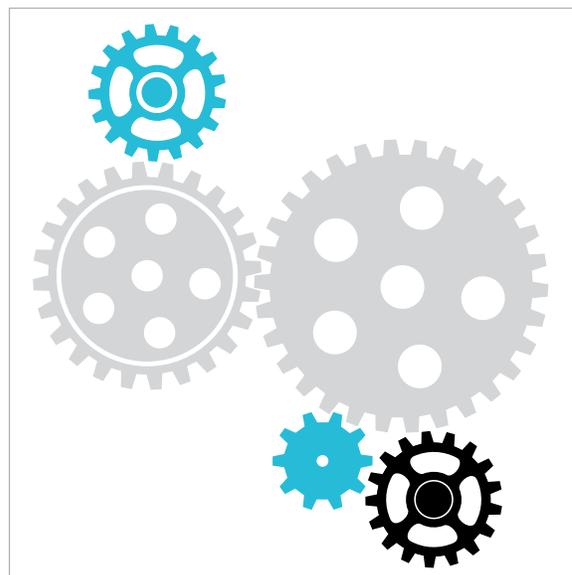


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# Adopting New Technologies for Student Success

## A Readiness Framework



**May 2014**



The Community College Research Center (CCRC), Teachers College, Columbia University, conducts research on the major issues affecting community colleges in the United States and contributes to the development of practice and policy that expands access to higher education and promotes success for all students.

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# Introduction

As state and federal policymakers continue to emphasize the importance of increasing rates of college completion, many colleges are beginning to consider the use of technological tools to support students' progress toward their educational goals. For instance, a growing number of colleges are implementing advising technologies that can help students identify programs of study or courses to take, help students and counselors generate educational plans, and aid faculty and college staff in identifying and reaching out to students at risk of failure. If employed effectively, such technologies have the potential to supplement colleges' student support activities and address a range of student and institutional needs.

Sometimes referred to as Integrated Planning and Advising Services (IPAS), these technologies can contribute to improved student outcomes by fundamentally changing the way students are guided and supported as they make their way through college. The main purpose of IPAS technologies is not to increase administrative efficiency or information technology (IT) compatibility, though this may occur. Rather, it is to help colleges in restructuring the student experience to encourage improved learning, persistence, and completion.

Using IPAS technologies to this end is challenging and requires that the technologies be adopted throughout the college. In fieldwork conducted at multiple sites across the country, Community College Research Center (CCRC) researchers have observed technologies that go unused or that are poorly used. When college personnel and students do not integrate the tools into their practice, the effect on student outcomes is usually minimal.

For a technology to be widely adopted, end-users must learn how to use the tools, and all the features of a product must be well understood and helpful. Yet we have observed in our visits to college campuses that adoption is not *just* about the technology. Colleges' organizational and departmental cultures also influence whether individuals make use of new technologies in ways that improve their practice and increase student success.

Many authors writing about organizational behavior have sought to understand why particular innovations are adopted and why some innovations change

## Integrated Planning and Advising Services (IPAS)

IPAS are technology systems that enhance and streamline advising and student support services in order to improve student progress toward degree completion. IPAS can address one or more of the following student support areas:

- 1. Education planning:** Guiding students to select programs of study that are relevant to their academic goals and courses that fulfill the necessary program requirements
- 2. Risk targeting and intervention:** Predicting course failure and program stop-out to support timely and effective interventions
- 3. Counseling and coaching:** Connecting students to on- and off-campus resources and enabling the creation of personalized action plans
- 4. Transfer and articulation:** Managing student flow between institutions to maximize credit transfer and degree completion

practice and others do not (see, e.g., Lehman, Greener, & Simpson, 2002; K. J. Leonard, 2004; Ratchford & Barnhart, 2012). Usually, these explanations and theories are retrospective and therefore of minimal use to colleges seeking to implement IPAS systems or other reforms. Implementing reforms requires a significant commitment of financial and staff resources, and college leaders want to know whether a new technology is likely to be successful at their particular institution before committing those resources. Understanding a reform's likelihood of success can help leaders decide whether to implement the reform, identify approaches that may increase end-user adoption, or decide to postpone implementing a reform in order to first ensure that the college is ready for its adoption.

