How Colleges Use Integrated Planning and Advising for Student Success (iPASS) to Transform Student Support

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Abstract

This paper examines technology-mediated advising reform in order to contribute to the understanding of how colleges engage in transformative change to improve student outcomes. Conceptualizing such change as occurring along three interrelated dimensions of organizational functioning (structural, process, and attitudinal), we seek to understand the contexts that encourage or discourage transformation of advising and student support. We use in-depth pre/post data from six colleges deploying integrated planning and advising for student success (iPASS) to investigate the reform process.

Three of the six colleges made steps toward transforming their student support delivery, shifting along all three dimensions. We identify four contextual features that appear to underpin colleges' likelihood of transformative reform. Technology and vendor relationships form an important foundation. Reform vision and rationale, leadership, and the college's orientation toward student success are important institutional influences. Our findings support the hypothesis put forth by Karp and Fletcher (2014) in their Readiness for Technology Adoption framework that technology is necessary but not sufficient for transformation, and that project-level and organizational factors are perhaps more important. Moreover, the findings demonstrate that technology can spur substantial institutional change, but only under certain circumstances.

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1. Introduction

There is a growing sense of urgency in higher education to raise college completion rates: Despite decades of reform efforts, completion rates remain low in community and broad-access four-year colleges.[1] These institutions are key drivers of educational access and mobility, particularly for lower income, first-generation college-going, and racial/ethnic minority individuals, all of whom are concentrated at these colleges (Berkner & Choy, 2008; Crisp, Doran, & Reyes, 2014; National Center for Public Policy and Higher Education, 2011). In general, as economic mobility decreases and the wealth gap increases (Organization for Economic Co-operation and Development, 2015; Piketty & Saez, 2014), there is concern that widening disparities in college completion rates will exacerbate class disparities in the United States.

Consequently, policymakers, researchers, philanthropic organizations, and colleges have committed to dramatically increasing the numbers of individuals who obtain a college credential. Evidence of this focus can be found in the completion goals of states and foundations (such as Tennessee's Drive to 55 campaign and Lumina Foundation's Goal 2025); state and federal support for free community college (including legislation in Oregon and Tennessee, among others); federal calls to action (Executive Office of the President, 2014); and myriad reports, op-eds, and white papers calling for improved college completion rates. Together, these efforts make up a national completion agenda that is shifting the nation's higher education focus from access to credential attainment.

With this sense of urgency comes the understanding that the old approaches to reform will be insufficient to drive substantial change. Previous reform efforts have typically been discrete interventions focused on college population subgroups or on one piece of the college completion puzzle. While promising in the short term, most of these interventions have not had substantial long-term impacts on completion, particularly for students from low-income, minority, or first-generation backgrounds (Bailey, Jaggars, & Jenkins, 2015; Brock, 2010; Crow & Dabars, 2015; Karp, 2013).

[1] We use the term *broad-access* to refer to community colleges, which are by definition open admission, and public four-year institutions that admit at least 80 percent of applicants (Doyle, 2010). In these two sectors, approximately 40 percent of students graduate within six years (Hess, Schneider, Carey, & Kelly, 2009; Shapiro, Dundar, Yuan, Harrell, & Wakhungu, 2014).

What is needed, reformers argue, is a new approach to higher education that fundamentally alters how higher education is delivered to and experienced by students. Some argue for a complete unbundling of higher education (see Bowen, 2013; Carey, 2015; Selingo, 2015), with the traditional college experience and postsecondary degrees being replaced by individualized competency-based learning and skill certifications. Others argue that substantial reform can be made within the context of traditional higher education institutions (Bailey et al., 2015; Bryk, Gomez, Grunow, & LeMahieu, 2015; David, Sivadon, Wood, & Stecher, 2015). This latter group of reformers argues that institutions of higher education should continue to exist largely in their current form but must be comprehensively redesigned—changing not just one aspect of the student experience but the entire approach to institutional improvement and student completion.

State policymakers and individual colleges are increasingly attempting to create comprehensive institutional change in the name of improved completion rates. For example, 35 states participate in Complete College America's Alliance of States, and have committed to improving completion through comprehensive reform strategies such as Guided Pathways to Success, block scheduling, and redesigned developmental education. At the institutional level, the City University of New York (CUNY) started a new community college in 2011 that fundamentally redesigned typical curricular pathways, student supports, and pedagogical approaches. CUNY also launched and expanded its Accelerated Studies in Associate Programs (ASAP) initiative, which provides comprehensive student support coupled with block scheduling. Both initiatives have led to high completion rates for participants (Guttman Community College, n.d.; Scrivener et al., 2015). City Colleges of Chicago has engaged in a near-decadelong transformation effort, redesigning curricular pathways, investing in student supports, and redesigning developmental education; at the four-year level, Arizona State University and Georgia State University have undergone similar reforms.

There is great enthusiasm for broad reforms that aim to redesign higher education institutions. But enthusiasm does not guarantee success, and as more colleges seek to transform their practices, how to ensure that reforms take root becomes a crucial question. What institutional conditions encourage transformative reform efforts? How

can college leaders ensure that their efforts pay off, in terms of changed institutions, student experiences, learning, and—ultimately—completion rates?

This paper begins to answer these questions by looking at an increasingly popular institutional reform in which colleges use technology to fundamentally redesign their advising and student support services. This type of reform—often known as integrated planning and advising for student success (iPASS)—serves as an example of transformative efforts because it is intended to touch all students throughout their educational careers, involves multiple departments within a college, and requires institutions to rethink how they deliver an array of services. In other words, it is not a discrete intervention or pilot program but a potential in-depth redesign of an entire institutional domain. We use iPASS as a case study for exploring how transformation occurs within institutions, and we assume that the experiences of colleges in this study have implications for reforms outside of the advising and student support realms.

In this paper, we examine six colleges engaged in iPASS reforms. Using an array of pre/post data, including interviews, observations, and surveys, we examine the extent to which colleges used advising technologies to transform student service delivery over the course of an 18-month project. We then examine the contextual factors that appear related to transformation or lack thereof. We find that merely wanting to engage in reform is an insufficient precursor to transformation. Rather, colleges that make progress toward deep transformation begin the reform process with a clear vision for change, have multitiered and collaborative leadership structures, and have a culture oriented toward holistic student success. Our findings support and extend previous literature on higher education reform, including Karp and Fletcher's 2014 Readiness for Technology Adoption framework and Kezar's framework for understanding change in higher education (2011, 2013).

2. Background

2.1 Advising and Broad-Access Colleges

Advising and counseling services are a critical piece of institutional redesign (Bailey et al., 2015; Center for Community College Student Engagement, 2013; Jenkins & Cho, 2014; Mayer et al., 2014; Nodine, Jaeger, Venezia, & Bracco, 2012). Given the multitude of course offerings and the complexity of certificate, degree, and transfer requirements at most broad-access colleges, advisors have a crucial role to play in supporting students. Adding to the difficulty of navigating a complex system, many students enter college academically underprepared, uncertain of their career goals, or unsure how to choose a program of study that connects with their career goals.

However, advising departments at broad-access colleges are typically small, with extremely high student-to-advisor ratios (Bailey et al., 2015; Jaggars & Fletcher, 2014; Karp, 2013). As a result, most advisors can afford to do little more than provide basic information and register students for courses. They rarely have time to engage in long-term education planning, discuss career goals, or provide comprehensive support for at-risk students. High student-to-advisor ratios also make it difficult to give advisors assigned caseloads, meaning that students rarely have the opportunity to meet with the same advisor consistently over time and often receive conflicting information from different advisors (Karp, 2013). Most students' introduction to college involves only a brief orientation, with an emphasis on placement testing and registration for the upcoming semester (Bailey et al., 2015; Jaggars & Fletcher, 2014; Karp, 2013).

This approach runs counter to research evidence indicating that a more holistic approach that conceptualizes advising and student support as a long-term, teaching relationship is most effective (Appleby, 2008; Habley, Bloom, & Robbins, 2012; National Academic Advising Association, 2006). The advising-as-teaching approach defines academic advising as a relationship between an advisor and an advisee that parallels the relationship between an instructor and a student. Both effective teaching and effective advising entail not only disseminating information but also cultivating students' higher order reasoning skills. Exemplary instructors teach students analytic skills that they can apply across subjects and contexts. Exemplary advisors guide students to develop the problem-solving and higher order cognitive skills they need to navigate their

postsecondary trajectory (Appleby, 2008; Lowenstein, 2005). Ultimately, effective instructors and advisors help students make meaning of their educational experiences. Instructors guide students to see connections between assignments within a course and thereby construct a cohesive understanding of the material. Similarly, advisors help students understand the logic connecting the disparate courses that comprise their college curriculum (Lowenstein, 2005).

To facilitate the development of higher order skills, advising sessions should mirror the active learning model of classroom instruction. According to this model, students develop analytic skills by engaging directly with the material instead of being passive recipients of information. Therefore, advisors should ideally guide students through an interactive exchange to explore and evaluate pathways and clarify students' education and career goals (Appleby, 2008; Lowenstein, 2005; Moore, 1993). Feedback from the advisor prompts students to reflect, evaluate, and ultimately arrive at a decision. By facilitating students' active participation, advisors help students develop the skills they need to make subsequent decisions about their education (Appleby, 2008; Lowenstein, 2005).

Research has also found that student outcomes are improved when advising and student support takes a "SSIP" approach (Karp & Stacey, 2013), meaning that it is sustained, strategic, intrusive and integrated, and personalized. Such an approach builds on research indicating that one-time interventions lead to impacts that fade over time (Rutschow, Cullinan, & Welbeck, 2012; Visher, Weiss, Weissman, Rudd, & Wathington, 2012; Weiss, Brock, Sommo, Rudd, & Turner, 2011). It is also rooted in studies finding that challenges to college completion can crop up throughout students' college careers and in nonacademic domains (Chaplot, Cooper, Johnstone, & Karandjeff, 2015), as well as research demonstrating that students are often unaware that they need help, unwilling to seek it out, or unable to find sources of support (Cox, 2009; Karp, O'Gara, & Hughes, 2008). Thus, interventions need to be sustained, in order to catch students when they need help, and strategic, in order to connect students with the type of support they need when they need it. They also need to be multifaceted, proactive, and intrusive, so that students are required to encounter them. Making nonacademic support an integral part of every student's experience means that all students will receive help, even if they think they do not need it.

The most compelling evidence of the potential impact of the SSIP advising approach comes from CUNY's Accelerated Studies in Associate Programs (ASAP). ASAP students, who are in the program from college entry until graduation, attend classes in cohorts, have dedicated advisors with whom they meet biweekly to discuss academic and career goals, and have access to supplemental support such as MetroCards. A rigorous random-assignment study found that after three years, ASAP students earned more credits, were more likely to graduate, and were more likely to transfer to a four-year college than similar nonparticipants (Scrivener et al., 2015). ASAP participants had a three-year graduation rate of 40 percent, compared with 20 percent for the control group. Ongoing studies of ASAP using quasi-experimental approaches have found similarly positive impacts (see http://www1.cuny.edu/sites/asap/evaluation/).

Though SSIP advising and advising-as-teaching are the preferred approaches of professional advisors, the high student-to-advisor ratios and relatively high levels of student need at open-access colleges make this approach challenging to implement. To facilitate an interactive relationship with students, advisors need to invest substantial time and resources in working with each student. For example, Appleby (2008) offers a guide for designing an advising curriculum that calls for scheduled face-to-face advising sessions with a question-and-answer format; in addition, advisors are encouraged to ask questions to prompt less expressive students. Financially constrained and understaffed colleges struggle to allocate the resources to structure advising sessions in this staff-intensive format.

