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**Introduction**

One of the major themes identified by the 2015 EDUCAUSE Top 10 IT Issues survey is the challenge of shepherding information technology (IT) from a technical orientation to one that is more in tune with the business of higher education. To meet this challenge, IT units need to address two potential obstacles: (1) applying technological innovation to student success initiatives that focus on improving faculty teaching and student learning outcomes, and (2) transcending organizational silos to cooperate with other functional and strategic units to support the educational missions of their respective institutions. The advent of integrated planning and advising services (IPAS) technologies presents IT departments with an excellent opportunity to span the gulf between the technology and business sides of their institutions.

Indeed, as a data-centered, holistic approach to sharing the responsibility of student success, an IPAS project may well be the catalyst that prompts a fundamental shift in the IT role from technology service provider to educational service partner. The four IPAS domains of education planning, progress tracking, advising and counseling, and early-alert systems (see figure 1) cut across traditionally discrete units. Given this reach, IPAS situates IT departments to directly address no fewer than 3 of the top 10 issues for 2015:

- Optimizing the use of technology in teaching and learning in collaboration with academic leadership (Issue #2)
- Improving student outcomes through an institutional approach that strategically leverages technology (Issue #4)
- Demonstrating the business value of information technology and how the IT organization can help the institution achieve its goals (Issue #5)

![Figure 1. A model of IPAS domains](image-url)
If institutions are to understand whether and how well they are addressing these issues with IPAS or other educational technology projects, evidence of the impact of these systems must be brought to bear. To demonstrate what, if any, effect an IPAS project has on student success, IT culture, and institutional transformation, data on the project must be systematically collected and rigorously analyzed. Therefore, on the heels of our previous IPAS reports—IPAS Implementation Issues: Data and Systems Integration⁴ and the IPAS Implementation Handbook⁵—we now turn our attention to the often overlooked but critical subject of evaluating and assessing IPAS projects.

As a basic resource on evaluation and assessment, this report is designed to be used by IPAS project teams at institutions of varying size and resources.
Summary

This report consists of two main parts. The first addresses a host of methodological and procedural issues related to the evaluation and assessment of IT projects in general and IPAS projects in particular. The second is concerned with comparing and contrasting the real-world evaluation and assessment experiences of four institutions that have recently launched IPAS projects. The key findings of the report map closely to the two parts of the report:

- **Institutions need to develop a protocol for assessment and evaluation during the project planning stages for their IPAS initiatives.** If assessment and evaluation are an afterthought in the project planning sequences, valuable data that could be used to demonstrate the impact and effectiveness of the project will be irretrievably lost. In that situation, the range of options available to an IPAS project team is narrowed considerably.

- **There is no one correct way to evaluate and/or assess an IPAS project.** A variety of strategies, methodologies, and types of data can be used to evaluate the worth and value of a project and to assess its impact. Each of these has its particular strengths and weaknesses. Regardless, the guiding factor for selecting methods and models should be the outcomes and goals targeted by the project.

- **Institutional type and resources influence, but do not determine, the assessment and evaluation options available.** Whereas larger institutions may have considerable human and financial resources that can be marshaled to conduct sophisticated evaluations and assessments, even smaller institutions can employ highly systematic and rigorous protocols. At the same time, in the absence of financial resources or evaluation expertise, simple, elegant assessment and evaluation methods can be highly effective if properly aligned with project goals.

- **The topic of data is central to any discussion that institutions should have regarding IPAS evaluation and assessment.** The entire IPAS approach to student success relies on leveraging institutional data and analytics. Furthermore, if institutions are to demonstrate the impact and worth of IPAS solutions, the systematic and thoughtful collection and analysis of qualitative and quantitative data are required.

- **Aligning and operationalizing goals and outcomes with meaningful variables are essential processes to any evaluation or assessment protocol.** Some variables will be readily available from existing institutional resources—e.g., student information systems (SISs), enterprise resource planning (ERP) systems, learning management systems (LMSs)—or from the IPAS solutions themselves. However, institutions should be prepared to identify gaps and develop measures to accurately capture the desired data.

- **The major obstacle for smaller institutions is related to the human resources available to design and execute protocols and to conduct the analysis and**
**reporting of results.** Smaller institutions invariably have faculty and staff with the skills and expertise to conduct evaluations and assessments but may not have sufficient numbers of those individuals to dedicate some of them to additional and/or larger projects such as IPAS.

- **Institutions need to be comfortable with uncertainty in outcomes, resilient in data-collection efforts, and patient with regard to having results that demonstrate impact.** Although IPAS solutions are designed to have a positive impact on student success, we simply do not yet know much about the effects of such systems. Even the most rigorous and well-designed evaluation and assessment protocols may fail to demonstrate effectiveness, especially in the immediate or short term.

Institutions of any type and with any range of resources can benefit from this report. We intend it to be used as a primer by IT project managers, project team members, and other institutional staff who find themselves called upon to carry out the evaluation and assessment of IPAS projects. We have organized it in such a way that readers can consume the entire report front-to-back or skip to parts that focus on the aspects of IPAS evaluation and assessment that are of the most interest to them. The sections include:

- A brief consideration of the importance and necessity of conducting an evaluation and assessment of educational technology projects in general and of IPAS projects in particular
- An overview of approaches to and issues surrounding project evaluation that should be taken into consideration in the planning stages of IPAS (and other IT) projects
- An introduction to a number of methodological topics such as levels of analysis, types of evaluation and models of assessment, the design of protocols, and the measurement, collection, and analysis of data
- A synthesis of responses to questions regarding assessment and evaluation efforts from four institutions that received grants from the Bill & Melinda Gates Foundation to carry out IPAS projects

At the end of the report, we include an appendix containing more detailed information regarding the methodological issues related to assessment models introduced in the main text. We think it will prove to be a valuable resource for those who wish to explore the issue a little deeper, those who need to select a particular approach to assessment, or those who desire a bit of a methodological refresher.

Before we proceed, a word of caution—or permission—is in order. There is no one correct way to evaluate a project or to assess its impact; there are, however, a myriad of ways to do it incorrectly, the most immediate of which would be failing to consider evaluation and assessment prior to the onset of a project.
IPAS Basics

IPAS projects are geared inherently toward improving student success, broadly defined. By marshaling technological resources to gather and analyze vast quantities of student data from institutional databases, LMSs, student ID swipes, and other sources, institutions aim to address a host of general and specific issues that often beleaguer students and undermine their ability to achieve their educational goals. Specifically, IPAS can contribute to student success in the following ways:

- Digitizing degree programs into degree-planning systems affords students the opportunity to plan out their entire academic course schedule with the most efficient and effective path to graduation.

- Tracking student progress through their degree plans—flagging deviations, facilitating major or concentration changes, identifying alternative or additional courses of study—has the potential to help students stay on the path to degree or certificate completion, eliminating potential dead-end course registrations and reducing higher education cost and debt.

- Integrating counseling and advising systems provides quick and easy access to campus resources that students need, renders notes from advisors and counselors available to campus liaisons who need to access them, and reduces or eliminates barriers to following up with students who have been referred to various resources.

- Early-alert systems allow instructors manually (or the LMS automatically) to easily raise “flags” for students who are underperforming, failing to complete assigned work, or not attending their courses so that timely interventions can be executed; conversely, students whose performance exceeds expectations can receive positive feedback, or “kudos,” from their instructors.

Representing the earliest practical applications of analytics to higher education problems, IPAS has garnered considerable attention and appears to be affecting the future allocation of IT resources dedicated to teaching and learning in higher education. Early accounts of IPAS success—from institutions such as Arizona State University and Austin Peay State University, and from 19 projects funded by grants from the Bill & Melinda Gates Foundation (see the IPAS Implementation Handbook), among others—have encouraged colleges and universities across the country and the world to pursue these technologies. In a 2014 IPAS benchmarking study, about 80% of survey respondents claimed that IPAS technologies are integral to larger student success initiatives. Additionally, 80% also signaled that significant IPAS investments were expected at their institutions in the next two years, with 90% expecting increased use of IPAS technologies in the next five years. Approximately 7 out of 10 respondents cited the strategic priority of student success as a major driver behind IPAS initiatives, and 4 in 10 suggested that the strategic priority of evidence-based decision making is such a driver.
Despite the emerging enthusiasm surrounding IPAS technologies, very little is known about their effectiveness. With the exception of a handful of self-produced white papers documenting the local impact of IPAS-like digital interventions, little to no systematic, peer-reviewed research has been conducted on the impact of IPAS technology on the various domains toward which it is oriented. To understand what, if any, impact IPAS technologies have on student success, systematic evaluations and empirical assessments must be conducted by the institutions undertaking them. Moreover, the results of these efforts and the methodologies undergirding them need to be publicly shared so that comparisons can be made between IPAS institutions. We hope that this report both inspires and facilitates the production of this knowledge.
Part I: Evaluation and Assessment

All IT projects, not just IPAS ones, should have some evaluation and assessment components built into them. Gathering and analyzing data in the course of executing a project helps organizations understand and improve processes. Used formatively, evaluation and assessment efforts can inform both short- and long-term decision making; used summatively, they can help determine whether the benefits outweigh the costs. Finally, an assessment and evaluation protocol helps IT managers and administrators to determine if and how well a project is working or has worked. In an era of scarce resources and shrinking budgets, the ability to demonstrate effectiveness and impact of expensive IT projects, such as IPAS, is tantamount to good stewardship of resources.