This report presents a literature-based framework that identifies characteristics associated with colleges' readiness for technology adoption (the RTA framework). By differentiating between implementation and adoption, we provide a new way of thinking about technology-based reforms as tools for changing end-user practice and student experiences. We conceive of implementation as the first step in instituting technological change within an organization. Implementation entails selecting an appropriate technological tool and ensuring that the organizational infrastructure supports its use. "Going live" with a new technology-based product is a key signifier that the product has been implemented. Not all technology products that are implemented, however, are actually adopted by the organization. Adoption, in this framework, refers to the use of the system by college personnel and students in their daily work practices. Ideally, a new technology will fundamentally change end-user practice in order to improve college functioning and student outcomes.

The RTA framework differs from previous approaches to organizational change in several ways. First, rather than focusing on how a technology is implemented at the operational level, we emphasize the importance of having end-users adopt the technology and integrate it into their day-to-day practice. Second, we take a forward-looking approach, seeking to understand the antecedents of successful technology adoption. This second point, which represents a fundamental departure from previous literature, gives the framework practical value for colleges seeking to implement IPAS and other technologies. Finally, we pay attention to the fact that institutions are not monolithic but are made up of multiple departments or groups of individuals, each with their own expectations, attitudes toward technology, and norms. The presence of such microcultures influences the adoption process.

The RTA framework presented here is a work in progress. It was developed by CCRC researchers during the fall of 2012 based on an extensive review of the literature. Preliminary validation work was conducted in fall 2013 at six colleges that were undertaking IPAS reforms; additional validation work is underway. Thus, the framework should not be viewed as a set of definitive predictors of readiness but as a tool to help colleges begin to think about their readiness for technology adoption and to help guide institutional conversations about integrating new technologies into the daily work of advisors, counselors, faculty members, and students.

# Readiness for Technology Adoption Framework

The RTA framework is a literature-based framework. CCRC researchers read and analyzed nearly 75 journal articles and books from a wide range of subject areas, including organizational behavior, healthcare, educational technology, and engineering. We also examined six surveys on organizational readiness for change developed through and validated by empirical research studies (Bouckenooghe, Devos, & Van den Broeck, 2008; Greener, Joe, Simpson, Rowan-Szal, & Lehman, 2007; Lehman et al., 2002; M. J. Leonard, 2004; Ratchford & Barnhart, 2012; Surry, Ensminger, & Haab, 2005).

The CCRC research team analyzed the findings from the literature to identify organizational features that are empirically related to successful technology adoption. These features were thematically categorized into four broad areas of organizational behaviors and attitudes in which an institution should demonstrate readiness in order to successfully adopt new technology. Below, we define and describe each area and its components. For each area, we also provide an overview of the research evidence on what readiness for end-user adoption looks like, focusing particularly on readiness among college faculty and staff. We illustrate what an adoption-ready college looks like in each area by drawing on fieldwork conducted at six colleges in five states implementing IPAS technologies during the fall of 2013. Four of the colleges were community colleges, and two were open-access four-year institutions. Across the six sites, we conducted 99 interviews with administrators, faculty, and other IPAS users (mostly advisors). We also conducted 18 focus groups with a total of 69 students.

Figure 1 illustrates the RTA framework model, including the relationships of the four areas to one another. Two areas address the underlying technological infrastructure of the organization, while two address its cultural context. Similarly, two areas address characteristics of the college itself, while two address the specific project or reform being adopted. The ability of an institution to adopt a new technology depends on technological and cultural characteristics across the institution as well as technological and cultural characteristics related to the specific technology.