2.2 Advising Redesign and iPASS

Recently, technology-mediated advising, which is sometimes referred to as e-advising or integrated planning and advising for student success (iPASS), has emerged as a strategy to address low completion rates that are related, at least in part, to under-resourced advising and student support services. Technology products may help institutions move closer to an advising-as-teaching approach by reducing the burden on advising services and thereby creating the space for advisors to take a more holistic approach. For example, products that allow faculty members to flag students who are underperforming as academically at-risk allow advisors to more quickly and effectively intervene with students who need additional support.

At its core, iPASS uses technology to support broader reforms within the advising and student support function of higher education institutions. Ideally, iPASS uses technology to promote, support, and sustain long-term intrusive and holistic advising relationships. Using technology enables personnel throughout the college to engage in advising and student support relationships that (a) approach student support as a teaching function; (b) touch students on a regular basis; and (c) connect them to the information and services they need when they need them, in order to keep students on track to graduation.

With regard to the underlying technology supporting iPASS reforms, the majority of systems observed for this study fall into three general categories: (a) education planning systems, which provide tools for selecting programs and courses, mapping degree plans, and tracking progress toward degree completion; (b) counseling and coaching systems, which provide tools for improving students' connections to support services; and (c) risk targeting and intervention systems, which provide tools for monitoring early indications of academic struggle. In sum, iPASS systems are designed to address the most immediate challenges to student success, providing effective program planning that connects to holistic support to promote students' progress toward a degree.

The theory of change for iPASS posits that in order for these systems to achieve their goal of supporting more students through to completion, institutions and end users[2] must adopt these systems in ways that transform advising from the performance of clerical registration tasks to the type of holistic case-management support described earlier. Although there is no one best way to organize student support services, successful iPASS reforms encourage organizational and behavioral reforms that enable advising-as-teaching and a SSIP approach. Thus, successful iPASS reforms can be recognized by the presence of all the following institutional characteristics:

1. advising structures that leverage technology to enable and encourage sustained support, long-term advising relationships, and just-in-time intervention;
2. technology-based and face-to-face interventions for students who need additional assistance, with

[2] We define an end user as anyone whose job or educational role involves using iPASS technology on a routine basis.

technology used to identify students in need of these interventions and/or connect students to the interventions;

3. student, faculty, and support personnel use of technology tools to holistically provide students with program planning resources, early interventions, connections to services, or other supports;
4. support personnel who engage with students within a teaching framework, building their problem-solving, self-advocacy, and navigational skills over time; and
5. deep-seated attitudes and institutional behaviors emphasizing student support in the service of degree completion (rather than course completion) and as a key element in students' collegiate learning.[3]

There are many ways to reform advising and many ways to deploy technology within a college. Not all of these constitute an iPASS-mediated reform. Engaging in an iPASS-mediated reform requires colleges to restructure how they deliver services and individuals within the college to engage with their work in new ways and to reconceptualize what it means to support students. But shifting student support delivery toward this model is precisely what colleges are being asked to do as part of the new wave of completion-oriented reform. Therefore, iPASS reforms have the potential to be transformative, and may serve as an example of higher education transformation.

3. Theoretical Framework

To examine if and how technology-mediated advising can spur transformative reform in advising, we drew on research in technology adoption and change management. We used Karp and Fletcher's 2014 Readiness for Technology Adoption (RTA) framework to examine how technology is deployed and how it permeates an institution.

[3] Because there is no one way to implement iPASS, these principles are enacted differently from college to college. The case study examples in this paper elaborate on what iPASS can look like in practice. Additional CCRC products related to iPASS may be found at http://ccrc.tc.columbia.edu/research-project/integrated-planning-and-advising-services.html.

And we developed a comprehensive framework for understanding transformative change that draws on research inside and outside of higher education, notably work by Kezar (2011, 2013) and Heifetz (1994).

3.1 Readiness for Technology Adoption Framework

Karp and Fletcher (2014) reviewed and analyzed nearly 75 journal articles and books to identify organizational features that are empirically related to successful technology adoption. The RTA framework begins with the premise that technology can be used to fundamentally redesign the student experience, but only if it is approached as a means of changing practice. The framework assumes there is a difference between implementing technology (installing technology systems) and adopting technology (using technology in everyday practice).

The RTA framework identifies four broad areas of organizational readiness: technological, cultural, institutional, and project-level. Organizations must be both technologically and culturally ready to adopt a new technology, and both technological and cultural readiness must exist at two distinct levels, the institutional level and the project level (Karp & Fletcher, 2014). Cultural readiness is complicated by the fact that organizations are made up of groups of individuals, or microcultures, with differing perceptions and propensities to adopt new technologies (Karp & Fletcher, 2014).

Karp and Fletcher's framework highlights two key aspects of technology-based reform. First, it demonstrates that reform happens across multiple dimensions: Reform simultaneously takes place at the project level and within a broader organizational context. It is not enough to be technologically ready, or to have institutional leaders engaged with the reform. Rather, meaningful technology adoption happens when an entire organization, as well as the individuals within it, is able to engage with and understand the reform. Readiness for a given project intersects with organizational readiness to engage in reform. Similarly, individuals may transform their own practices but do so within institutional structures.

Second, the framework emphasizes that even for reforms rooted in technology, the technology itself is necessary but not sufficient for meaningful change. Merely deploying a tool does not guarantee that it will be adopted or used in ways that shift student outcomes.

Instead, the technology serves as a precursor to reform; attention must be paid to organizational and cultural features in order to facilitate widespread adoption of new tools.

3.2 Organizational Change

Studies of organizational change, particularly those focused on leading change, also emphasize the multidimensionality of reform. Heifetz (1994) proposes that there are two broad types of problems that reforms might address: technical problems and adaptive problems. Technical problems have known solutions, while adaptive problems have no known solutions and therefore require changes in thinking and values (Heifetz, 1994; Heifetz, Grashow, & Linsky, 2009). Different problems require different approaches; adaptive change requires leaders who can motivate people to engage in difficult conversations and to think and act differently (Heifetz, 1994; Heifetz et al., 2009).

Kezar (2011, 2013) examines the ways that reforms take root within and across organizations. She emphasizes that reforms are adopted via an interaction between organizational leadership, resources, and stakeholder engagement. Her framework for change (2013) unpacks the reform process by identifying three distinct aspects of change: scope, level, and focus. Importantly, in describing the scope of change, she differentiates between "first-order" reform, or minor changes, and "second-order" reform, or deeper changes of the type necessary to achieve the nation's completion goals.

According to Kezar (2013), enacting deeper, second-order change requires close attention to each of the distinct levels at which change occurs (individual, group, institution, and organizational sector). In addition, it demands a clear understanding of the focus of the desired change—the structures (organizational hierarchies and policies), processes (approaches to planning and decision-making), and attitudes (feelings and underlying assumptions) that must be changed in order to have a significant impact. Thus, second-order reforms occur via collaboration across multiple levels of an organization, involve an emphasis on all three focuses of change, and necessitate informal as well as formal leadership.

3.3 Transformative Reform Framework

Based on these two bodies of literature, we developed a framework for articulating and examining the type of reform encouraged by the completion agenda. We

refer to this type of change as "transformative" change because it is bigger, bolder, and more comprehensive than previous reforms. Rather than changing a small part of an organization, transformative reforms fundamentally reorganize how education and educational services are delivered and experienced.

Transformative change occurs at Kezar's (2013) three focuses of organizational functioning—structural, process, and attitudinal. To operationalize these focuses (which we refer to hereafter as "dimensions"), we define structural change as changes to the organization or design of systems and business practices. We define process change as changes in individual engagement, behaviors, and interpersonal interactions with systems and business practices. Finally, we define attitudinal change as changes in core underlying attitudes, values, and beliefs.

Change in each dimension occurs at multiple levels. Some changes are relatively contained—for example, incorporating new forms of questioning within advising interactions. We refer to these as micro-level changes because they are enacted by individuals, often independently of one another. Other changes are more widespread, such as when advising is moved from a centralized to a decentralized model, or when a multitude of college personnel take on a new set of shared values. We refer to these as institutional- or macro-level changes.

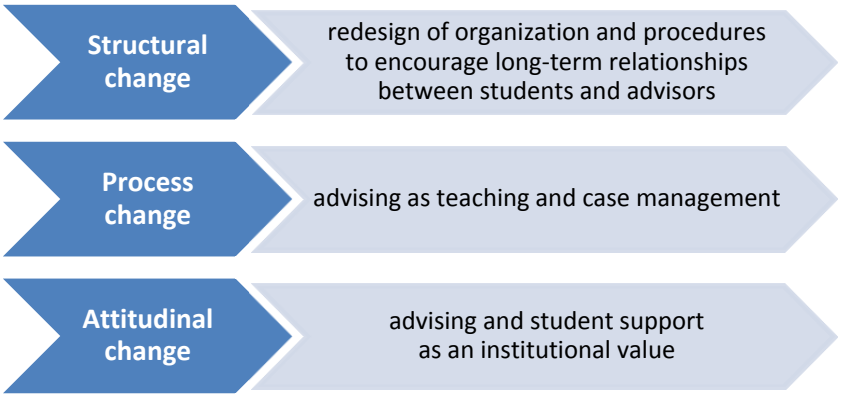
Transformation bridges the micro/macro divide. Institutional changes can encourage and reinforce (or discourage and restrain) micro-level changes, and vice versa; as individual changes bubble up or percolate throughout an institution, its overall culture begins to shift. The relationship between the micro and the macro is iterative. At times, it is difficult to discern where individual change ends and institutional change begins because the two interact, reinforce one another, and span various stakeholders' engagement.

For example, a "case management" approach to advising cannot entirely exist without new institutional structures and norms (for example, student assignment to specific advisors, policies that encourage or require regular touchpoints, and the expectation that advisors will be responsible for specific students from entry to graduation). At the same time, case management requires new behaviors at the individual level (such as regularly reaching out to students, engaging in conversations about challenges to completion, and entering case notes). As individual-level changes take root,

they embed themselves in the culture of the college, becoming "how we do things here." This type of shift in deep-seated attitudes and norms indicates that a transformative reform has become institutionalized—a marker of successful change.

Such a broad shift in structures, processes, and attitudes across stakeholders and departments is what ultimately influences students' experiences and can potentially shift student engagement, behavior, and outcomes. Taking this multidimensional view enables us to understand how resistant microcultures of an institution can impede transformation. If a group of individuals resists the reform, broad-based "bubbling up" or "bubbling down" of changed behavior will be blocked, and the aggregate impact of the reform will be smaller than if a wide range of individuals and departments engage in the work. The opposite is possible, too, whereby supportive microcultures can encourage transformation. Figure 1 illustrates transformative change within the context of an iPASS reform.

Figure 1
iPASS and Institutional Transformation



In short, to improve student outcomes, colleges need to support students using a SSIP approach, and they are increasingly relying on technology to help them do so. Given the current state of advising and student support in broad-access colleges and universities, engaging in SSIP advising will require changing student support structures, processes, and attitudes. Thus, iPASS is potentially transformative. Given the newness of the approach, it is not yet clear whether colleges can successfully engage in this type of reform. Are institutions able to use technology to achieve advising reform—and if so, how?

This paper begins to answer these questions. In doing so, we provide insight into the transformative reform process. We also confirm Kezar's (2013) framework for change within a specific reform context, providing more specificity regarding what structural, process, and attitudinal change look like and how they play out in practice. Moreover, we combine Karp and Fletcher's (2014) framework with Kezar's, illustrating the ways structural, process, and attitudinal change play out at both the organizational level and the project level, thereby underscoring the iterative micro/macro nature of transformation.

4. Method

We studied six colleges deeply engaged in iPASS reform over an 18-month period to examine the following questions.

1. How do colleges implement an iPASS reform, and how do they change their structures, processes, and attitudes such that iPASS can have a positive effect on student experiences and outcomes?
2. To what extent do colleges engage in transformative change?
3. What organizational features are associated with transformative change in the context of an iPASS reform?