Defining Evaluation and Assessment

For our purposes, we define evaluation as the process by which the merit or worth of a project is determined. Assessment, on the other hand, is the process by which the impact of a project is determined. The former tends to focus on the process, frequently requiring reflection at various stages of a project from its inception to its conclusion, and renders a judgment on the value of the project. The latter focuses on outcomes and relies heavily on empirical evidence—qualitative or quantitative—to understand the significance and magnitude of a project’s impact. The criteria for making an evaluation can, to some extent, be flexible, although they should be identified and agreed upon a priori. Assessment, however, requires careful identification, operationalization, measurement, and analysis to identify objective gains and losses. Results obtained via assessment can (and should) be used in the evaluation process, but the value judgments derived from evaluation efforts typically are not suitable to determine the empirical outcomes of assessments (see Table 1).

Table 1. Evaluation versus Assessment*

<table>
<thead>
<tr>
<th>Question</th>
<th>Evaluation</th>
<th>Assessment</th>
</tr>
</thead>
<tbody>
<tr>
<td>What is the value or return on investment of the project, program, or service?</td>
<td>Does the project, program, or service work?</td>
<td></td>
</tr>
<tr>
<td>Object</td>
<td>Worth or merit of a project</td>
<td>Impact of a project</td>
</tr>
<tr>
<td>Aspects</td>
<td>Procedurally focused</td>
<td>Outcomes focused</td>
</tr>
<tr>
<td></td>
<td>Judgmental</td>
<td>Diagnostic</td>
</tr>
<tr>
<td></td>
<td>Contextual</td>
<td>Empirical</td>
</tr>
</tbody>
</table>

* The Reference and User Services Association, a division of the American Library Association, provides an excellent set of resources for conducting project assessment and evaluation.

Evaluation is the process by which the merit or worth of a project is determined. Assessment is the process by which the impact of a project is determined.
Levels of Analysis

One of the first things that need to be considered when planning an assessment or evaluation protocol is the level or levels of analysis at which the project is to be evaluated. In terms of IPAS, we can think of the lowest level of analysis occurring at the domain or the application level. That is, determining whether and how well degree-tracking tools, progress-tracking software, advising and counseling applications, and early-alert systems are working would reside at the lowest level of analysis (see figure 2).

Examples of appropriate assessment questions at this level might include:

- Examining the impact of early-alert flags on students’ successfully completing the courses in which they received them, or
- Exploring the ease with which student services are able to follow up on and share information with fellow counselors and advisors after referrals are made.

A couple of examples from the evaluation side at the domain level might include:

- Examining the rollout of the new early-alert system to understand why faculty, staff, and students have been quick or slow to embrace the new tool, or
- Rethinking implementation processes based on the experience of programming curriculum rules into a degree-planning tool.

At the next, or intermediate, level of analysis in our example is the IPAS project level. That is, questions asked or objects of concern here focus on the IPAS project and its components as a whole. Examples of assessment issues to be explored at the project level might include, but are not limited to, questions related to user adoption rates, experiences, and/or satisfaction with the IPAS project or the IPAS systems that have been successfully implemented. Or, from a more evaluative standpoint, an institution might be interested in understanding the issues related to integrating various applications from different vendors and data from various sources into a single system.

Figure 2. Levels of analysis

Understanding the level of analysis for your evaluation and assessment questions helps identify the proper sources of data and evidence required to demonstrate the value and impact of the IPAS project.
The highest level of analysis in our model, the programmatic level, is targeted toward the assessment of longer-term issues and higher-order questions about the impact of IPAS on things like student graduation, completion rates, transfer rates, and other institutional outcome variables. Changes to college or university procedures, restructuring of units, curricular overhaul and major restructuring, or the creation of new services, units, or facilities might all be plausible evaluation outcomes that demonstrate a return on investment (ROI) or the value of the IPAS project.

Those who are leading evaluation and assessment efforts need to think about how different goals and outcomes, questions, and data belong to each of these levels of analysis when preparing the protocols for their projects. Although the results from each of the lower levels might be used to support or inform the questions located at the level above it, one needs to be careful that variables and data are appropriate to the questions asked, processes evaluated, or outcomes assessed.

**Types of Evaluation**

Generally, two types of evaluation—formative and summative—can be used to determine the worth or merit of a project. Both evaluation types are defined by the combination of a temporal component, the questions being asked, and how the evaluation team employs the results.

Formative evaluation typically occurs at or near the beginning of project implementation and continues to be used iteratively throughout the life cycle of the project (see figure 3). The types of questions guiding formative evaluation processes are designed to capture information and data in the stream of the process of executing a project, focusing on such topics as progress, implementation, feedback, and the unexpected.

Data collected as part of formative evaluation processes enable project managers to pause, reflect, and take stock of the project process at various junctures; to inform decisions about what, if anything, needs to be changed; to identify features to
emphasize or de-emphasize; and to reevaluate timelines and budgetary allocations. Some typical questions that evaluation efforts might attempt to answer include:

- Are project deadlines, milestones, and goals being met?
- Are improvements to the original process necessary? If so, what are they?
- Procedurally, what is working and what is not working? How can what is not working be fixed?
- Have any stakeholders been excluded from the project? If so, what have been the implications of doing so?
- Has the intended user base embraced the new IPAS tool(s)? Why or why not?
- What unintended consequences, positive or negative, have resulted?

Summative evaluation typically comes later in a project. Although the planning for the summative evaluation may take place during the early stages of the project, the evaluation typically occurs at the conclusion of a project or soon thereafter. The questions and topics on which summative evaluations focus typically do not stray too far from the ones used during the formative evaluation process. However, as the name suggests, the purpose of the evaluation that occurs at the end of the project is to provide a summary of the project’s successes and failures, setbacks and advances, and allowances and limitations so that a judgment on the ultimate worth or merit of the project can be rendered. Therefore, the questions being asked are necessarily in the past tense:

- Were the deadlines, milestones, and goals met? Why or why not?
- How well was the issue on which the project focused addressed?
- In terms of process, what worked? Why? What did not work? Why not?
- What were the unintended or unplanned outcomes of the project?
- What lessons can be learned from this project to inform the next one?

By looking backward at the entire project cycle and evaluating it either as a whole or in parts, a final judgment can be made regarding the project’s value to the unit, constituency, and institution. Moreover, the lessons learned from such a retrospective can inform how similar projects in the future can and should be approached so as to accentuate and capitalize on the positive while avoiding known pitfalls and mistakes.

Models of Assessment

Although the processes, measurements, and evidentiary thresholds for assessment are much stricter than those for evaluation, a host of models can be used to demonstrate the impact of IT projects. Not unlike the types of evaluation discussed above, the models of assessment have a temporal component to them, but they also depend heavily on the sequencing of assessment events and the arrangement of comparison groups. Because the evidence required to empirically demonstrate the impact of interventions are much higher than the thresholds for evaluation, assessment designs
require careful thought and rigor based on the outcomes one hopes to demonstrate. That is, if we are to demonstrate the efficacy of IPAS systems to higher education, we need assessment efforts that can produce evidence that is convincing to both internal and external reviewers.

Although the proverbial gold standard of assessment and evaluation might employ multiple models, especially true experimental ones, and constantly collect data at all levels of analysis, not every institution will have the resources available, or even the desire, to carry out such efforts. The complexity of evaluation and assessment protocols needs to be consonant with institutional IPAS goals, the human and financial resources available to dedicate to the project, and the evidentiary thresholds that need to be met in order to satisfy key stakeholders. Because of the variation around these factors, we recommend strongly the customization of evaluation and assessment protocols on a case-by-case basis. Regardless, evaluating and assessing IPAS projects requires that one pay attention to

- the levels of analysis at which efforts are directed,
- the timing and sequencing of formative and summative evaluation data-collection efforts and assessments, and
- the model(s) of assessment used to obtain and analyze results.

In the appendix, we look briefly at some models of assessment that were born out of social scientific research methods as options that are available and can be readily used in setting up a protocol for an IPAS project. In that section, we also discuss the technical and methodological aspect of the benefits and drawbacks of each model. One does not need to have a background in research methods or measurement to read the appendix, but we think that doing so will prove beneficial to those who are novices or have limited experience in assessment because it covers some basic features to get you thinking about your project. Those who plan to rely more heavily on institutional research (IR) or external consultants to conduct the assessment may wish to proceed directly to the next section of the report.
Executing Evaluation and Assessment Protocols

For many, one of the more surprising aspects of designing and carrying out the evaluation and assessment of IT projects is the need to begin at the end. However, the concept of “backwards design” is nothing new to higher education; it is a hallmark of academic research and, more recently, college course design. Our recommendation in using backwards design for setting up and implementing IPAS evaluation and assessment protocols is grounded in the former, inspired by the latter, and born out of the necessity for pragmatic project solutions. To that end, let us briefly consider the six basic steps to executing evaluation and assessment protocols.

1. Identify Project Goals and Outcomes

To begin the assessment and evaluation process, you need to understand what the goals and outcomes of the IPAS project are. The number and type of goals and outcomes will vary by institution, project scope, number of IPAS domains targeted, campus stakeholder interests, and, if part of an externally supported project, conditions set by grant makers. Regardless, the previous discussion in this report should provide some useful heuristics with which to think about the goals and outcomes you have for your project. Specifically, consider the following to organize your thoughts:

- What is the purpose (or purposes) of the IPAS project?
- What is to be evaluated, and what is to be assessed?
- What are the intended objects of interest?
- What questions do you want to answer about those objects of interest?
- What levels of analysis are covered by the outcomes and goals identified?
- What specialized stakeholder outcomes need to be considered?
- What, if any, grant-making goals or outcomes need to be evaluated or measured in order to comply with the terms of the grant?

