintain a user-friendly, clear and concise publishable document containing only the “official” rules of transfer articulation.

Principle 4. The pressures of real-time data publication, when shared by all institutions, motivate collaborative and cooperative problem resolution and can lead to system-wide business process re-engineering.

The ability to provide real-time reporting of changes in transfer rules and policies (and the ability for institutions to quickly and efficiently correct errors of reporting) was one of the main motivations for the state to enter into a project such as CAS. However, this ability also raises a number of management issues. The magnitude and complexity of these issues is increased in accordance with the number of institutions involved in the project.

With the advent of CAS, Arizona institutions have been working together closely to synchronize their business processes relating to transfer articulation decision-making. One crucial part of the implementation of this project was a business process re-engineering effort undertaken by all the institutions in the state to ensure that the decision-making process behind transfer articulation rules and policies would work with a system that could publish changes at any time. This process has reinforced the interdependence of the participating institutions, and the need for effective, accurate and timely communication among them.

We’ve also found that the ability to publish varying reports from a single data source is working to not only serve the needs of various constituencies (students, advisors, faculty and administrators), but also to help all participating institutions to improve the integrity and accuracy of their data. By creating reports that sort the data in different ways, data inconsistencies have been made much easier to spot than they could otherwise have been. And because these reports pull from data belonging to all of the participating schools, representatives from each institution can see exactly how their school’s data fit into the bigger picture.

Principle 5. In a collaborative environment, respect for institutional diversity is essential, as is institutional ownership of data and processes

Along with the pressures toward increasing cooperation and collaboration brought on by the CAS project in Arizona, there has been a concomitant need to respect the differences among the participating institutions in terms of resources, culture, and objectives.
One of the ways in which the Arizona CAS project has enhanced this understanding is that it has relied on the participating institutions to host meetings and working sessions at most of the various campuses in the state. Participants have been able to see first hand something of the environment in which each institution operates. They have also been able to observe and acknowledge their colleagues’ pride in the particular strengths of each campus. This approach is costly in terms of time and travel for participants, but has proved worthwhile in the dividends it pays in mutual understanding and respect.

With respect to institutional ownership of data and processes, one of the changes that has come into play in the implementation of CAS is that there is no longer a centralized ‘authority’ in charge of data accuracy. In the past, the CEG editor performed the function of coordinating proofreading of the document, and incorporating corrections. Constituents who spotted errors could contact the editor who could make corrections. Furthermore, the “official” source of the CEG document was housed in a central office, which was unaffiliated with any particular institution.

Participating in CAS has changed this structure, and eliminated the “middle-man” in data maintenance. Institutional ownership of data files is strictly enforced, and no one outside an institution has the authority or access to change that institutions’ data. This has meant that each institution has had to take an increasingly active and accountable role in the publication of transfer articulation rules and policies.

**Conclusion**

The CAS project in Arizona is in full implementation, with all public, posts-secondary institutions in the state as active participants. Arizona CAS is the official repository of course equivalency rules for the state, and the annual production of a paper Course Equivalency Guide has ceased.

This is not to say that the state of the CAS project today is viewed as complete by any of its participants. The system will be expanded to include more institutional data, and more technological resources to support the business processes involved in transfer articulation decision-making in the state. Various accountability measures, including those that will be accessible through the Arizona Statewide System for Information on Student Transfer, have yet to be fully implemented.

The success of this collaborative effort can be hinted at, however, by looking at trends in system usage and user satisfaction. Data in both of these areas is currently being collected, and will be published via the Arizona CAS Project Homepage ([http://az.transfer.org/cas](http://az.transfer.org/cas)). Preliminary findings indicate a very high degree of user satisfaction with the system, and rapidly increasing usage. Although thorough results are not available at the time of submission of this paper, the authors fully expect them to be available within the next few months, and would be delighted to share them with participants at the conference.

**ENDNOTES**

i The Arizona Course Applicability System Project can be accessed at [http://az.transfer.org/cas](http://az.transfer.org/cas).

ii The second technology component, which is not a focus of this paper, is a statewide data warehouse for tracking the success of Arizona transfer students. It is called the Arizona State System for Information on Student Transfer (ASSIST), and can be accessed at [http://www.asu.edu/assist](http://www.asu.edu/assist).

iii The first statewide projects for CAS were conducted in Arizona, Ohio and Wisconsin. A number of other states, including Minnesota and Indiana are beginning to build statewide implementation efforts.

iv See the Arizona Transfer Articulation Support Systems website ([http://az.transfer.org/cas](http://az.transfer.org/cas) > ATASS) for details.

v The notion of participation levels was also used by the Ohio CAS project, but the specifics that constituted a particular participation level differed according to the Ohio CAS priorities.