To answer these questions, we used a contrasted case study design with six sites that were part of a larger group of colleges selected to receive a grant dedicated to implementing iPASS technologies. All of the colleges that had received grants were asked to answer questions about their technological, cultural, institutional, and project readiness that corresponded to the RTA framework (Karp & Fletcher, 2014). In order to ensure that our findings were not influenced by a particular set of preexisting conditions or cultures, we chose to study colleges that varied in terms of their RTA scores, institutional characteristics (e.g., sector, urbanicity), and project goals for iPASS.

Table 1 provides an overview of the six sites. All college names are pseudonyms. Note that the mid-sized, urban state university is also categorized as a historically black college or university (HBCU).[4]

Table 1
Case Study Sites

Site	Sector	Urbanicity	Project Goal	Readiness for Technology Adoption[a]
Crescent Community College	Community college	Suburban	Improve information provision	Low (logistical readiness, clarity of goals)
Lakeside Community College	Community college	Suburban	Redesign advising	High
Harbor University	Open-access four-year (HBCU)	Urban	Integrate technology and automate disconnected and paper-and-pencil processes	Low (vision of benefits)
Forest Hill University	Open-access four-year	Midsize city	Integrate multiple technology platforms	High
Treetop Community College	Community college	Rural	Improve counseling efficiency and personalization	Low (project management resources, communication)
Bluffview Community College	Community college	Small city	Integrate counseling and risk management	High

[a] See Karp and Fletcher (2014) for details on the areas of readiness in parentheses.

4.1 Data

Data for this study were collected at two distinct periods of time in order to assess changes over time. In-depth site visits took place early in the implementation process (fall 2013). We returned to each college for in-depth site visits after iPASS technologies were fully installed (spring 2015). Table 2 illustrates the data collected at each point in time.

[4] An HBCU is a college or university founded before 1964 for the primary purpose of serving African American students. There are currently 105 certified HBCUs in the country (White House Initiative on Historically Black Colleges and Universities, U.S. Department of Education, n.d.).

Table 2
Data Sources

Data	Fall 2013 (Pre-reform)	Spring 2015 (Post-reform)
In-person interviews with administrators, key personnel, and advisors	101	88
Guided advisor observations	49	38
Student focus groups	18 focus groups/ 69 students	9 focus groups/ 52 students
Administrator, key personnel, advisor, and student descriptive surveys	170	138
Administrator, key personnel, and advisor network questionnaires	101	86

Given the RTA framework's emphasis on the multifaceted nature of reform, data collection tools were designed to examine the iPASS reform itself and the broader organizational culture in order to understand the interaction between the two. Our data collection procedures enabled us to examine organizational structures and norms as well as individual behaviors and attitudes, reflecting our transformative change framework. To the extent possible, we interviewed the same individuals during both site visits in order to assess changes over time.

We used five methods of collecting data (interviews, focus groups, a descriptive survey, a network questionnaire, and guided observations) from four key stakeholder groups (administrators, key project personnel, end users, and students). We used semi-structured interviews and focus groups to understand the structure of support services; the technological infrastructure of the college; attitudes toward advising; and approaches to key advising tasks, such as education planning and risk targeting. We conducted hour-long, in-person interviews with administrators, key personnel, and end users (primarily advisors) during fall 2013 (n = 101) and spring 2015 (n = 88). We conducted 90-minute, in-person focus groups with students during these same time periods (fall 2013, n = 69 students; spring 2015, n = 52 students). In-person interviews and focus groups were audiorecorded and transcribed for analysis.

During fall 2013 and spring 2015, all interview and focus group participants also completed a descriptive survey, which included a background questionnaire and

additional questions regarding the service flow and use of technology-mediated resources. In addition, key personnel, administrators, and end users completed a social network questionnaire; informants were asked to list the five people at the college with whom they speak most often about their job and rank the importance of those interactions for their job. We used these data to understand information flow at the college and identify potential barriers to the diffusion of technology innovation, such as the isolation of a subgroup of stakeholders.

Finally, we asked end users to respond to one or two advising scenarios and show us the steps they would complete to address the situation; these guided observations contributed to our understanding of changes in advising practices. Observations lasted approximately 30 minutes and were conducted as an add-on to the semi-structured interview (for a total engagement with end users of approximately 90 minutes). To the extent possible, we interviewed and observed the same end users in spring 2015 as in fall 2013 in order to examine how individuals changed their practices over the course of the reform. We observed 27 individuals during both guided observations. Guided observations were audiorecorded and transcribed; interviewers also took typewritten notes in order to record nonverbal cues and resources used or referenced during the observation.

4.2 Data Analysis

Interview and focus group transcripts from 2013 and 2015 were coded using Dedoose analytic software. A preliminary code list was developed based on the research questions guiding the study and initial impressions about possible themes. We organized codes into four overarching categories: context, service practices, service process, and service structure. Context codes captured student and institutional needs. The service practices category included 15 codes, one for each identifiable service function, such as course selection, registration, and major selection. Service process codes specified whether students completed the task independently or with assistance from institutional support services, including iPASS products. Finally, the service structure codes captured the organizational setup of support services.

Four rounds of test coding were conducted to refine the preliminary codebook. Inter-rater reliability was established through the test-coding process and ongoing coding

reviews conducted by the project lead for every fifth transcript. Coders also discussed codes for particular passages during weekly coding meetings.

We read codes thematically to identify commonalities and differences across colleges. We used this thematic analysis to create analytic memos highlighting institutional features that appear related to transformational change. For example, our thematic reading led us to focus on organizational buy-in as an important feature; we therefore analyzed the "vision" and "rationale" codes to better understand colleges' approaches to gaining buy-in and its relationship to process and attitudinal change.

We also used the transcript data to look at individual-level processes, creating narrative case studies for all end users. These case studies enabled us to look at individual-level behaviors and changes over time. Two researchers read transcripts for each end user and used a standardized template to complete a narrative report summarizing advising practices and attitudes in 2013 and 2015. The template included topics such as use of iPASS technology, orientation toward advising, and opinion of iPASS reform. The templates also included a narrative assessment of their change (or lack thereof) over the course of the reform. Initially, all case studies were reviewed by the project lead to ensure that conclusions were reasonable and substantiated within the case report; once reliability was established, the project lead reviewed every fifth case study.

Descriptive survey data were analyzed using Stata and included basic descriptive statistics of demographic information and service-flow indicators, such as the proportion of respondents who indicated using technology for the advising task in question. We used NodeXL for the visualization of network questionnaire data and the calculation of network properties, such as the extent to which stakeholders were linked to others in the network with different job functions (e.g., links between end users and upper level administrators) or from other departments (e.g., links between student services and information technology).

Finally, we completed institutional case studies relying on data from all of these sources. We used a standardized template to describe colleges' student support structures, organizational features, institutional norms, and approaches to student support in 2013 and 2015. Comparing across the two time periods, we assessed the extent to which structures, processes, and attitudes changed over the course of the project.

We also used the case studies to confirm the organizational features associated with transformation identified during the coding, and to identify additional relevant features. The deep transcript reading and synthesis of data sources required to prepare the case studies enabled us to identify emergent themes and commonalities. We discussed these as a group, clarifying our hypotheses. We then prepared memos on each emergent organizational feature, using a variety of data sources to substantiate our findings.

4.3 Measuring Transformation

The multidimensionality of transformation presents a unique measurement challenge. How do we know an institution has changed, and more importantly, how can we assess whether or not a change has taken root in ways that are likely to shift student experiences?[5] Measurement within a change framework requires understanding the state of a college prior to a reform, and then assessing it again at a later point in time. Measuring change is not the same thing as measuring adherence to a standard. Colleges may engage in transformation but still adhere to a standard imperfectly. Moreover, institutions may change along one dimension but not others—in which case they may have made progress toward reform but may not yet be seen as engaging in *transformative* change.

We therefore took an aggregate approach to measurement. We looked at the extent to which colleges changed structures, processes, and attitudes at the micro and macro levels. The extent to which multiple shifts aggregated across organizational functions at both levels is an indicator of the depth, breadth, and transformative nature of change.

In keeping with our conceptualization of technology-mediated reform as ideally supporting a SSIP approach to advising, we measured transformation toward this ideal. This means that we measured the extent to which colleges made multidimensional moves toward providing students with intensive, personalized support that engages advisors and support staff as teachers. We measured change along structure, process, and attitudes individually, and we also considered change in the aggregate across all three

[5] To be clear, this study focuses on *institutional change*, not changes in student outcomes. The theory underpinning iPASS and other potentially transformative reforms assumes that institutional change is a precursor to or leading indicator of improved retention and completion rates. Given the newness of iPASS at the colleges included in this study, we did not expect to see changed student outcomes during the time period covered by the study, and thus we deliberately focused on institutional indicators rather than student-level metrics. Future CCRC studies will examine changes in persistence, completion, and other student-level metrics resulting from iPASS-mediated advising reforms.

dimensions. Given the state of advising and student support at broad-access colleges, we expected that the colleges had room for transformative growth using technology and along a SSIP continuum.

To measure change within an iPASS context, we developed indicators along multiple continuums, reflecting individual and institutional movement toward SSIP advising in terms of structures, processes, and attitudes (see Table 3). These indicators are rooted in the literature on advising practices and an inductive analysis of interview transcripts. The indicators themselves are an ideal instantiation; we used our various data sources to examine whether colleges and individuals moved closer to this ideal over the course of the reform.

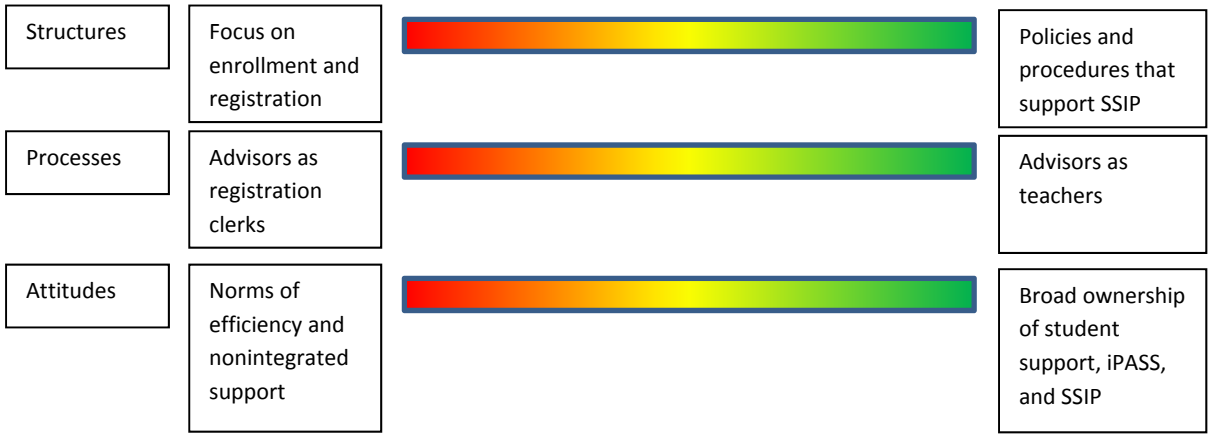
Table 3
Indicators of iPASS-Related Transformation

Level	Structural Change	Behavioral Change	Attitudinal Change
Micro	• New protocols and policies that encourage SSIP approach (e.g., procedures requiring case notes; departmental protocols requiring touch points)	• Developmental advising and advising-as-teaching pedagogy infused in advising sessions • Intrusive advising (i.e., reaching out to students in trouble or at early signs of trouble; or, for faculty, giving alerts) • Engagement in long-term program planning by students or students in conjunction with advisors	• Student support seen as primary job responsibility by student services staff • Belief in advising-as-teaching/SSIP approach • Conception of student success as program completion rather than course completion
Macro	• Reorganization of advising structures (e.g., move to departments; new staff or job descriptions) • Deployment of tools that can encourage SSIP approach (e.g., early-alert system, program planning, etc.)	• Organizational decisions that privilege support activities (e.g., budgetary choices) • Communication from college personnel about the importance of sustained support and advising-as-teaching • Cross-departmental collaboration and decision-making focused on student success	• Demonstrated commitment to student support as an institutional priority • Organizational narrative around supporting students to credential completion • Consistent understanding of iPASS/student support across the college

For each college, we assessed adherence to the SSIP approach along a continuum for structures, processes, and attitudes. For example, a college in which advising was structured as a drop-in, voluntary activity (which we refer to as "advising-as-registration") might be assessed as far from the SSIP ideal for structures. In contrast, a college in which the bulk of our data indicate that individuals throughout the college viewed student support as a critical piece of their role might be placed on the SSIP end of the continuum. Figure 2 illustrates these three scales.