The goals and outcomes should be concisely stated, specific, oriented toward the respective IPAS domains represented, and aligned with the institutional aims of the project.

2. Operationalize Definitions

Take the goals and desired outcomes identified in the first step and begin fleshing them out with definitions that lend themselves to measurement. Unpacking concepts and terms to their lowest common denominator helps those involved think about and identify specific variables for which data could be collected. If, for example, “improved student success” is a stated goal and outcome, operationalize student success by thinking about what indicators could be used to demonstrate that concept. Student success might mean a host
of things depending on the institution, including, but not limited to, improved GPAs, on-time graduation or certificate completion, retention, persistence, articulation, or course completion.

3. Identify Data Types

Identifying the types of data required to measure the variables enumerated in the previous steps is the next task. Qualitative data can help tell individual stories or put flesh onto concepts and processes to better understand the IPAS users’ perspectives. Typical qualitative data include anecdotes, stories, descriptions, and examples. Quantitative data allow for precision and statistical analyses of experiences and outcomes. Descriptive statistics (e.g., counts, means, standard deviations, effect sizes), comparative tests of significance (e.g., differences of means tests), inferential statistics (e.g., attaching probabilities to outcomes based on observations), and statistical modeling (e.g., predicting certain outcomes based on a set of independent variables) might be used with quantitative data. A mixed-methods approach uses a combination of both qualitative and quantitative measures and affords the opportunity to tell a more comprehensive story in which the statistics from the latter are explained by the former and the stories from the former are backed up with hard evidence by the latter.

4. Collect Data

Once the type of data required to measure the goals and outcomes is known, IPAS teams can focus on collecting the data for their evaluation and assessment projects. There are a number of possible methods by which data can be collected, some of which may depend on the types and sources desired. Qualitative data are typically culled from open-ended survey questions, focus groups, and interviews; quantitative data can be gathered by surveys, institutional data (e.g., official records), the LMS, and, in this case, IPAS software applications. Although student data could be collected by any of these methods, data from faculty and staff might be more limited to surveys, focus groups, or interviews. Depending on the IPAS software being used, data might also be harvested concerning instructor, counselor, and/or advisor usage.

One should also consider the frequency and timing of data-collection efforts. To some degree, these factors are shaped by the type of data being collected and the assessment and evaluation design implemented. For example, a time-series design that examines the impact of early alerts on successful course completion requires that data be collected on a semester-by-semester basis. Conversely, an evaluation of the short-term impact of early alerts on students’ accessing student services might require data collected at more frequent intervals. Finally, if the project requires deploying surveys to faculty, staff, and students, consider carefully the timing of such efforts because low response rates may result from ill-timed (e.g., midterms, finals week, holidays) efforts or from survey fatigue when those surveys coincide with other institutional data-collection efforts.
5. Analyze Data

Data analysis is largely dependent on the kinds of data collected, the evaluation and assessment questions to be answered, and the staff and resources available to carry out the tasks competently. It is also good to keep in mind that different kinds of data require different analytical skills. Unless members of the IPAS implementation team have the expertise to handle qualitative, quantitative, and mixed-methods analysis, seek the support and advice from institutional researchers, evaluation and assessment specialists, and/or statistical support.

6. Report On and Share Results

Once the analysis has been completed, the final step of the evaluation and assessment processes is to produce a report on the findings and/or disseminate the results. The former serves as a referential document that catalogs the efforts of the entire project, providing both the empirical results of the assessment and the judgmental results of the evaluation. Key stakeholders in the IPAS project—from upper administration to functional units, faculty, staff, students, underwriters, and funders—should have access to the report, especially since many of them would have contributed significant amounts of effort and/or data to the project.

Disseminating the results—especially the empirically significant and positive ones—to the broader audience of higher education is important, especially for institutions that are considering whether to pursue their own IPAS projects and would benefit from knowing what to reasonably expect. In this way, those institutions might, as a result, avoid potentially costly pitfalls and limitations. Although institutions rarely like to acknowledge projects that did not produce the desired results, to admit that efforts or projects failed to meet expectations is in keeping both with the research mission of higher education to produce knowledge and with a certain civic responsibility to not allow scarce educational resources to be wasted on projects that may not bear fruit. In this sense, sharing the negative results of evaluation and assessment efforts is just as important as the positive ones, if not more so.

IPAS evaluation and assessment protocols will vary in terms of the levels of analysis covered; the frequency, breadth, and depth of data-collection activities; and the assessment model(s) chosen. The differences in protocols selected will be the product of institutional goals, resources, and complexity of IPAS projects. Regardless, these six basic steps should prove useful and effective.
Part II: The Cases

To offer readers a grounded perspective in issues about and approaches to evaluation and assessment, we selected 4 institutions from a pool of 19 that received funding from the Bill & Melinda Gates Foundation in 2013 to support the implementation of IPAS systems. These institutions were selected using criteria to maximize the diversity of

- the types of project goals that were identified and are being assessed and evaluated,
- the complexity of the IPAS projects being evaluated and assessed,
- the types of data and methods being employed to demonstrate the efficacy of IPAS projects (e.g., qualitative versus quantitative, survey versus counts, thresholds versus gains), and
- how far along the institutions were in the process of evaluating and assessing their IPAS projects.

Once the four institutions were identified, we made a series of site visits to each of the institutions between December 2014 and February 2015. During these sessions, we conducted semistructured interviews with IPAS project leads, IPAS project team members, and other campus stakeholders.

The institutions participating in this study are:

- Colorado State University
- East Mississippi Community College
- Montgomery County Community College
- Stanly Community College

The basic questions asked of participants included the following:

- What are generally the best practices for planning and designing an evaluation and assessment protocol for IPAS projects?
- What issues, approaches, and obstacles need to be considered when evaluating and assessing IPAS projects?
- What key variables and measures can be used to evaluate and assess IPAS projects?
- How are the results of IPAS evaluation and assessment efforts rendered actionable?
- How effective are IPAS solutions at achieving their intended goals?

Each of these topics is discussed, in the above order. For the first two, the general character of the responses we obtained conduces a synthesis. For the latter three questions, the responses we received are so detailed and institutionally specific that they warrant treatment on a case-by-case basis.
**Best Practices for Evaluation and Assessment Design**

During our conversations about what practices might be best when thinking about a protocol for carrying out the assessment and evaluation of IPAS projects, six broad themes emerged. Some of these directly echo our previous discussion of the methodological issues and approaches, while others offer insight and advice grounded in the participants’ immediate experiences.

**Plan for Assessment and Evaluation at the Onset of the Project**

First, representatives from each of the four institutions emphasized the need to begin planning for assessment and evaluation at the onset of the project. This may have been driven in part by the requirements of the grants received for building and launching IPAS systems, but it was also part of a regular pattern of how projects are executed. To this latter point, some institutions, such as Montgomery County Community College (MCCC), highlighted the fact that by virtue of having a heavy IT component, the IPAS project triggered a routine evaluation protocol. However, each of the institutions emphasized that IPAS is not merely an IT project. Acknowledging that IPAS has a broad reach into a variety of domains related to student success, these institutions ensured that representatives from IR and other functional units that directly address student outcomes were involved with the evaluation and assessment processes before the projects launched.

**Use a Backwards Design Approach**

Second, the “backwards design” approach was a frequently cited aspect of evaluation and assessment planning. For some, like the IPAS project team at Stanly Community College (SCC), using a backwards design approach was a natural consequence of thinking through the larger purpose of the project as a whole. The SCC project team exerted considerable effort to keep expectations for and desired outcomes of the IPAS project firmly in mind from the outset; knowing the “whys” and “whats” of IPAS proved critical in designing the metrics by which to measure the impact of their IPAS tools. For Laura Damm of East Mississippi Community College (EMCC), experiences overseeing student learning outcomes helped her recognize the importance for backwards design in the assessment and evaluation of the IPAS project; thinking carefully about the goals of the project before the project started was critical to designing the necessary and desired measurements.

**Identify Ways in Which IPAS Aligns with Institutional Goals**

Third, respondents highlighted that one of the factors that facilitated planning for the backwards design component of the evaluation and assessment process was identifying ways in which the IPAS project aligned with institutional goals. If the institution was highlighting retention, graduation and completion, or articulation rates, then the
assessment and evaluation of IPAS needed to pay attention to how, if at all, the new
systems affected those key metrics. If IPAS is part of a larger student success initiative,
such as the one being carried out at Colorado State University (CSU), touch-points
or overlapping areas of interest with IPAS become critical to identifying evidence
that can be used to assess outcomes. Although the outcomes of IPAS projects will
not necessarily align to all or even most institutional priorities, the ones that do may
provide easy and visible wins, even if the impact is modest.

Include Stakeholders in the Process of Developing Protocols

Fourth, all of the institutions included in this study emphasized the need to include
stakeholders in the process of developing IPAS evaluation and assessment proto-
cols. Despite the unanimous call for stakeholder inclusion, the reasons for doing so
varied considerably:

- Some believed it important to include representatives from various units, espe-
cially those in administrative and leadership roles, in order to understand the
general expectations for the types of data required to demonstrate effectiveness
of IPAS solutions.

- Including stakeholders and end users from various constituent areas—IT,
faculty, advisors, students, registrars, tutors, marketers, call center specialists,
trainers, IR, etc.—helped the IPAS project team identify specific and specialized
variables and learn about possible points of impact that might have been over-
looked by a closed committee that did not seek input.

- Including stakeholders afforded the opportunity to set reasonable expectations
for the kinds of evaluation results that might be obtained following a successful
IPAS implementation process. For example, EMCC initially set an institutional
goal of increasing enrollment by 10% in conjunction with the IPAS project but
lowered that target to 2% once exogenous factors and historical trends were
taken into account.

Be Flexible About the Types of Data and Measures Used

Fifth, respondents noted the need to be flexible about the types of data and measures
that might be used to demonstrate IPAS efficacy and impact. Although designing
assessments and evaluations in advance with significant input from others is para-
mount, having the flexibility to adjust measures (e.g., adding new ones, fixing or
eliminating broken ones) or to embrace unplanned outcomes is critical to the process.
In fact, the unforeseen outcomes that defy measurement or a priori consideration
might well be the ones that provide convincing evidence that an IPAS project was
worth the time, effort, and expense. In general, it behooves IPAS project teams to be
aware that shifts in the existing metrics and evaluation protocols may result from the
new systems themselves.
Expect to Use a Range of Measures to Evaluate and Assess IPAS Projects

Sixth, the diversification of measures used to evaluate and assess IPAS projects was a common thread identified by study participants. Not only is it strategically ill-advised to use a narrow range of variables and types of measurements, but when conducting exploratory assessments and evaluations of nascent technologies about which one knows little to nothing, it is paramount to cast a wide net to gather as much evidence as possible on potential points of impact. Moreover, collecting a wide variety of data from various resources encourages the use of multiple methods in the analysis of data so that quantitative findings support the stories that are told by the qualitative data.

Issues, Approaches, and Obstacles

Three major topics emerged from conversations regarding the issues, approaches, and obstacles that institutions had to consider when evaluating and assessing IPAS projects: data, resources, and reporting.

Data

The topic of data is central to any discussion that institutions should have regarding IPAS evaluations and assessment. This is not merely because of the requirements of having data with which to conduct analyses; it is also important because the entire premise behind IPAS systems is leveraging data for student success. However, the data employed within IPAS solutions may not be the best for carrying out an evaluation of the project’s worth or its effectiveness. In fact, there may be significant discrepancies between the available data and the kinds of data one needs or hopes to have. Even if an IPAS tool is able to provide the categories of data an institution would like to have, it remains anything but guaranteed that those data will be available in a meaningful or useful format; oftentimes, the data extracted from vendor solutions are unusable because they are either aggregated, de-identified, or both.

If good data are available to institutions from their IPAS programs, the possibility remains that the variables and metrics collected do not align with the project goals being evaluated or assessed. Aligning and operationalizing goals and outcomes with meaningful variables are essential processes to any evaluation or assessment protocol. However, the data captured and available from the IPAS systems may not provide good measures of the quantities of interest. Therefore, it becomes incumbent on those responsible for IPAS assessment and evaluation to identify alternative or proxy measures, understand the complexity of concepts being measured, and operationalize goals and outcomes creatively, thoroughly, and precisely. Moreover, if the necessary data cannot be pulled from IPAS systems, instrumentation must be developed and designed and/or alternative sources of direct or indirect measures must be identified.
Finally, obstacles stand in the way of the very process of data collection itself. Failure to garner widespread support for and usage of IPAS systems has the potential to hobble data-collection efforts. If faculty, students, and staff simply are not using the tools implemented as part of the IPAS project, data cannot be collected and subsequently analyzed. Furthermore, the frequent use of surveys, especially if they are lengthy, can result in survey fatigue, a phenomenon in which potential respondents refuse to initiate surveys, complete only part of surveys, or fall victim to boredom. Survey fatigue is increasingly a problem for higher education research, assessment, and evaluation and results in lower response rates and deterioration in the quality of data collected.

**Human Resources**

The second major topic to emerge focused on the resources required to carry out an IPAS evaluation and assessment. For the smaller institutions—EMCC, SCC, and MCCC—the major obstacle was related to the human resources available to design and execute protocols and carry out the analysis and reporting of results. The skill sets and expertise were not really the issue. Each of the smaller institutions could draw upon staff from IR or ancillary units; in fact, the institutions included in this study made an explicit point of highlighting the ways in which IR engaged in the processes of identifying, collecting, and analyzing data for the IPAS teams. Instead, the problem noted repeatedly was not having *enough* staff FTE dedicated to the IPAS project to conduct a proper evaluation and thorough assessment.

The evaluation and assessment of IPAS often is an additional assignment beyond the boundaries of normal duties, often resulting in delays. Although grant monies afforded the opportunity to cover some of the expenses of bringing in additional staff, the scarce and short-term nature of such funding make this an unviable solution for many institutions. However, larger institutions, as represented by CSU, are more likely to have a large staff that can take on the evaluation and assessment portions of IPAS projects. In fact, functional units engaged with more discrete or lower-level outcomes are able to assign staff to the tasks of evaluation and assessment.

**Reporting**

The institutions participating in this study identified several issues related to when and how the results are conveyed to stakeholders and other interested parties. A couple of the institutions noted the need to temper expectations about whether and when results will demonstrate the efficacy of IPAS. Here, institutions placed an emphasis on being comfortable with the uncertainty of outcomes, having the constitution to collect the necessary longitudinal data to demonstrate results, and having the patience to explore the long-term outcomes. The ability to be patient, however, may be constrained by the expectations of stakeholders, administrators, and grant makers for regular and timely reports.
The forms and functions of reporting also may vary by institution and project. For some, demonstrating a significantly positive empirical impact of the project on outcomes may not be nearly as important as engendering a culture of student success and generating enthusiasm for the project that is cultivated by IPAS. For others, the results from the analysis are used to respond to the needs of the college; to refine existing procedures and plan for next steps; to produce planning tools and dashboards for consumption by students, faculty, staff, and administration; and to address a range of other issues tailored to the audiences and responsible parties at which they are aimed.

Finally, the complexity of IPAS projects and the data collected on them may preclude the possibility of determining any meaningful causal effect on outcomes. Most IPAS projects focus on more than one domain, and the students on whom data are collected are multifaceted and complicated. Beyond the multivariate aspect of any analysis directed toward determining the worth and impact of IPAS is the fact that many other factors and variables may be working to confound or obscure direct relationships. At CSU, IPAS is part of a larger, multifaceted Student Success Initiative (SSI); at EMCC, MCCC, and SCC, a host of other student-oriented programs, college initiatives, and exogenous events have the potential to disrupt the variables being used to evaluate and assess IPAS outcomes. In this sense, even with the most rigorous assessment designs and statistical controls, one should exercise a great deal of caution in attributing causal changes in outcome measures to IPAS solutions.

**Key Metrics to Evaluate and Assess IPAS**

In this section, we consider some measures by which our four participating institutions are evaluating the success and assessing the impact of their respective IPAS projects. Although some common metrics resurface across the cases (e.g., retention, persistence, completion, articulation rates), the institutions take slightly different approaches based on the data and instruments available to them and the goals they set for themselves. We also discuss, where appropriate, unforeseen or unintended outcomes that are being used to demonstrate project worth and impact.

**Colorado State University**

The CSU IPAS project is one of the most complex of its cohort, given that it is nested in the larger SSI, is engaged in all four IPAS domains, employs a best-of-breed approach to software solutions, and includes a number of additional supporting technologies (e.g., a mobile platform). The complexity of the project is also evident in its evaluation and assessment protocols, with all three levels of analysis covered, separate assessment models deployed for each technology, and multiple functional units conducting coordinated and independent analyses. As a
result, a discussion of every variable or metric being used to demonstrate effectiveness is precluded from a report of this length. Instead, we highlight some of the key variables and measures shared with us.

At the institutional level of analysis, CSU’s IR unit has focused on a number of factors to track as part of the larger SSI. Drawing upon a veritable treasure trove of institutional data, the IR unit employs a longitudinal perspective to understand how IPAS and other programs are collectively affecting student success. The variables and constructs being tracked and modeled include, but are not limited to,

- retention and four- and six-year graduation rates,
- first-term credits passed and GPA,
- key demographic predictors of student success, and
- ROI statistics.

In addition to tracking the institutional-level measures of student success, the SSI team tracks some metrics specific to different IPAS domains. To evaluate the impact of the early-alert system, for example, the number of comments and outreach attempts made by advisors is tracked and logged. Data on whether alerts have been viewed or opened and whether follow-up appointments have been made in conjunction with the logged comment entries provide valuable information about the breadth and depth of early-alert impacts.

Via the degree audit programs, the registrar collects data on a host of variables, including the waitlists for courses; the time of and pace toward graduation; the number, types, and success of users getting the information they require; the number and type of appeals; and general usage of the system by both students and advisors. For the mobile component of CSU’s IPAS system, Google Analytics provides a wealth of data regarding the number of downloads and the number of unique users. By using focus groups, the mobile group was able to gather important evaluation feedback from students whose satisfaction prompted the full funding of the mobile project through student technology fees in just its second year. The faculty-led Analytics for Learning and Teaching (ALT) group aims to improve student success in gateway courses by leveraging pedagogically useful analytics obtained from the LMS, online tutoring, educational games, institutional data, and swipe cards.