It is important to note that, because SSIP can be enacted in many different ways, we did not precisely rate colleges on the dimensions. Rather, we used our various data sources to assess overall adherence to the various indicators of SSIP we identified, and provide a holistic assessment of college structures, processes, and attitudes.

Figure 2
SSIP Continuum for Structures, Processes, and Attitudes



5. Results

5.1 Descriptive Findings: Change at the Six Colleges

Between fall 2013 and spring 2015, all six colleges in our study were able to deploy iPASS technologies.[6] Their tools were live and accessible to intended end users. Given the resource constraints faced by the majority of these institutions and the technical requirements of many iPASS tools, the significance of this accomplishment should not be underestimated.

However, our data indicate that only a subset of colleges were able to use iPASS technology deployment to spur transformative change. Figures 3–8 illustrate each college's transformation over the course of the grant period. In keeping with our theory of transformation, we provide an assessment of the structures, processes, and attitudes at each college at two points in time based on our analyses of interview, focus group, and guided observation data. We assess the extent to which advising structures encouraged sustained, long-term advising relationships and just-in-time intervention (structures supporting SSIP advising); the extent to which personnel engaged with students within a teaching frame (SSIP advising–oriented processes); and the extent to which institutional norms emphasized holistic student support (attitudes aligned with the SSIP approach). We provide these assessments for our 2013 pre-implementation visit (indicated by the blue bar) and our 2015 post-implementation visit (indicated by the black bar).

The figures illustrate that, as designed, the colleges in this sample varied in their pre-implementation structures, processes, and behaviors. Some, such as Forest Hill, were well on the way to comprehensively supporting students using technology within a SSIP framework. Others, such as Crescent and Treetop, were primarily focused on student support as registration and enrollment management. All, however, had room to improve their practices and move further along the SSIP continuum.

[6] At Forest Hill University, the technologies deployed differed from those originally described in grant applications. This university was the only one in the grant cohort to abandon its original plan; as we discuss later, the university found that the plan and related technologies ultimately did not meet its needs. However, the college *did* engage in other iPASS activities and deployed other iPASS technologies more aligned with its institutional goals.

Figures 3–8
Change and Transformation in Six Case Study Sites:
Visual Representation of Multidimensional Movement Toward the SSIP Ideal

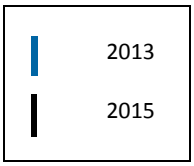


Figure 3
Crescent Community College (No Transformation)

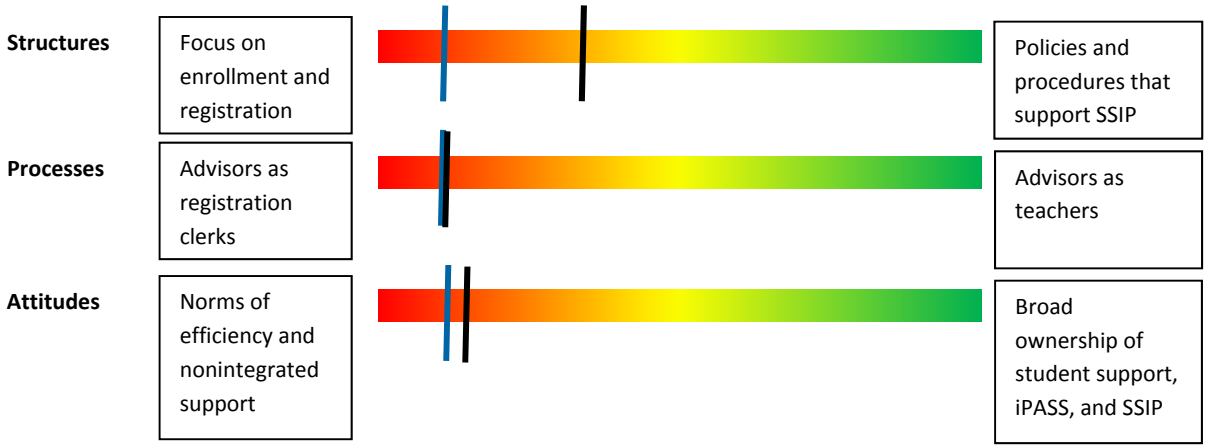


Figure 4
Lakeside Community College (Transformation)

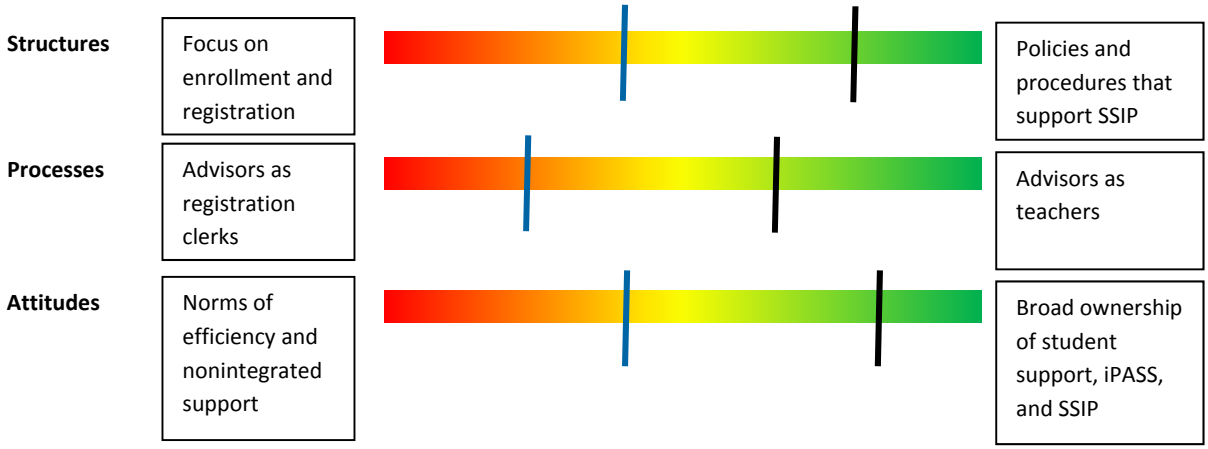


Figure 5
Harbor University (Transformation)

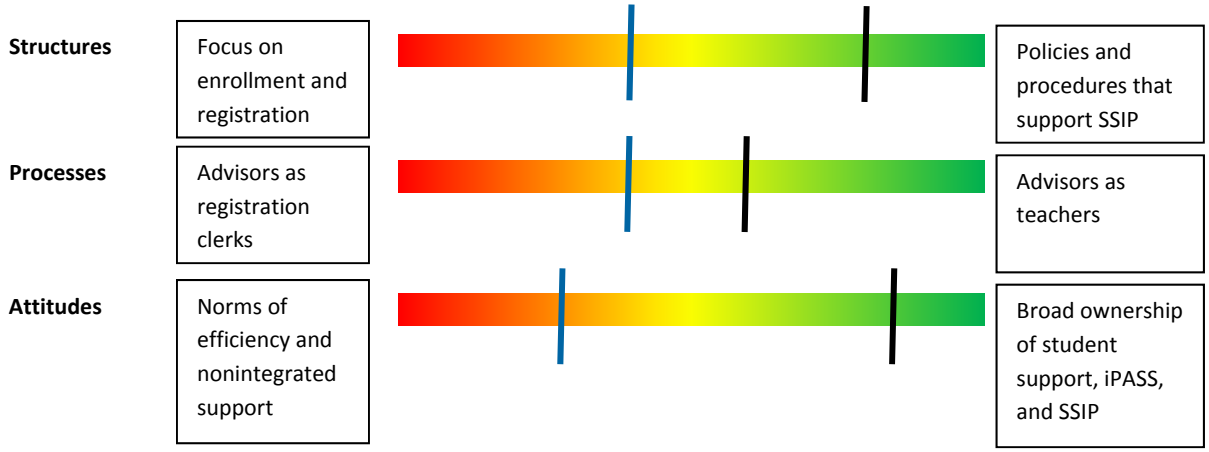


Figure 6
Forest Hill University (No Transformation)

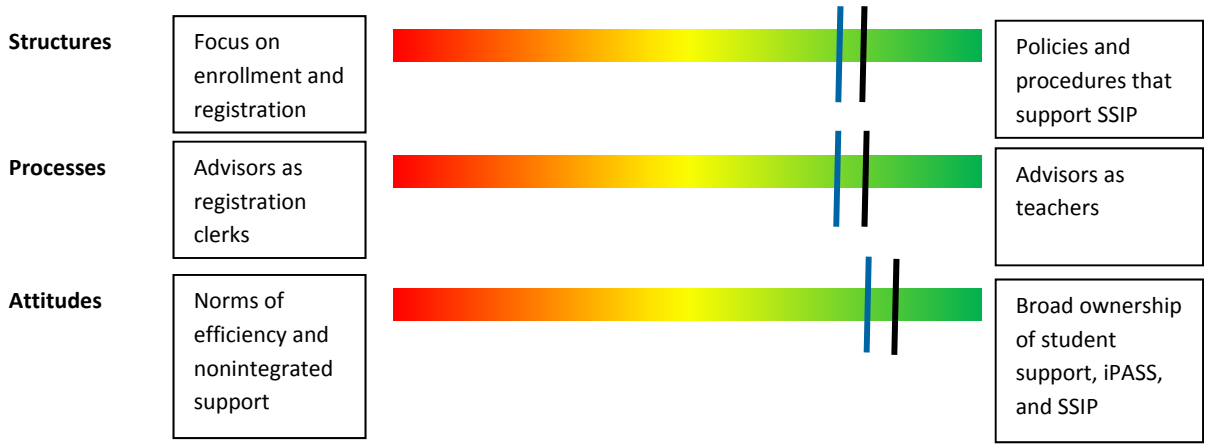


Figure 7
Treetop Community College (No Transformation)