The size and scope of the CSU SSI and IPAS projects are such that data-collection efforts have been, and will continue to be, extensive and evolving.

**East Mississippi Community College**

Given the differences in institutional size, range of resources, and scope of IPAS projects, the metrics tracked by EMCC are comparatively narrower than and scaled down from those of larger institutions. Nevertheless, the goals being measured at EMCC are just as ambitious and grounded in institutional needs as
those of their research counterparts. Regarding students, EMCC collects data on a basket of variables typically related to IPAS outcomes:

- Retention
- Persistence
- Graduation
- Transfer
- On-time degree completion

The early-alert system prompts interventions from tutors, counselors, and other college resources that, it is hoped, will help students complete their courses, persist, and re-enroll past their first semester or year.

Regarding faculty, the funding model in the state mandates that class attendance be recorded by every instructor for every class in each semester; the data and funds collected as a result of these efforts serve as a metric of effectiveness (and also usage) of the IPAS tools. Additionally, the impact of IPAS on faculty and advising time is reduced as a function of the degree-planning tools; creatively, EMCC tracks the impact of IPAS on faculty workload by the proxy measure of the amount of time novice and experienced students take to execute their degree plans, which is about 1 hour and 15–20 minutes per student, respectively. EMCC tracks not only the usage of the early-alert flagging system but also detailed data on the nature of the flags given by instructors. The categorical set of 26 metrics includes warning flags for things such as

- financial aid and academic probations,
- absences,
- failed or missing homework submissions, and
- poor test performance.

In addition, positive flags are included, such as

- student requests for resources,
- making up missing work, and
- receiving tutoring.

In addition to these more quantitative measures, EMCC conducts regular satisfaction surveys of all IPAS users—faculty, staff, and students. Furthermore, an ongoing “customer service” project allows members of the EMCC community to provide continuous feedback on the IPAS projects.

Finally, EMCC experienced an unplanned and possibly immeasurable outcome in the creation of the Lions’ Brew student engagement center, a cozy, inviting space that offers students a place to have coffee, participate in center programming, use computers, meet, and study. The space did not exist before the onset of the IPAS project but was inspired by formative feedback and comments obtained during the
evaluation process regarding the need for such a space that conduces to student success activities. Although the creation and operation of such space is considered by itself a positive outcome by the EMCC IPAS team and campus leaders, efforts are also made to track the use of, satisfaction with, and recommendations for the Lions’ Brew.

Montgomery County Community College

MCCC’s IPAS protocol employs a combination of multivariate metrics to evaluate the worth of the project and to assess its impact on students, staff, and faculty. Beyond the more frequently cited institutional-level metrics of persistence, completion, and retention (relative to national benchmarks), MCCC also partially gauges the impact of its IPAS programs on student success at the course level, as measured by students’ earning an A, B, C, or Pass grade. Additionally, MCCC has started tracking the occurrence of midterm progress reports from instructors to students as a measure of both usage and outreach via the early-alert system. While counts of users, alerts, contacts with and cases closed by advisors and counselors, and other analytics drawn from the ERP, LMS, and IPAS solutions are all monitored to gauge effectiveness and impact, MCCC’s more sophisticated approach to evaluation and assessment involves the use of key items of interest generated by externally developed survey instruments.

The first instrument MCCC deploys to assess the impact of IPAS is the Noel-Levitz Student Satisfaction Inventory, an instrument designed to measure student satisfaction and priorities on a range of topics. The gaps between student importance ratings and satisfaction levels of three sets of items from the Noel-Levitz inventory are being tracked longitudinally and against a national benchmark for institutions similar to MCCC. Specifically, the gap scores from the inventory being tracked are related to the importance of and satisfaction with

- advising,
- receiving early notification in the term if one is doing poorly, and
- academic advisor concern about personal success.

The second instrument MCCC is using to evaluate and assess its IPAS project is the Survey of Entering Student Engagement (SENSE), which takes stock of early academic and service experiences of new college students. The first measure is a construct that measures students’ experiences in the earliest stages of their college careers; the “early connections” construct takes stock of how welcome students feel, how much financial assistance information they receive, and the strength of personal connections with college staff. Other items from SENSE being tracked include students’ evaluations of the degree to which advisors help set and create plans for achieving academic goals, whether a person was assigned to check in with them regarding needed information or assistance, and whether college staff conversed with them about their commitments beyond the boundaries of campus and the classroom. Improvements on each
of these metrics are expected due to IPAS-inspired changes in how advisors, students, and faculty interact with one another.

Finally, MCCC's third instrument is the Community College Survey of Student Engagement (CCSSE), the community college counterpart to the National Survey of Student Engagement (NSSE) used at four-year institutions. The construct used from the CCSSE measures the levels at which students perceive the institution to be providing support for its learners. This construct includes seven separate items addressing issues related to

- support for success,
- encouraging interactions among different groups of students,
- coping with personal issues,
- social and financial support, and
- the use of campus advising and counseling resources.

**Stanly Community College**

SCC’s approach to collecting data on its IPAS project is fairly conventional, but it is effective in tying specific measures to operationalized outcomes, distinguishing between evaluative and assessment components, and thinking in both short and long terms.

On the evaluation side of the equation, very brief, customized questionnaires are used to gather data on student experiences with the degree-planning and early-alert tools in SCC’s IPAS suite. For the former, student data are collected on whether a degree plan was created and, if so, whether it is helpful; an open-ended comments section is also available for feedback. For the latter, students are asked to evaluate their early-alert system experiences on topics such as

- staff contact turnaround,
- staff helpfulness,
- types of student support services used, and
- other issues, which can be entered in an open-ended comments section.

These summative data are then used formatively to help SCC identify and respond to deficiencies in the system, as well as to understand what aspects of IPAS appear to be working well for students. Additionally, department heads are preparing to use the educational plans generated by students to assess course offerings and staffing for future semesters so that the supply of sections and courses can better meet student demand.

On the assessment side, SCC takes a longitudinal approach to collecting data that are aligned tightly and discretely with the stated goals of the project. At the institutional level, SCC is measuring improvements in cross-departmental collaboration geared toward student success with statistics related to:
the number of student journal entries created by different users,
the number of early alerts generated, and
rates of student success and course completion.

To measure the ability of instructors to offer students “a holistic approach to advising and intervention strategies” geared toward retention, SCC is collecting data on

- the numbers and types of interventions,
- the number and sources of early alerts, and
- the rates of student persistence from term to term.

SCC aims to measure students’ understanding of their academic pathways via the aforementioned survey items and a count of the number of students who create, adhere to, and deviate from their structured academic plan.

**Actionable Results**

The evaluation and assessment data collected on IPAS projects are not limited merely to the tasks of judging the worth of those projects and determining their effectiveness. The results of the analysis may also lead to actionable outcomes. Each of our four case-study institutions identified an array of actionable outcomes resulting from their efforts.

**Colorado State University**

The IPAS project at CSU has produced a number of actionable outcomes that have resulted in some innovative solutions geared toward student success. First, stemming from its efforts with its academic planning tool, u.direct, CSU has been able to overhaul and streamline its graduation audit process by providing students with clear choices and clear pathways to degree completion. In addition, the automatic population of degree plans with the courses necessary for majors (with empty slots for electives) provides departments a clear and long-term picture of the demand for their courses several semesters forward. This allows department chairs and others to plan accordingly and supply the correct number of the correct courses in any given semester. It has also prompted a wave of comprehensive degree audits to streamline curricula and has offered more stability for adjunct hires, who can be offered contracts beyond a single term.

In the course of analyzing data related to the impact of IPAS, CSU also found that the graduation rates of students who failed to take math and/or composition in their first year were significantly lower than those of students who did take the courses during that time period. In fact, CSU found that if students took even one credit hour of either composition or math, the rates of graduation increased significantly. With this information in hand, CSU changed the requirements for first-year students to include those courses.
Analysis of IPAS and institutional data also revealed that a host of problems stemmed from students’ dropping courses during the semester, including delayed time to completion, threats to financial aid packages, and lowered confidence levels among students. In response, CSU developed a series of credit-recovery courses that begin halfway through the semester. Although open to all students, those who have dropped courses and fallen below a full-time load are especially encouraged to enroll, thereby allowing them to keep their full-time status, complete more course credits, and build their confidence levels in their academic abilities.

An indirect outcome of the CSU IPAS and SSI programs has been the formation of the aforementioned ALT center within The Institute for Learning and Teaching (TILT). Inspired by the availability and usage of analytics for student success, ALT was created as an effort—driven by faculty—to promote learning analytics as a way to improve student success. Researchers from a variety of academic disciplines participate in ALT to find pedagogically useful indicators in existing data and convert that knowledge into actionable goals oriented toward student success.

In addition to these actionable outcomes, CSU has also used analysis related to IPAS to undertake the following:

- Analyzing seat utilization data to better manage the scheduling of classrooms and other campus resources
- Promoting and revamping the campus mobile strategy to reduce unimportant, distracting communiqués, to improve faculty experiences, and to increase student opt-in for mobile alerts to 95%
- Rethinking chemistry prerequisites and course sequences to better align and set expectations of students’ knowledge from previous courses as they progress
- Rethinking and restructuring the architecture of the institutional data systems to create new opportunities for research, collaboration, and sharing

**East Mississippi Community College**

Three actionable outcomes from EMCC’s IPAS project are particularly noteworthy. First, student satisfaction surveys revealed that students rated their IPAS experiences favorably at high levels (approximately 80%). These data have been used to justify the inclusion of IPAS activities during student orientation to increase the overall exposure of students to IPAS and to acclimate students to the new tools.

Second, EMCC has increased the visibility of IPAS tools by creating registration stations that are included as part of the planning and advising weeks held each semester. Although the registration station requires the presence of additional personnel, EMCC reports that students increasingly are exercising more independence in planning and registering for courses with IPAS tools.

At EMCC, students rate their IPAS experiences favorably, use IPAS tools to plan and register for their courses, and benefit from a new student success lounge created to better meet their needs.
Third, the EMCC IPAS team is leveraging the results of its assessment and evaluation efforts with senior college staff to identify and make the case for future student success projects. The continued collection of evaluation and assessment data on IPAS provides feedback on what students want and need; those data are then shared with institutional leaders to garner support for new initiatives. The aforementioned Lions’ Brew lounge in the Student Success Center is one example of a project that resulted from this process.

**Montgomery County Community College**

MCCC experienced two noteworthy actionable outcomes as a result of evaluating and assessing its IPAS project. First, during the course of analyzing data on early alerts, it was determined that the traditional practice of using midterm evaluations as a method of conveying to students where they stood in their courses was not as effective as it could be; waiting until the semester was halfway completed proved to be simply too late to really help students turn around their semesters. In addition to using early alerts on an as-needed basis throughout the semester, MCCC is now moving toward changing the timing of its mandated reporting to the second week of the semester to ensure that students have plenty of time to receive the help they need to successfully complete their courses.

Second, with data suggesting that MCCC’s IT unit was perceived as being more reactive than proactive, plans are under way to launch a point-of-service initiative. Inspired by its success with IPAS, MCCC is now looking at other steps it can take to better engage clients, including the development of a front-line service promise to students. In reimagining IT projects as student success projects, the academic technology group has been more fully integrated as a key partner in assisting faculty.

**Stanly Community College**

SCC’s IPAS efforts produced a number of actionable outcomes as well. For the first of these, a lacuna in institutional support for online students was discovered and rectified by the creation of a new full-time student support services officer. This position is charged with identifying which services are the most difficult to access and closing the access gap between online and face-to-face students with a series of new online features, clearer points of access, and the provision of live chat service for those requiring additional assistance.

Two new endeavors have emerged at SCC in the advising and counseling realm:

- Whereas IPAS has certainly improved the ability of student support services to follow through in closing cases, especially those generated by the early-alert system, advisors and counselors recognized the need to follow up after the cases were closed, checking in with the students to see whether the advice or solutions offered were working and whether additional support might be required. Efforts are under way to develop creative approaches for making this happen.
Additionally, input from students, faculty, and staff has inspired student support staff to rethink how student cases are managed. SCC is responding to this feedback with the creation of Service Evidence Plans to improve institutional effectiveness in the management of student caseloads and programming to better respond to student needs.

Although IPAS has resulted in additional unplanned work on the part of departments and the registrar, the need to populate the degree planner with SCC’s entire course catalog has prompted efforts to streamline the curriculum by eliminating inefficiencies in sequencing, deleting courses that were no longer offered, and identifying unnecessary course options that might confuse or distract students from their degree maps.

The final actionable outcome is something of a meta-actionable outcome. Given the success in identifying areas for improvement as a result of IPAS, SCC is making efforts to share its data and findings with various audiences throughout the college. By presenting the results of IPAS efforts at divisional meetings, at strategic planning committee meetings, to institutional leadership (including the board of trustees), and to the larger community, program leaders are garnering input on identifying additional areas for actionable improvement.

The Effectiveness and Worth of IPAS (Thus Far)

In a report that emphasizes the importance of the evaluation and assessment of IPAS projects, it seems appropriate to conclude with the presentation of some initial findings. The amount of data and information, as well as the level of detail shared, varies considerably among our four institutions. This reflects not on the quality of their projects or assessment and evaluation efforts but on what data and analyses were prepared for public consumption at the time of the site visits.

Colorado State University

Even though (or because) CSU has a trove of detailed metrics related to its IPAS and SSI, the outcomes highlighted for this report are pitched at the higher, institutional level of analysis. Representatives from CSU’s IPAS team noted that a lot of time and money have been sunk into the IPAS project up to this point, but the cascading series of observed effects, unexpected benefits, and new opportunities have made the endeavor completely worthwhile. In fact, CSU considers the cumulative impact of the IPAS systems to be much greater than initially anticipated.

For CSU, isolating the impact of the individual components of its IPAS program has proved quite difficult. The outcomes at lower levels have been particularly difficult to ferret out for two reasons:
• The simultaneous launch of IPAS solutions in conjunction with the larger SSI introduces confounding factors that disrupt the direct connections of IPAS to outcomes.

• The complexity of the IPAS system is designed to support the complexity of the student and her/his experience and must be considered holistically. CSU suggests that eventually the data at the lower domain level of analysis will reveal an impact on the major goals of improving retention, graduation, and persistence rates, but it will likely take several years of intensely focused data collection on key variables to demonstrate it.

One of the most important outcomes noted by the IPAS team was the fundamental transformation of CSU IT thinking that has resulted from the project:

• First, the complexity of the IPAS project has prompted a move from focusing on individual products to thinking more about the entire system of products available at CSU and how they work or don’t work together.

• Second, it was noted that the manner in which the CIO thinks about IT has been completely inverted by the IPAS project. In the old manner of thinking, the importance of determining which software and systems are the most critical for the university was dominant. Now, the focus has shifted completely to what kinds of data are needed, what kinds of goals are desired, and how to align those things. As Laura Jensen, Director of Institutional Research, noted, “I think we just use data differently now.”

**East Mississippi Community College**

EMCC set four clearly stated goals for itself when planning its IPAS evaluation and assessment protocol:

1. Increase the retention rate for new cohorts to 10%.

2. Increase retention, persistence, and graduation or transfer rates by 5 percentage points.

3. Have 100% of full-time instructors and 75% of adjunct instructors using the early-alert system in the first year, with the latter to increase to 85% by the end of the second year.

4. Have 25% of new-cohort students using the degree-planning tool by the end of the first year and 50% using it by the end of the second year.

The first two of these were largely driven by sources external to the IPAS team. The former was derived from a change in state law that tied funding to the number of students enrolled; the latter was influenced heavily by the IPAS grant-making agency’s expectations. The third and fourth goals were derived largely from institutional data, strategic goals, and prior experience with new IT program usage.
The first goal, of increasing the retention rate for new cohorts by 10%, has not been met to date and is unlikely to be achieved in the near future due to a host of factors that include changes in admissions requirements, shifts in the local economy, decreases in the number of financial aid appeals accepted, and the rather high level of the threshold itself. The retention data related to the second goal are somewhat mixed at this point. On the one hand, the EMCC retention rate as related to course completion has improved from a pre-IPAS mean of 93.2% to a post-IPAS mean of 95.6%. Although this shift fails to meet the 5 percentage-point threshold defined by the IPAS assessment protocol a priori, it shows movement in the intended direction. On the other hand, the retention rate as related to reenrollment has actually experienced a steady decline over the course of the IPAS period, going from 75.0% in 2012 (baseline) to 74.8% in 2013 and 72.1% in 2014.

The results related to the goals derived by the IPAS committee appear to be faring considerably better. Approximately 99% of all full-time instructors have been using the early-alert system since it came online (each semester at least one instructor fails to do so). In the first year of IPAS, only about 65% of adjunct instructors were using the early-alert system, but that number grew to around 85% in the second year. Although the faculty appear to embrace the early-alert tool for its own sake at this point, the initial uptake was steep due to the requirement to use it for state-mandated attendance reporting.

For the degree-planning tool, the first cohort exceeded the intended goals at significantly high levels. In fact, usage in the first year exceeded the second-year goal of 50%, with 68% of students creating degree plans.

EMCC has also been collecting data on a number of other metrics, with mixed results, including tutoring (a metric that is difficult to track and for which only intermittent data exist), the impact of early warnings on completion rates (no clear pattern has emerged), and the impact of tutoring on finishing a semester (100% of tutored students have finished in three of the past four semesters). About 80% of students are satisfied with the degree-planning tool.

**Montgomery County Community College**

MCCC also took a highly empirical approach to assessing the impact of its IPAS project by establishing targets for each of the metrics at which it looked and comparing itself to national benchmarks of the same measures. On the Noel-Levitz measures of student perceptions of advising, between 2011 and 2014 MCCC reduced the gap scores for two of the three key performance indicators; these gaps were brought down even below target levels. Moreover, for these same items, MCCC outperformed the national benchmarks. Although the third item—related to advisor concern about student success—failed to meet its targeted level
and only approached the national benchmark, MCCC nevertheless experienced 20% normalized gains toward its goal for this item during the same period.

The results of MCCC’s metrics on the CCSSE item related to the college’s providing support for learners are somewhat mixed. Between 2011 and 2013, the score on this construct improved by only 0.9 points, to 50.7, in the direction of—but well below—its spring 2015 target—of 55; the increase, however, further secured its position against the national benchmark of 49.