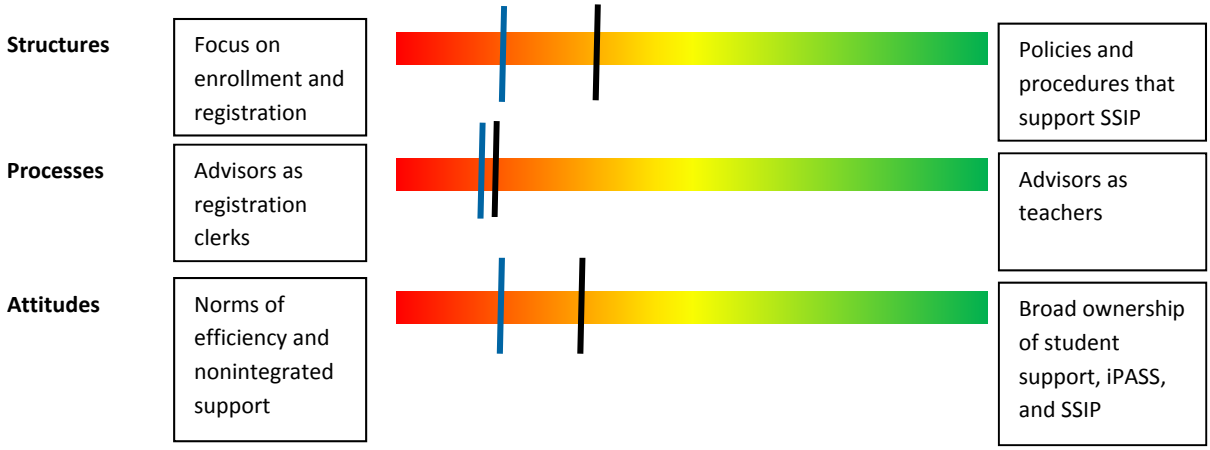
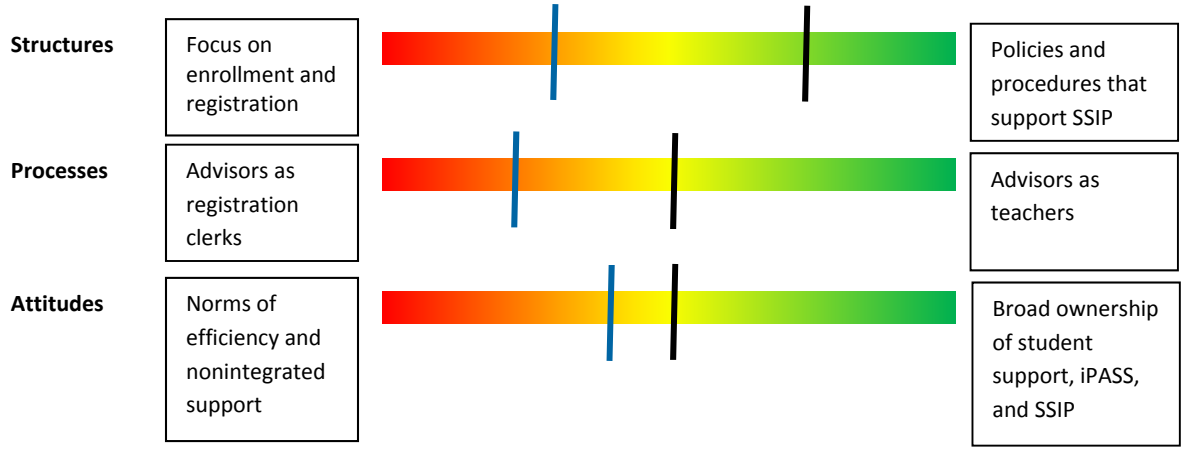


Figure 8
Bluffview Community College (Early Transformation)



The figures also illustrate that all six colleges experienced some movement on at least one dimension. In some cases, the movement was a small shift, such as minor modification to existing structures, processes, or attitudes. In these instances, while there was some evidence of change, we would not categorize the college as having engaged in *transformative* change because the change was limited to a single dimension or minor modifications. Three institutions (Crescent, Forest Hill, and Treetop) did not engage in transformation over the course of the study. In other cases, the observed change was

larger, such as when multiple individuals began voicing new norms around advising or demonstrating new methods of working with students within the advising context. Moreover, at some colleges, these larger changes were visible across all three dimensions of our framework. We consider colleges in which such larger and multidimensional changes occurred to be engaged in transformative change. In our sample, three institutions (Lakeside, Harbor, and Bluffview) began to engage in transformation. At all three, we observed clearly identifiable and often quite tangible shifts in structures, processes, and attitudes.

The experiences of Crescent Community College and Harbor University illustrate a clear distinction between small change and transformation. Crescent is a large community college located in a suburban area adjacent to a metropolitan city. Advising services at Crescent are significantly under-resourced. Staff and students we interviewed noted long wait times for in-person advising, at times as high as seven hours. At the time of our first site visit, advising at Crescent was provided through multiple structures. Most students were initially advised at the centralized advising center, where they met with generalist advisors on a drop-in basis or via appointment. Subpopulations of students were also sometimes advised through special programs; students enrolled in those programs indicated that they usually met with their program advisor rather than a generalist or faculty advisor. Continuing students also had access to specialized career advisors and retention coordinators, though typically on an ad-hoc basis.

Overall, before iPASS implementation, advising at Crescent primarily focused on course selection and planning, rather than longer-term goal setting or case management. Advisors of all types helped students identify courses that are necessary for their program of study and helped students plan for two semesters. Advisors also reminded students of significant registration and financial aid dates. These activities reflected, at least in part, a clerical function for advisors.

Our data indicate that the college did change its structures to leverage new program planning and early-alert technology in ways that could enable integrated, comprehensive student supports. The college hired additional advisors; shifted their job responsibilities so that they were all generalists; merged disparate student development divisions into a single

function focused on retention, advising, transfer, and disability services; and standardized advising documents to facilitate a consistent student experience.

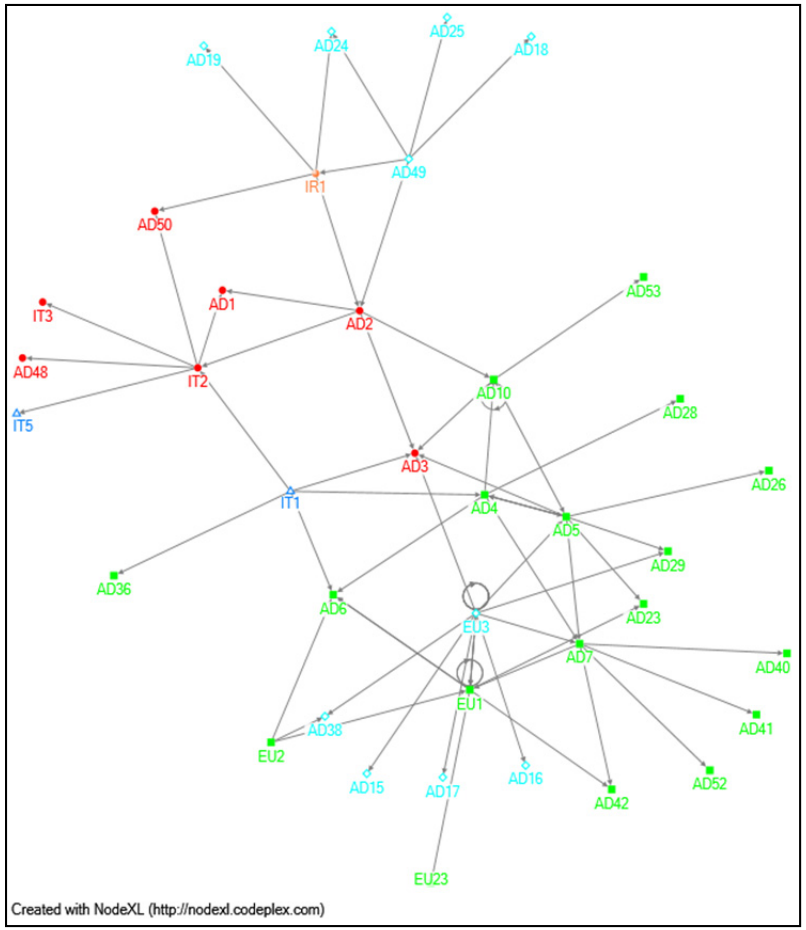
However, interviews with key personnel and end users indicate that processes did not shift along with structures. Advisors viewed the above changes, as well as new iPASS technology, as a way to do more with less rather than an opportunity to change their student support practices. Advisors viewed iPASS as a technical upgrade that enabled them to do what they were already doing, but in a speedier or more visually appealing way. Though they shifted their behaviors to make use of the tools in ways that enabled speedier performance of job functions, they did not change how they advised—for example, using a program planning tool to ask students new, teaching-focused questions.

In addition, we found that attitudes toward student support shifted only slightly over the course of the project. During our first visit, there was a clear advising-as-registration norm and a focus on efficiency. Most of those we interviewed during our 2015 visit continued to express this point of view, focusing on clarifying students' course-taking choices and ensuring their completion of degree requirements. It should be noted, though, that we did encounter some individuals—primarily administrators—who expressed a more holistic, completion-oriented, and integrated perspective.

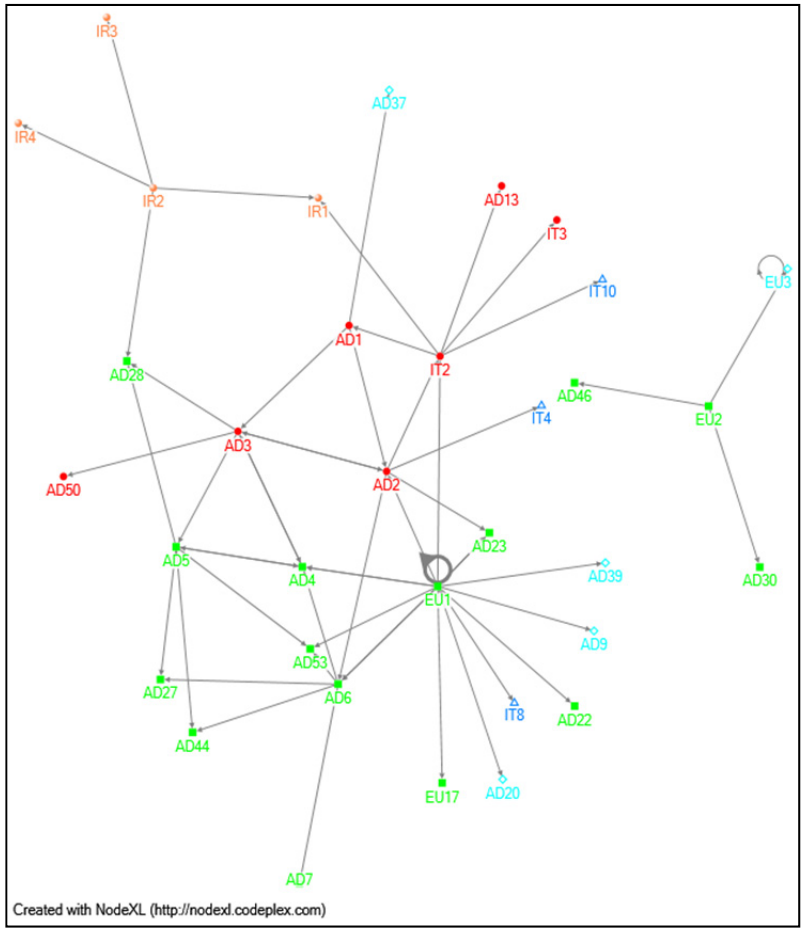
The overall similarity between 2013 and 2015 at Crescent Community College can be seen using a network analysis of survey data (Figure 9). The charts show the relationships between various stakeholders, groups of which are color-coded by department and labeled by function. The chart on the left illustrates relationships in 2013; note that stakeholders of various departments and job functions rarely indicated that they communicated regularly. Student services personnel (labeled in green), for example, rarely viewed academic affairs personnel (labeled in light blue), including faculty (marked EU3), as essential for their jobs, even though faculty served as advisors and could potentially direct struggling students to various support services offices.

Figure 9
Relationship Networks at Crescent Community College

2013



2015



Legend:

Executive Office	EU: End user
Academic Affairs	AD: Administrator
Student Services	IT: Information Technology
Information Technology	IR: Institutional Research
Institutional Research	

The structural changes described above, coupled with the addition of an iPASS tool, could have created opportunity for greater integration and communication. But the 2015 network map (on the right) shows continued cross-departmental and cross-functional fragmentation. In fact, instructors continued to be largely isolated from support services staff; only a single student support program staff member indicated communicating with instructors, and generalist advisors (EU1) did not identify a direct connection.

Thus, despite structural changes that could have supported activities such as technology-mediated case management, Crescent Community College did not appear to be engaged in deep transformation. This was most clear when speaking with students. In 2013, students were frustrated with long wait times and the college's formulaic and impersonal approach to advising. Given continued norms focused on advising-as-registration and advisors' focus on efficiency, these concerns were not explicitly addressed by iPASS and related structural changes. In 2015, students still indicated that they found advising sessions formulaic. One student we interviewed in 2015 described what she felt was an impersonal approach to advising. She was an older student and reported feeling that the advisor made a general assumption about the course load that she would be able to manage based on her age and employment responsibilities. She indicated she did not feel like the advisor was considering her unique attributes, including her positive academic record, when advising her on how many courses to take.