Although MCCC came up short on each of its 2015 SENSE goals related to developing early connections with students via advisor help, assigned contacts, and conversations regarding extracurricular commitments, two of the three items are trending in the desired direction. The outcomes of the SENSE surveys have served to inspire new programs and efforts in the direction of creating more opportunities for faculty and staff to make contact with students in the early stages of their academic careers.

Since implementing its IPAS solutions, MCCC is also moving in the direction of exceeding both national benchmarks and its 2015 targets for student persistence. Between 2013 and 2014, MCCC’s fall-to-spring persistence rates improved from 70.3% to 71.3%, a respectable amount of improvement on an outcome that tends to resist change. From 2012 to 2013, the fall-to-fall persistence rates improved from 49.7% to 51.9%, a full 2.2 percentage points. Finally, new students at MCCC are experiencing higher rates of overall course success since the onset of the IPAS project, going from 66% in spring 2014 to 69% in fall 2014.

**Stanly Community College**

SCC has also demonstrated a systematic and deliberate approach to assessing and evaluating its project, especially as it relates to early alerts, persistence rates, and completion rates. From the baseline of spring 2014 through the most recent data in fall 2014, SCC has observed that the number of faculty using early alerts has not changed substantially but the number of alerts issued and the number of students receiving them has increased significantly. Persistence rates, however, have remained largely flat, increasing from 52.8% in 2013 to 52.9% in 2014. When it comes to student success, measured by course passing and course completion rates, SCC has experienced noteworthy results since the IPAS project was implemented. Course passing rates improved from 75% in 2013 to 78% in 2014, and course completion rates also improved by about 3 percentage points for the same period.

SCC’s use of student surveys to gather additional data on the impact of its IPAS project has also produced interesting and useful data. For example, about 74% of students who received early-alert interventions rated them positively in terms
of their helpfulness, and 99% of students who used the degree-planning tool found it helpful. These efforts have also helped identify the resources most used by students who receive early-alert notifications; the top 3 include the Student Success Center (44%), instructors (36%), and advisors/coaches (28%). In their comments, students expressed positive evaluations of the IPAS tools:

- “This plan helped me get ready and prepare for the semester to come.”
- “I like that it helps me keep track of what needs to be taken to finish my degree.”
- “It truly helps me believe and actually see that my goal is attainable.”

Given these results, it should not be surprising that SCC sees its IPAS project as having an overall positive impact on campus.
Conclusion

The assessment and evaluation of any IT project is an important exercise. It is especially so in the case of IPAS projects, where little is known about the actual impact or effectiveness of the software solutions that compose them. The lessons learned from this project are important first steps toward gathering the data that will help determine the efficacy of IPAS:

- Plan evaluation and assessments early in the project process.
- Understand that there are many ways of evaluating and assessing projects.
- Build assessment and evaluation protocols based on the resources available.
- Align IPAS goals and outcomes with operationalized metrics.
- Prepare for the possibility that outcomes may be indeterminate.

Between considering methodological approaches to and issues about evaluation and assessment and reviewing real-world examples of evaluation and assessment drawn from institutions that have launched IPAS systems, we think that implementation teams at institutions of any type will find something useful and helpful in evaluating the worth and assessing the impact of their IPAS projects.
Recommendations

Based on our methodological review and the analysis of our case study data, we offer the following recommendations for assessing and evaluating IPAS projects:

- **Build evaluation and assessment into the IPAS project during the planning phases.** Bring stakeholders, IR, and evaluation and assessment specialists to the table early to identify goals and outcomes, design metrics with which to measure them, and select appropriate assessment models.

- **Select the levels of analysis, data-collection procedures, and assessment models that are best suited to the goals of the IPAS project, are aligned with institutional goals, and can be supported by institutional resources.** Knowing what needs to be measured, how to measure it, and why it is being measured can greatly facilitate the overall evaluation and assessment process.

- **Use a “backwards design” that first identifies goals and outcomes when planning evaluation and assessment protocols.** Beginning with the end and working toward the beginning is a tried and true design method that facilitates the alignment of outcomes with methods and metrics while deepening one's understanding of the project.

- **Be flexible with the types of data and measures used to demonstrate effectiveness—not all outcomes will be expected or captured by initial measures.** Even when backwards design methodologies are used, metrics can be overlooked, new ideas about what to measure may emerge, and, during the course of the project, unforeseen outcomes may become manifest, providing additional information about the impact and/or value of the project.

- **Share findings with key stakeholders and disseminate them to the broader IPAS community so that other and future IPAS institutions can benefit.** In general, the dissemination of assessment and evaluation findings to the broader community of higher education institutions can help others understand what to expect, learn what to avoid, and identify potential wins.
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Appendix: Models of Assessment—Benefits and Drawbacks

Methodologically speaking, not all models of assessment are created equal in terms of their ability to produce valid and reliable results. Some of the key characteristics that render different models of assessment more or less attractive include:

- **Randomization**: The process of assigning individuals to control or treatment groups
- **Comparison groups**: Assigning one group the use of a treatment while withholding that treatment from another group
- **Longitudinality**: The use of time as a within-group control or comparison

For each of the models of assessment considered in the main report, we offer here a brief consideration of some of its benefits and drawbacks.19

**Preexperimental Designs**

Models of assessment that lack randomization of participants into treatment and control groups are referred to as preexperimental because randomization eliminates a host of confounding factors that have the potential to undermine the validity of results. Studies based on preexperimental designs are easier to conduct and are more conducive to a general rollout of IPAS solutions, but questions about the validity of the results obtained will persist.

**One-Shot Case Study**

The one-shot case study is one of the more ubiquitous forms of assessment that occur in higher education. The basic structure of the one-shot case study involves the introduction of some sort of treatment or intervention to a single group or population, the putative impact of which is then described in great detail (see figure A1). An institution that used this model might implement and launch an IPAS system for all students, faculty, and staff on whom data are collected ex post facto, or after the fact, at the institution.
Preexperimental designs

One-shot case study

One-group pretest-posttest design

Static-group comparison

Although the widespread use of this model in higher education assessment is waning, the fact that it remains pervasive is methodologically problematic. The one-shot case study lacks systematic controls that can be used for comparative purposes. Without either baseline measures to serve as temporal controls or a comparison “control” group that does not receive the intervention or treatment, there is no way to know what, if any, impact the project has had on a given population or outcome. Although one-shot case studies might offer a wealth of information about the particular cases in question, they cannot tell us what we need to know about the effects of a project and, therefore, tend to have little to no assessment, or scientific, value. As such, this is a model that should be avoided when assessing IPAS or any other IT projects.

The next two models of assessment are designed to correct the temporal deficiency (one-group pretest-posttest) or the control-group deficiency (static-group comparison) of the one-shot case study.

One-Group Pretest-Posttest

Imposing temporal controls in conjunction with a single group results in a one-group pretest-posttest design. With this design, one might collect baseline data on a variety of potential IPAS users (e.g., students, faculty, advisors, counselors) to understand their attitudes, behaviors, beliefs, usage, and success patterns prior to the introduction of the IPAS systems. Once the system has been launched and clients have had the opportunity to use it, one collects data on the same topics from the same populations so that exact comparisons can be made between the posttest and pretest data. The observed differences, if any, will be a measure of the impact of the IPAS project (see figure A1).

If it is possible, collect and match baseline and posttest data from the same
respondents. This provides another layer of control because the results would track individual participants’ overall changes. In this sense, assessment participants serve as their own controls.

As much as the one-group pretest-posttest is an improvement over the one-shot case study, it also suffers from a number of threats to its validity. First, the temporal lag between the pretest and posttest data collection produces something of a history problem in that a host of other things that could confound the results might be occurring at the same time the intervention is administered. For example, it will be difficult to isolate the impact of early alerts while simultaneously implementing degree planning, progress tracking, and/or advising and counseling services in that any combination of the other IPAS solutions might be responsible for the observed changes. Furthermore, since IPAS projects are often part of larger, campus-wide student success initiatives, the observed differences between posttest and pretest measures may not be completely attributable to the IPAS initiative. The longer the duration between the baseline and posttest data-collection efforts, the greater the possibility of non-IPAS factors confounding the results.

Second, assessment participants might also experience a degree of maturation during the period of time between the collection of pretest and posttest data. On a basic level, the maturation issue gets at issues related to biological processes associated with aging; on a more complex level, maturation occurs based on how experiences shape and change who the subjects are, what they think, and how they behave. To some degree, IPAS is designed to influence student experiences in positive ways toward successful completion of academic goals even within relatively short periods of time (e.g., semesters). However, any number of other experiences exogenous to one’s experience in higher education or endogenous—but not related to IPAS—may also have an effect that shows up in or obscures assessment results.

The last three threats to the validity of the one-group pretest-posttest design are probably more suitable to scientific, social scientific, and educational research than to assessment of IPAS projects, but they merit brief consideration: Third, when a pretest is administered to a subject, there is a risk of the subject learning the test with repeated iterations, thereby biasing the results in the favor of positive outcomes. Fourth, shifts or discrepancies in the application of the instrumentation used to collect the data might occur (e.g., focus groups, interviews, observations), thereby producing unreliable measures of data, especially during the posttest phase of the assessment project. Fifth, and finally, the aggregated discrepancies of individual responses from the pretest and posttest may produce a regression to the mean whereby an observed correlation between the pretest and posttest data might simply be an artifact of the assessment design itself.
Static-Group Comparison

The introduction of a control group to the one-shot case study produces the static-group comparison model of assessment, also known as the A/B test (see figure A1). This model includes two groups, one of which receives the treatment (A) and one that does not (B). The static-group comparison operates on the assumption that all other things being equal, the impact of the treatment will manifest itself in the experimental group (A). Of the preexperimental designs, the static-group comparison is the most rigorous of the three introduced here since it provides a much-needed comparison group and does not incur any of the temporal threats to validity introduced by the one-group pretest-posttest design. While this assessment design has a host of advantages, it also has some potential methodological drawbacks that warrant attention and a practical drawback that may render the design unusable for many IPAS assessment projects.