In contrast, Harbor University—an HBCU located in a nearby city—experienced notable transformation over the course of the project. At the time of our first site visit, its advising services were incoherently structured. Advisors were managed through a centralized office, but each of the college's 10 schools followed different processes for delegating advising responsibilities to retention coordinators and other staff and faculty advisors. Staff and students we interviewed were frustrated with this variation and found the multiple layers of advising confusing to navigate. For example, colleges assigned advisors differently. As a result, both university personnel and students had difficulty tracking student–advisor assignments.

As part of its iPASS project, Harbor implemented a risk targeting and intervention system, as well as an advising appointment and communication system. The launch of these tools led the college to engage in substantial and positive structural change and

supported a universal understanding of the importance of retention, completion, and holistic student support. Structurally, the university shifted to a single advising model, with all incoming students assigned a retention coordinator who "handed off" advisees to a faculty advisor upon completion of 24 credits. This consistency helped students develop a relationship with one or two individuals who were responsible for their success, while enabling the college to keep careful tabs on which students were in need of or receiving additional support. The university also leveraged its early warning tool by creating a clear process for faculty to submit alerts when students were struggling and a streamlined system for addressing alerts and communicating back to faculty.

With regard to attitudes, the university engaged in a clear rebranding of its retention work to focus on student success and completion. Emblematic of this shift was the renaming of the Student Retention Office to the Office of Student Success and Retention. Project personnel and university administrators were relentless in their communication to faculty and staff that holistic student support in the name of completion was a key element of the university's approach to education.

Research participants told us that as a result of these structural and attitudinal changes, they felt more connected to students and more responsible for their success. Student photos in the system enabled them to connect faces with names, and students' responses to alerts made them feel like their efforts to reach out paid off. Students appreciated receiving alerts and being connected to support, though a few noted that they preferred in-person support to automated messages. One student noted mixed feelings toward the system, saying:

> So I don't know if it helps, but I would say that it's kind of like a wake-up call for you to be like, okay, so I'm missing some assignments, or I'm coming in late, so maybe I need to change some things. But like I said, I really don't think a lot of students take it seriously.

Our data reveal a shift in the clarity of advising processes, as well as their importance in the eyes of Harbor University stakeholders. Network maps (Figure 10) illustrate the overarching change at this college. As at Crescent, the 2013 map on the left indicates a lack of coherence across the university. Advisors had to coordinate with multiple administrators (such as deans) from various academic departments and portions

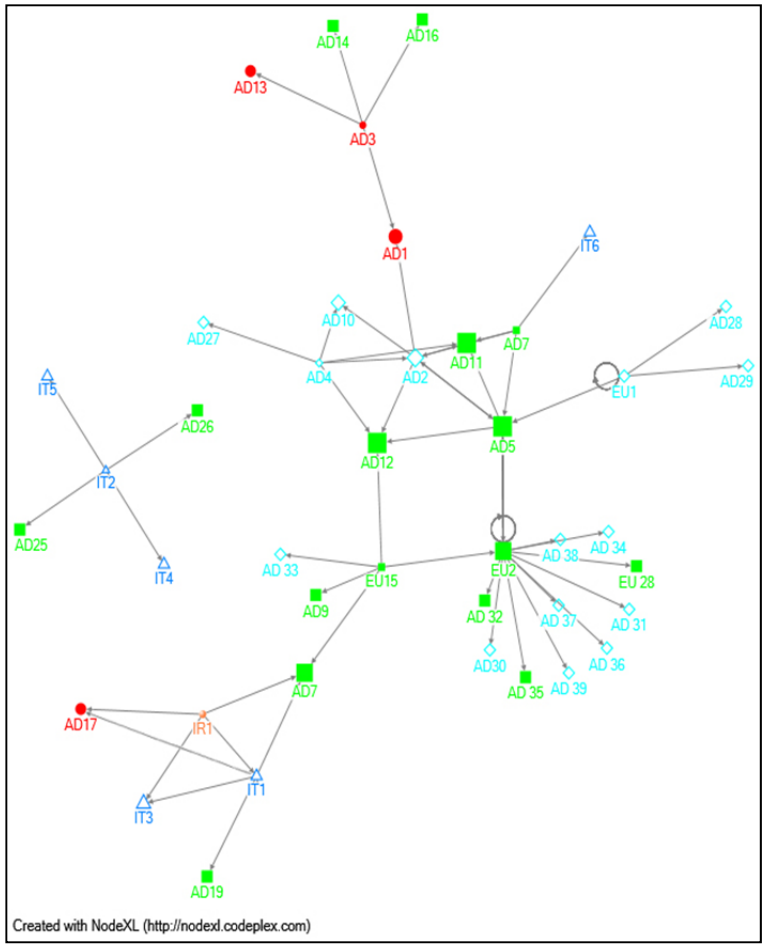
of the college, as indicated by the myriad lines to light blue nodes emerging from EU2, the advisor node. In the 2015 map, the advisor node is connected to fewer academic departments because those departments communicated through a single point-of-contact (AD5). Moreover, advisors are shown to be more widely connected to other student support offices, indicating that advisors were working with colleagues to provide holistic support that crosses various offices.

Despite the substantial change made at this university, at the time of our 2015 visit, structural and attitudinal changes had not yet consistently trickled down to behaviors. While we observed changed processes on the part of some end users, others indicated that they were still learning the systems or had not yet adopted them in their daily practice. For example, according to key personnel, over 50 percent of faculty submitted alerts, and the numbers were increasing each semester since initial implementation. But we were told that even among faculty submitting alerts, processes varied. Some faculty approached the assignment of flags purposefully, reviewing grades and attendance records to accurately assign flags. Other faculty assigned flags based primarily on their perceptions or gut instincts, flagging students based on what they recalled from memory. Similarly, while the system enabled advisors to keep and share case notes (something that was previously impossible due to the university's reliance on paper notes), most advisors were not entering case notes into the system at the time of our 2015 visit.

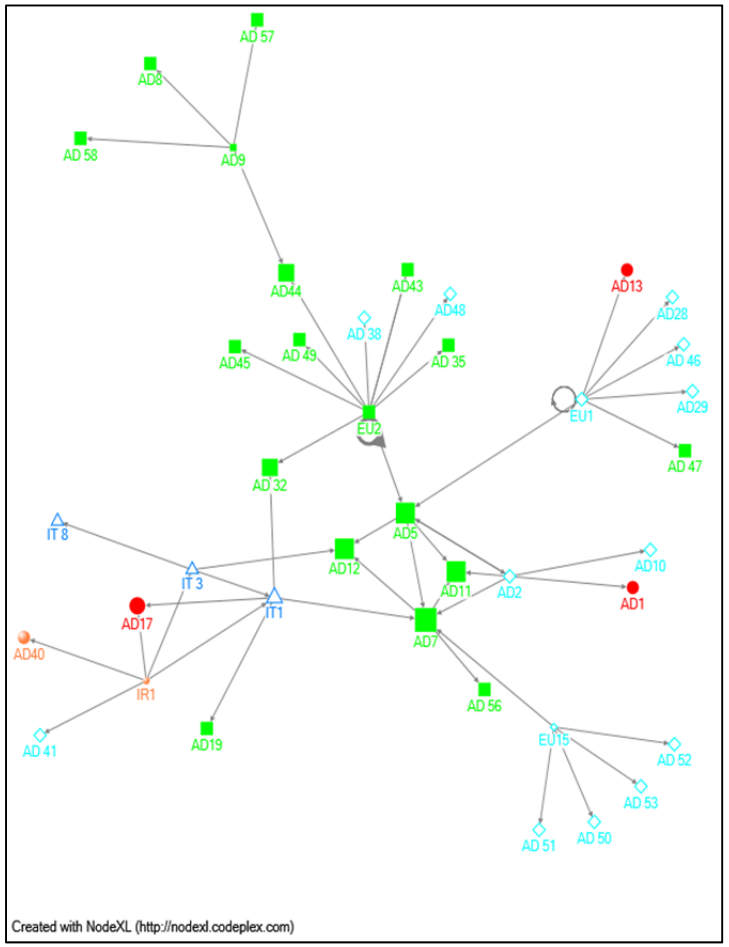
We did see evidence of process change on the part of students, however. We were told that students responded to the new system by reaching out for help or reengaging in their academic work. We were also told that students had coined a new verb for receiving an alert: "being Starfished," in reference to the name of the tool. The students with whom we spoke indicated that they paid attention to alerts and often reached out to faculty to follow up on them. Thus, though process change was less dramatic than structural and attitudinal change, we saw strong evidence of transformative change occurring at Harbor University.

Figure 10
Relationship Networks at Harbor University

2013



2015



Legend:

Executive Office	EU: End user
Academic Affairs	AD: Administrator
Student Services	IT: Information Technology
Information Technology	IR: Institutional Research
Institutional Research	

5.2 Analysis: What Influenced Transformation?

All of the colleges in this study sought funding for iPASS reforms, indicating a base level of commitment to the work and a desire to reform advising and student support. Yet, as our descriptive analyses make clear, they saw differing levels of success. We therefore analyzed the data to tease out commonalities that might explain the different degrees of institutional change across the case study sites. We identified four relevant conditions at transforming colleges that differentiated them from the other colleges in this study: successful engagement with the technology; an institutional orientation toward student success; a clear and actionable rationale and vision for the project; and multitiered, aligned leadership.

Interestingly, these conditions touch all four areas of the RTA framework—the organizational as well as the project level, and technology as well as culture. The alignment between these findings and the framework provides additional support for the validity of the RTA framework. We present our analysis according to the RTA framework in order to emphasize this alignment and the importance of attending to multiple aspects of an organization when encouraging transformative change. For each area, we also explore how our emergent findings supported our framework's emphasis on structural, behavioral, and attitudinal change.

Technology at the institutional and project levels: Infrastructure, products, and vendors. The data indicate that, as predicted by the RTA framework, technology deployment is a necessary precursor to transformation. At the institutional level, technology deployment focused on issues such as integrating new systems into the existing technology infrastructure, ensuring appropriate data-transfer procedures were in place, and maintaining compliance with state- or system-level technology requirements. Many stakeholders mentioned that their experiences with past technology rollouts at the college colored their expectations for iPASS; stakeholders who felt that previous technology rollouts had been ineffective or disruptive were concerned that iPASS rollouts would be similarly challenging.

Merely launching an iPASS tool did not guarantee change along any dimension of transformation, however. In other words, organizational technology infrastructure was not correlated with transformative success—but project-level functionality, capability,

and support were. We found that non-transforming colleges encountered iPASS technology–related challenges that stalled the reform processes.

Project-level technology issues played out in two ways. First was whether or not the technology worked for its intended purposes and institutional needs; iPASS tools need to be easily accessible to end users, reliable, and compatible with other systems. At Crescent, key personnel and end users felt that the technology was not consistently available due to technical problems and that when it was, it did not meet their needs. The resulting delays and downtime, coupled with "glitchy" tools, reduced buy-in among end users. Advisors could not change their behaviors if the necessary tools were not reliably available to them, and their openness to iPASS was impeded by a lack of reliable technology. In contrast, schools with reliable technology tools were able to generate end user buy-in and build new structures and processes that leveraged the tools.

The second way iPASS technology at the project level influenced transformation was in the role of the vendor. Key personnel at both transforming and non-transforming colleges spoke about the need for positive, flexible, and responsive vendor engagement. Colleges in which transformation did not occur spoke of challenges in getting their vendor to align with their vision for reform and understand their institutional needs. In contrast, transforming colleges established strong, positive working relationships with their vendors; they often used the word "partnership" to describe the relationship.[7]

Compare the descriptions of the vendor relationship from an end user at Forest Hill University (a non-transforming college) and a key iPASS team member at Bluffview Community College (a transforming college). The following quote from a Forest Hill end user indicates a high degree of frustration—the vendor was perceived by this study participant and others as rigid, nonresponsive, and not attuned to institutional needs.

> We needed to know what the limitations of the system was. We were told, oh yeah, you know, it can do that. Oh yeah, it can do that. And then when it came time to doing it, it couldn't do it. And whenever we would contact them and

[7] It should be noted that the transforming colleges used different vendors, and in some cases, the same vendor worked with transforming and non-transforming colleges. In other words, there was no clear relationship between vendor and transformation. There *was* a relationship between how vendor relationships were described and transformation, implying that it is the relationship that is correlated with transformative change rather than the vendor or the technology itself.

> say, "We can't get it to do this or that," they would go, "Oh, yeah, well, that's the way it is."

In contrast, the vendor for Bluffview was seen as practically part of the project team; we were told that key personnel were "surprised" at the level of vendor responsiveness. A key iPASS team member stated:

> They kind of jumped whenever we said to jump to get things fixed. Just any changes that we had or tweaks or things that [the product] could do or couldn't do that we needed it to do to fit our model as a community college . . . they would get it fixed or get the proper changes in.

Importantly, colleges had to work to create the type of vendor relationship that supported transformative change. At Lakeside, vendor relationships were testy at first. The college felt that the vendor did not understand the college, its work processes, or its project goals and needs. One end user described the initial relationship by saying, "They didn't really know how we worked, so there was a lot of conversation spent as we were trying to build it, of saying 'but this is how we do things.'" However, through dialogue, the college and vendor came to an understanding, and while end users did have to adapt to the technology somewhat, the vendor worked with them to ensure that the product met their needs.

This type of partnership engenders buy-in from end users. It also ensures that the technology supports the process and behavioral changes intended as part of an iPASS reform. When vendors understand what colleges are trying to achieve and are willing to work with colleges to make sure their tools support their goals, the technology becomes an underlying architecture for broader change. When such understanding and flexibility are absent, colleges cannot effectively leverage tools to achieve their goals. A key project staff member at Forest Hill summed up the vendor challenge by saying, "The lesson is to clearly communicate what your needs and must-haves are and what your vision is."

Organizational readiness: A college-wide orientation toward student success. Colleges in our sample that were engaged in transformation made student success a priority in their actions, not just their words. This orientation was expressed in policies and practices that put advising at the center of reform activities and made student support the shared responsibility of staff and faculty across the institution. In the RTA

framework, clarity of mission is noted as an indicator of readiness for change. At all three transforming colleges in our sample, we heard a clear, well-defined, and shared organizational mission articulated by the majority of stakeholders with whom we spoke during our 2013 visits. Not only was this mission clear, but it also had a specific focus: student success as the responsibility of all members of the organization.

An administrator at Lakeside summed up this orientation when she said in 2013, "We're all about students. . . . It's always, when a student calls, what barrier can we knock down?" A Bluffview iPASS team member described the college culture as one of constant improvement in the name of student success and "really keeping things student-centered, so when we look at making change, [we ask] how does this improve things for the student as opposed to just making our lives easier?" A faculty member at Harbor put this orientation in explicitly cultural terms:

> And so that is just the culture of this place and this chairperson, that when we meet, we are talking about putting students first. . . . Students this, that, student success, did you see this one? So it's just like part of the culture. It's not even anything that's written, that's just part of what we do.

Moreover, stakeholders at transforming colleges saw student success as the shared responsibility of everyone in the college, not a fragmented set of activities—a cultural orientation that aligns with the iPASS theory of change. In 2013, stakeholders at these three colleges were able to discuss how organizational decisions aligned with a student success orientation, giving us examples of changes to policies and procedures in areas as diverse as staffing, senior-year capstone examinations, student planning, and transfer counseling.

As a result, the structural and process changes necessary to leverage iPASS technologies were entirely in line with organizational activities. The goal of iPASS-mediated transformation made sense to stakeholders and aligned with how they saw themselves, how they conducted their work, and the types of changes they wanted to see in their institution. For example, Lakeside Community College used iPASS tools to support a comprehensive advising redesign, moving to an assigned-advisor model connected to programs of study in order to facilitate case management and long-term planning. The college expected advisors to engage in new behaviors, such as the use of a

program planning tool and a shift away from drop-in advising appointments. And college personnel needed to shift their perception of advising-as-registration to advising-as-long-term-relationships; to encourage this new norm, Lakeside worked to engage students in advising early in order to give them a firm foundation with an advisor from the beginning of their college career.

During our 2015 visit to Lakeside, we repeatedly heard from stakeholders that iPASS reforms—while challenging and not without setbacks—were an obvious next step for the college. One advisor told us that iPASS and related changes "made sense." She went on to note that the changes, both structural and behavioral, aligned with the point of view that student success requires joint ownership. Because advisors were now connected to academic programs, they were able to become experts in the programs, their faculty, and their students. This advisor described the shift by saying, "We got to become the go-to people. We get to [go to] divisional meetings, we kind of get to feel ownership, and we get to feel more aligned with our teaching faculty colleagues." A key project team member noted the synergy between iPASS reforms and the college culture, saying, "Advisors were already being groomed for a [case management] role, and [iPASS] is the enabler. So we already made our cultural change."

This is not to say that non-transforming colleges did not care about student success. But their organizational culture tended to view success as a set of discrete functions, or as something that was not entirely in the hands of the college. As a result, iPASS reforms were not intuitive to staff members, nor were the reforms aligned with their understanding of their college mission. For example, in 2013, conversations about student success at Treetop Community College were in their infancy. Though stakeholders discussed the need to encourage retention and completion, they did not discuss institution-sponsored processes for facilitating these outcomes, outside of motivating student engagement with the college via extracurricular activities. We were told by a key project member that funding for student support activities was minimal, and that these activities were viewed as "pretty much fast food, come in and get your course, and leave." This description remained apt during our 2015 visit, when we heard from students that participation in support activities was scattershot and dependent on word-of-mouth, and a key project staff member described the continued fragmentation of student support efforts:

> Somewhere, there's a disconnect between Student Success and Dean of Students and recruiting, maybe. I don't know, somebody's not talking. Student success is supposed to be like the number one thing. They keep talking about it. . . . If it was number one, [information about iPASS tools] would have been in the [registration] packet.

Motivational readiness: Urgency and a clear vision. Transforming colleges were similar in terms of their project-level motivational readiness as well as their overarching cultures. In the RTA framework, motivational readiness is described as the way in which college personnel understand the need for a reform, its alignment with the broader institutional mission, and the vision for what the reform will look like in practice. Our data indicate that motivational readiness plays out in two important ways at colleges engaged in iPASS reforms.

The first is in the importance of a sense of urgency regarding reforms to improve completion and/or student support services. At all three of our transforming colleges, iPASS and related student success reforms were understood by study participants to be critical to the college. There was a palpable sense among stakeholders throughout the college that iPASS could improve college functioning and student success—and that these improvements were necessary for the college to achieve its mission. In this way, motivational readiness and organizational readiness intersected; stakeholders perceived that the iPASS reform supported the institution's broader goals and mission.

For example, Bluffview Community College had been engaged in a variety of student success–focused reforms. However, these reforms were fragmented and needed additional architecture to ensure coherence and success. A key project member explained to us that the iPASS reform clarified the college's focus on retention:

> You know, I mean, it's nice to have now consistency at different levels in terms of emphasis on retention and student persistence. I don't think that that was necessarily there in the past, and not purposely, just not necessarily a focus at the time. So, you know, with that, it's kind of all the pieces combined, and iPASS sort of pushing us over the edge.

Similarly, Harbor University had been engaged in retention-oriented reforms that were not, according to stakeholders, moving the needle on student success fast enough.

An advisor said, “We’re doing all this—muscle. It’s supposed to be something, you know, return on that investment, and I think we’ve gone up just about two points.” The need to do something different to help the university achieve its goals was clear.

Thus, stakeholders bought into the idea of the reform and were willing to modify their behaviors and entertain new organizational structures because they understood that, if the changes worked, they would better meet their organizational mission. For example, during our 2013 visit to Bluffview, various stakeholders told us they were “excited” to learn about the new tool, ready to “play with [the product]” to see if it could help them improve their work with students, and “optimistic” that the tool would improve advising. These sentiments were expressed even as stakeholders noted that the reform might at first create more work for them.

In contrast, non-transforming schools such as Forest Hill lacked a sense of urgency for iPASS reforms. At Forest Hill, stakeholders indicated that previous reforms had been successful and questioned the need for additional change. The iPASS project was driven by a single institutional leader who selected a new early-alert product with limited input from end users and other key personnel, and then left the college before the new technology was implemented. Thus, the new project managers were placed in the difficult position of implementing a product that end users had not asked for, without the guidance and vision of the original project leader. In addition, the implementation process was more difficult and costly than anticipated, and the college was ultimately unable to configure the new early-alert system as it had intended. Consequently, stakeholders across the college felt that the new product added little value over existing systems. They did not see a need for the iPASS product, so iPASS did not drive any meaningful change.

In addition to having a sense of urgency about the need for reform—and more specifically, the need to use iPASS to create such reform—transforming colleges were able to articulate a clear vision for reform. All three transforming institutions presented to us, in multiple ways and via multiple stakeholders, a unified understanding of the types of structures, behaviors, and attitudes that would need to change in order for the college to leverage iPASS to meaningfully improve students’ experience and outcomes.

Lakeside had the clearest vision for iPASS reform and related structural, behavioral, and attitudinal change. Institutional leaders approached the reform with a

clear idea of what they wanted to accomplish—a move toward advising as case management rooted in academic disciplines. Importantly, this vision for iPASS was clear, specific, and actionable. It delineated not only the goals of the reform (improved student success) but what needed to happen to make sure the goals were reached (long-term academic planning, proactive engagement with students, developmental advising).

The clarity of this vision enabled end users and other college personnel at Lakeside to understand what was expected of them as a result of the reform. During our 2013 visit, we heard trepidation and disagreement about some of the changes, but also evidence of a clarity of vision that could potentially help guide behavior. For example, when asked about iPASS reforms, one end user said that the goal was to create an "early intervention, reaching out, and part of the new entry is to encourage them to come back in four weeks after they get registered; come back and have a conversation."

That this clarity of vision helped create transformative change was evident during our 2015 visit to Lakeside. First, the structural changes we heard about from administrators in 2013 had been implemented, and advisors had bought into their usefulness. More importantly, advisors were shifting their behaviors to align with the overarching goal of the reform. It helped that they understood what they were supposed to do and why. Interestingly, language that was used by administrators in 2013 (such as the term "case manager") was used by advisors in 2015. A professional advisor stated:

> So [system] is allowing for incredibly intrusive advising in a way that our old system never would have been able to do. So it's really allowing our advisors to become more like case managers in some respects, with really tracking their students, follow up with their students, taking action on the students appropriately.

A faculty advisor described the change in the approach to advising as follows:

> I used to sit down with a paper and map it [a course plan] all out like a big puzzle, but that's not advising. . . . Having these tools allows us to put scheduling in the hands of students, where it belongs, and allows us the opportunity to do advising. . . . That was a huge, huge shift for us.

In contrast, non-transforming schools had unclear visions for their iPASS reform. At Crescent, for example, a small group of administrators had applied for the grant to

support the iPASS work, but they had not thought through what they would do beyond deploying new technology, should they receive the grant. They could not articulate what the tool was supposed to accomplish beyond improved efficiency—so neither could other stakeholders. If and how increased information and gains in efficiency would change how advisors or students approached key advising tasks, such as planning and selecting degree-oriented courses, remained unclear. As a result, end users were unclear about what they needed to change to leverage the technology, and they engaged in business-as-usual practices during both of our site visits. A similar situation was evident at Treetop. Advisors did not understand how iPASS could and should shift their practice, and administrators did not have a clear understanding of how they might shift advising structures.