The first of the methodological issues related to the static-group design focuses around the need for equivalency between the experimental and control groups in order for the outcomes to demonstrate the efficacy of IPAS on the variable(s) in question. This means that the two groups need to be highly similar (in statistical terms, not significantly different from one another) on any factors that could possibly affect the outcome of the assessment. That is, group A must be roughly identical to group B in terms of demographics (e.g., gender, ethnicity, age, year in school, marital status), aptitude measures (e.g., test scores, GPAs), and other characteristics one may deem important (e.g., majors, college, veteran status).

The best way to achieve such a distribution would be through random assignment to either the IPAS or non-IPAS group to avoid issues that may occur with selection bias. The inclusion of randomization technically renders this model of assessment a posttest-only control-group design (see figure A2 in the next section), a design that reduces both potential validity threats to the current model. If random assignment is not possible, however, distributing subjects using a systematic and documented selection method is the next best option. Regardless, once the groups have been established, checks on equivalency should be performed. If they are not nearly identical, one can either attempt to reassign participants or duly note the differences and then control for those going forward.

The second of these methodological issues is related to the first but has to do with changes in the groups due to the mortality, or attrition, of individual participants over time. For any number of reasons, participants may leave a study group or fail to respond to the posttest data-collection efforts. When this occurs, the equivalency established at the beginning of the assessment project may be disrupted in such a way as to affect the assessment results. Fortunately, the mortality issue is not fatal to a project or its validity. When using statistics, post hoc equivalency can be used to test for how well the groups remain similar to one another, and discrepancies can be
controlled for in the analyses used. When qualitative data are employed, caveats or possible explanations of outcome discrepancies must be provided in the analysis.

While the static-group comparison might be the best of the choices presented thus far in terms of methodological soundness, it might be the most impractical and, potentially, ethically questionable approach from an IPAS project implementation perspective.

Such an approach would essentially require that the IPAS systems go live at lengthy (probably semester-long to detect impact) staggered intervals for the campus population. For example, group A would get full functionality in the fall semester and group B would get nothing; in the spring semester, group B could be given full access to the IPAS suite of tools. Some institutions, given their size, culture, or standard operating procedures, may take a phased approach to IPAS and other IT projects, thereby providing excellent working conditions for a static-group comparison model of assessment. However, the rigor that accompanies this design will not be deemed by most institutions to be worth an entire restructuring of the IPAS project timeline.

Ethically, concerns arise about the fairness of giving half of a student population—even if randomly selected—access to a set of tools that may give them a leg up toward student success while denying access to the other half. Moreover, biased data and results (e.g., a “halo” effect) and/or ill will toward the IPAS technologies may emerge when students are aware that some have access and others do not during the course of the initial assessment phase.

### True Experimental Designs

Models of assessment that include the random assignment of participants into treatment and control groups are called true experimental designs. Although true experimental designs are much more difficult to execute, the results obtained will be considerably more valid than those of preexperimental designs.

### Posttest-Only Control Group

The posttest-only control-group design is structurally identical to the static-group comparison from the preexperimental designs (see figure A2). However, it is a superior version of the A/B design because the subjects are randomly assigned to the treatment and control groups, thereby eliminating a host of potential threats to the validity of the results that are derived. It also avoids the bias inherent to systems that employ baseline testing (e.g., learning the test). If randomization is possible, the posttest-only control-group design can be quite useful in circumstances where collecting baseline data is difficult or impossible.
True experimental designs

**Posttest-only control-group design**

| IPAS project | posttest | posttest |

**Pretest-posttest control-group design**

| pretest | IPAS project | posttest | posttest |

Figure A2. Models of assessment: True experimental designs

**Pretest-Posttest Control Group**

In addition to using randomization, the pretest-posttest control-group assessment model takes us one step further than the static-group comparison. With the addition of a baseline or pretest data-collection effort, virtually all of the threats to the internal validity of the results are eliminated. In addition to the threats corrected by the static-group comparison, the pretest-posttest control group also provides for corrections to issues related to selection equivalency and mortality.

First, because the randomization of subjects is a necessary feature of this design, the probability that group A and group B will be nearly identical is increased substantially. Because subjects would have both pretest and posttest data collected on them, those data can be matched and analyzed as such to track the aggregated expression of individual changes that results from IPAS interventions.

Second, if some participants exit the study following the collection of the pretest data, one can simply remove from the data set all subjects who failed to complete the requirements of the posttest data-collection efforts. This way, the experimental assessment data contain only those who completed the pretest, used IPAS, and completed the posttest, and the control assessment data contain only those who completed both the pretest and posttest.

**Time Series**

Time series, the last of the assessment models to be considered here, requires both considerable planning and patience to execute well. The basic structure of a time-series design is such that periodic data-collection efforts, preferably identical in
duration, are undertaken both before and after the introduction of the IPAS systems (see figure A3). In this way, the group or cohort being studied serves basically as its own control over time, with IPAS serving as the potential catalyst that results in a sustained disruption of the previous pattern in favor of the direction of desired student success outcomes.

Time-series design

Figure A3. Models of assessment: Time-series design

For example, if an institution wanted to examine the impact of early-alert systems on student success as measured by the number of D and F grades students receive and the number of withdrawals in a given semester, an appropriate time-series design might include gathering several semesters’ worth of data before the introduction of the early-alert system and several semesters’ worth of data after the system is implemented. If a discernible downward shift is detected in such grades—a shift that is not part of an existing trend or a randomly chaotic pattern—and if that shift is sustained for several semesters after students begin receiving early alerts, then one would have empirical evidence suggesting that IPAS has contributed to the observed improved levels of student success.

Time-series designs and analyses have properties that are, in many ways, natural fits for colleges and universities. First, the natural rhythms of semesters (or quarters) and the academic-year cycle provide the nearly identical time periods required for analysis of time-series data. Second, because institutions collect and hold on to vast quantities of nonsurvey data on students (e.g., demographics, test scores, course grades, GPAs), IPAS assessment teams can—through offices of institutional research—marshal semesters’ or years’ worth of preexisting data in service of their longitudinal analyses of the impact of IPAS systems going forward. In this way, start dates for IPAS projects are unimpeded by assessment parameters. Third, as with the previous models, the need for sampling is reduced because the institution can use the entire population of data to analyze its results, thereby reducing some of the concerns for equivalency or accessibility ethics. Fourth, given the availability of institutional data, assessment efforts can include data from cohorts of students who have been completely untouched by the IPAS efforts (even ones who have already graduated!) as the benchmarks against which to measure any and all future shifts that result from the IPAS initiative.
At a four-year institution, for example, if an IPAS system is implemented at year zero \((y = 0)\), data from six years prior \((y = -6)\) will produce two to three cohorts of students who graduated in four years, plus some who took five or six years. With data collection beginning in year zero, the impact of IPAS on seniors (those graduating in year zero, \(y = 0\)), juniors \((y = 1)\), and sophomores \((y = 2)\) could be isolated. And students who begin their studies in year zero and each subsequent year will have had IPAS technologies available to them for their entire college careers. Controls for shifts in the student population, admission requirements, etc., will have to be used to ensure comparability over time, but the time-series model does allow for these more complicated and revealing sorts of assessments.

As promising as time-series models of assessment might be, they do possess two aforementioned threats to the validity of the analyses of comparative trends. First, because time-series designs inherently involve a temporal component, history reemerges as an issue of concern. One cannot simply control for exogenous factors that may serve as confounding factors with an IPAS initiative. If institutional data are employed to reach further back into the history of the institution, it becomes even more important to understand historical factors that might have shaped previous data.

One should also carefully choose the number of time periods that are used to benchmark variables before the IPAS intervention and to track variables afterward. Fewer time periods (two to four) may mask preexisting antecedent trends (e.g., an upward trend may have already begun) or fail to detect unsustained changes (e.g., observed effects may disappear after a few periods). A greater number of time periods counter each of these concerns but introduce more exogenous historical factors and require considerable patience to collect data going forward.

The second threat to the validity of time-series analysis is instrumentation. It is possible, especially with historical institutional data, that the methods by which certain variables are measured, coded, or derived from secondary and tertiary calculations might change over time. Using different measures or even data-collection methods for the same variable negatively affects the ability to compare the variables over time and across groups. Of course, if the IPAS implementation team is partnering with IR to obtain, store, collect, and analyze IPAS data, navigating these detailed issues surrounding measurement will be accomplished considerably more easily.
Notes


14. For more on the complexity of the CSU project, see Brooks, *IPAS Implementation Issues*, and Brooks, *IPAS Implementation Handbook*.

15. See “Key Community’s Impact on Graduation and Retention: A Propensity Score Analysis.”

16. See “Early Indicators of Student Progress and Success.”

17. See “Descriptive Logistic Regression Results.”

18. See “Key Learning Community Return on Investment Analysis.”