Pulling it together: The necessity of aligned leadership. The final commonality among transforming colleges was the presence of a particular kind of leadership, sometimes referred to as "visionary" (Klempin & Karp, 2015). In this type of leadership, senior leaders and project-level leaders were aligned in their understanding of iPASS reforms and the need to approach iPASS as an adaptive challenge that requires innovation and changes in roles and behaviors throughout the institution. This visionary approach to leadership connects with the multidimensionality of reform, as described by the RTA framework. First, it requires leadership throughout an organization, rather than merely from the top or at the project level. Second, it is built on an organizational culture with a shared mission and a well-articulated understanding of the reform in question. Finally, it addresses the need for project-level readiness, including appropriate staffing and administrative planning.

From the beginning of its iPASS project, Bluffview Community College exemplified the visionary approach to leadership. College leaders prioritized open communication and engaged stakeholders at all levels in a mission-framing exercise. Because the information technology department was included in the exercise before being tasked with leading implementation, project planning began with a clear focus on using iPASS as a tool for achieving shared goals for student support. Consequently, iPASS was championed by both institutional and project leaders, who shared a vision that resonated with end users.

Institutional leaders set the vision, but they gave the authority for enacting the vision to like-minded project leaders. Both institutional leaders and projects leaders were invested in using iPASS to change the way students and advisors interact. For example, one of the primary project leaders explained how a vice president communicated from the beginning that undertaking iPASS meant making a major commitment to changing advising processes:

> One of the things [vice president] was pretty adamant about if we were going to apply for the grant was that we would actually follow through with it. . . . He had to make sure everyone was committed to it, and not just make it one other way students could work with us, but the way they work with us.

As previously illustrated, our 2015 data indicate that Bluffview was well on the way to transformative change. The college had redesigned its outreach and retention efforts, including physically redesigning its advising space and materials as well as shifting the structure of advising interactions by lengthening advising appointments from 15 to 25 minutes. Although faculty had not yet begun to use iPASS tools in 2015, advisors were shifting their practices and using data to guide student planning, and students themselves had begun to engage in longer term academic planning activities. Advisors described iPASS reforms as a "game changer," indicating a high degree of buy-in and a shift in attitude.

In contrast, non-transforming colleges had leadership approaches that were either highly technical (focused on deploying technology rather than reform) or unaligned (with administrators and project leaders taking differing views on what iPASS could and should be).[8] For instance, at Forest Hill University, there was a clear reform-oriented understanding of iPASS on the part of university administrators. However, this conceptualization was not transmitted to or shared with project-level leaders; in 2013, key project personnel and end users provided us with a range of conceptualizations of the purpose of iPASS, with one going so far as to say, "I have no idea" when asked what the intended result of the project might be. Thus, key project personnel could not lead day-to-day activities aimed at ensuring the adoption of the tool.

[8] Additional details about leadership and iPASS can be found in Klempin and Karp (2015).

The peril of misaligned leadership was particularly acute in this institution because halfway through the reform, the key administrative leader left the university for another position. With no one else able to shepherd the work at a high level, the reform floundered. Left without a visionary institutional leader, project leaders were uncertain how to proceed, and they could not articulate the importance of the work to other stakeholders. By the time of our 2015 visit, the iPASS reform had been abandoned in favor of other student-focused initiatives that had wider buy-in and more cross-hierarchical and aligned leadership and support.

Importantly, aligned, visionary leadership did not need to be present at the outset of the project. In two of our three transforming colleges (Lakeside and Harbor), it emerged once the change effort was underway. For example, in 2013, institutional leaders at Harbor University had a greater interest in the prestige of receiving the iPASS grant than they did in using iPASS to transform practice. After assigning responsibility for iPASS to project leaders, they were relatively hands-off. One institutional leader stated:

> I saw a proposal for a [foundation] grant, for, you know, a decent amount of money, and if it were technology and advising, and I was like, we ought to do something with this. . . . Just knew we needed to do something, and so I asked [project leader] to look at it.

Project leaders at Harbor, however, realized that the grant was aligned with their efforts to standardize and improve advising across the university, and they conceptualized the project as a way to shift structures and behaviors to support intrusive advising, saying that the project was "forcing the university's hand to really kind of clean up its process, clean up its data, and really visit how we do advising now, which I think is a great thing because it is necessary."

Harbor had a strong bureaucratic culture with a clear-cut hierarchy. Project leaders knew which institutional leaders they needed to gain support from, and they knew how to access them. Moreover, administrators empowered the project leader to make day-to-day decisions regarding project rollout. After a few quick wins, college administrators realized the project's potential for supporting larger change and became aligned with the project manager's vision for iPASS-mediated transformation. This spurred university leaders to support the project more vocally, including issuing

something "between a soft and a hard mandate" for faculty use of the new technology tool and supporting the project leader's efforts to create structural changes to university-wide advising processes. By acting in concert, the two levels of leadership enabled widespread structural, process, and attitudinal change by the time of our 2015 visit.

This alignment did not occur at the outset of the iPASS project, indicating that visionary leadership can emerge over time and even be spurred by the initiation of reform. Moreover, at both Harbor and Lakeside, transformation did not occur until *after* project- and institutional-level leadership were aligned around a vision of iPASS-mediated transformation. This finding underscores the importance of visionary leadership—without it, these colleges' efforts would not have been transformative. With it, they were dramatically so.

6. Conclusions and Implications

This study examined transformative change at six colleges engaged in technology-mediated advising reform. We sought to understand whether colleges could use iPASS to transform student services such that they were delivered in more sustained, strategic, intrusive and integrated, and personalized ways—and if so, how they achieved that type of transformation. Because our motivating assumption was that transformation is a first step toward improved student outcomes, we used iPASS as a way to understand how to create the deep institutional change necessary to achieve the nation's completion goals. Relying on previous studies of organizational change within and outside of education—including Karp and Fletcher's (2014) Readiness for Technology Adoption (RTA) framework and the work of Kezar (2011, 2013) and Heifetz (1994)—we conceptualized transformation as a multifaceted, multidimensional process that encompasses changed structures, processes, and attitudes.

Although all six colleges in our case study sought funding to implement iPASS reforms, only three were able to spur transformative change over the 18 months of this study. All six shifted on at least one dimension of the transformative change framework, but three were unable to change their structures, behaviors, and attitudes simultaneously, and thus we did not consider them to be on their way to transformation. Our data analysis

revealed four commonalities among transforming institutions: functional technology and a positive vendor relationship; an orientation toward student success as a shared enterprise across the institution; a clear vision for iPASS reform; and cross-hierarchical, visionary leadership.

These four conditions align with and support the RTA framework. First, they underscore the RTA framework's contention that technology is a necessary but not sufficient precursor to a technology-based reform's success. All six colleges were able to deploy their technology tools, but just having the technology up and running was insufficient for transformation. The three transforming institutions leveraged their iPASS technology to make their reform visions a reality, while the other three colleges could not leverage technology into transformation.

Second, the RTA framework makes clear that technology-based reforms are multifaceted. The findings in this study clearly demonstrate this. At transforming colleges, organizational features and project-related features of the reform intersected to encourage transformation. And individuals from multiple layers of the institution, from project managers to end users to high-level administrators, all played a part in moving iPASS from a small change to a larger one.

The findings from this study also confirm Kezar's 2013 framework for organizational change. Transformation is clearly a second-order change, in its large scope and its reliance on change at the individual and institutional levels. Moreover, our findings clearly map onto Kezar's conception of changed structures, processes, and attitudes—thereby both confirming her framework and, by discussing it in a specific context, providing more detail on how these constructs play out in institutions. By mapping our findings onto the RTA framework, our study extends Kezar's (2013) framework by illustrating that structures, processes, and attitudes are in and of themselves multidimensional. Though Kezar notes that change plays out at multiple levels, our findings further illustrate that it *plays out differently* at the project level than at the organizational level. For example, the behavioral changes required to get advisors to use new iPASS tools (project-level technology) were different than the behavioral changes required to enact a college's orientation toward student success via holistic student support (institution-level clarity of mission).

Thus, our findings introduce additional complexity and nuance into both the RTA framework and Kezar's (2013) framework. They further do so by illustrating the intersection of the macro and micro levels of an institution. In all three transforming colleges, macro-level structural changes, such as new mechanisms for assigning advisors, enabled micro-level shifts in structures (e.g., advising protocols) and processes (e.g., forms of interaction with students). Either one of these shifts on its own would not have radically changed student experiences, but together, they enabled a new approach that was more aligned with the sustained, strategic, intrusive, and personalized interactions supported by the advising literature. Moreover, new structures and behaviors encouraged attitudinal change at the macro level—such as a new commitment to providing institutional resources for advising infrastructure—and at the micro level—such as a new self-perception among advisors that they are case managers. In other words, as delineated by the transformative change framework, those colleges that engaged in transformation were characterized by shifts in their entire student support ecosystem.

Our data do indicate that pieces of the RTA framework may need modification when applied to transformative change. For example, the administrative component of project readiness did not emerge strongly in our data as a distinguishing factor between transforming and non-transforming colleges, perhaps because the constraints of the grant required that project support already be in place. In addition, leadership emerged as a uniquely important element of transformation. Though the RTA framework alludes to leadership, it does not articulate the importance of the type of cross-hierarchical, visionary leadership that our data indicate is characteristic of transforming colleges. Importantly, leadership appears to be a cross-cutting through-line, encompassing the organizational readiness, project readiness, and motivational readiness areas of the RTA framework.

Findings from the current study therefore have theoretical implications, providing a clearer conceptualization of what it means to transform higher education institutions and providing support for the notion that transformation is a multifaceted construct that cannot be identified or measured along a single dimension. Our findings also have implications for colleges seeking to engage in large-scale reform. They underscore the fact that the type of change lauded and encouraged by today's policymakers, grant makers, and reformers is not simple. They also remind stakeholders that change can

occur in absence of deep transformation; but to achieve the desired results, it is necessary to look beyond structural redesign to a broader, more culturally and behaviorally oriented notion of reform.

The six institutions in this study provide lessons for others seeking to engage in meaningful reform. First, institutions need to think about reform rather than initiatives. Thinking in terms of discrete initiatives encourages a technical focus. Conceptualizing work as a broader reform enables stakeholders to understand the multilayered change that will need to occur to attain transformation. Second, institutions must pay attention to leadership. Leading only from above, or leading only from the middle, will not spur transformation. Instead, institutions need cross-hierarchical leadership aligned around a clear vision. Third, institutions should clearly articulate what they want to accomplish through reform and how they intend to accomplish it. Clarity of vision creates an architecture that can guide structural change, and it helps stakeholders understand the types of behavioral and attitudinal shifts that will be required of them. It also helps align leadership across the institution and eases communication and buy-in. Finally, institutions should be attentive to features of their preexisting culture. If an institution does not view student success as a shared mission or activity, or if leadership is unwilling to share responsibility for change, it will be difficult to achieve transformation.

This last point raises an interesting question for future research: What do these findings mean for colleges that have weaker or less reform-oriented organizational cultures? How can institutions move from a project-oriented or technical focus to a transformative one? Three of our case study sites engaged in transformation, but three did not. What would it take to help those latter three create broader change?

Transformative change is a bigger and bolder project than traditional, initiative-oriented reform. It has the power to create the types of shifts in student experiences and outcomes necessary to achieve the United States' ambitious completion goals, but the process of transformative change is more complicated than previous efforts at reform. Using the experiences of six colleges engaged in technology-mediated advising reform, this study identified key organizational factors related to early-stage transformation. The next step is leveraging these findings so that more institutions can successfully engage in deep, multifaceted reform.

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