## Key RTA Framework Terms

**Implementation:** The institutional deployment of a new technology.

**Adoption:** The integration of a new technology into end-users' daily work tasks.

**Microcultures:** Institutional subgroups with their own attitudes and norms.

Readiness for Technology Adoption Framework		
	Technology	Culture
<b>Institution Level</b>	<b>Technological Readiness</b> <ul style="list-style-type: none"> <li>• IT system maturity</li> <li>• IT system stability</li> <li>• Compatibility of new and existing IT</li> <li>• Current patterns of IT use</li> <li>• Past experience with IT implementation</li> </ul>	<b>Organizational Readiness</b> <ul style="list-style-type: none"> <li>• Clarity of mission</li> <li>• Communication</li> <li>• Decision-making process</li> <li>• Openness to change</li> </ul>
<b>Project Level</b>	<b>Project Readiness</b> <ul style="list-style-type: none"> <li>• Administrative and technical resources</li> <li>• Training</li> <li>• Ongoing support</li> <li>• Incentives</li> </ul>	<b>Motivational Readiness</b> <ul style="list-style-type: none"> <li>• Need for reform</li> <li>• Vision of benefits</li> <li>• Perception of functioning</li> </ul>

We first examine the areas related to technology, which we term “technological readiness” and “project readiness.” These focus on the conditions needed to implement new technologies so that they are available to end-users. Colleges looking to adopt new technologies necessarily need technological expertise and resources, but we posit based on our research that readiness in these areas is insufficient for end-user adoption. Thus, we then turn our attention to areas related to culture, “organizational readiness” and “motivational readiness.” We define culture in its most general sociological sense, as the predominating attitudes and behaviors that characterize a group or organization. The RTA framework assumes that all institutions have underlying behavioral and attitudinal patterns that influence how likely their members are to embrace change.

## Technological Readiness

Technological readiness focuses on institutional-level characteristics affecting the deployment of new technology. It refers to the capacity of a college as a whole to implement a new technology, make it reliably available for use, and train users to effectively employ it (Twigg, 2000). Most discussions of successful technology implementation focus on this capacity and define success as getting a new technology to a point where it can be reliably used by college personnel. Not surprisingly, an institution’s level of technological readiness is critical to the successful implementation of newly acquired technology (Surry et al., 2005).

In our review of the literature, we identified five components of technological readiness. At the most basic level, implementation-ready colleges have *mature IT systems*, with the hardware, software, network capabilities, and human resource capacity to support the use of the technology. The literature strongly indicates that a mature IT system facilitates end-user adoption (Narwani & Arif, 2008; Surry & Land, 2000; Twigg, 2000).

Similarly, implementation-ready colleges have *stable IT systems*. This means that the college’s “technology adoption cycle,” or the frequency with which technology changes within the college, is not too rapid. When technology frequently changes, end-users are often unable to learn about and meaningfully implement tools; this may increase users’ resistance to change (Hall, 2010; McGee & Diaz, 2007; Rogers, 2003). Moreover, end-users do not want to invest time and

effort in learning to use new tools if there is no assurance that the tools will have some permanence at the institution (Dean, 2003; McGee & Diaz, 2007).

The *compatibility of new and existing IT* also influences implementation and end-user adoption. IT systems are considered to be compatible if they can seamlessly share information and data without having to be manually synced. When a reform introduces a new technology that is compatible with existing technology, the user experience is not disrupted; end-users do not have to re-input data or recreate documents (Dean, 2003). A lack of integration between tools and systems requires users to log in, input data, and track results multiple times, creating frustration among end-users and ultimately inhibiting adoption (Ahmed, Daim, & Basoglu, 2007; Dean, 2003; McGee & Diaz, 2007; Rogers, 2003).

*Current patterns of IT use* influence how constituents will utilize new technologies (McGee & Diaz, 2007; Narwani & Arif, 2008; Surry, Ensminger, & Jones, 2002; Twigg, 2000). Technologically savvy end-users are more likely to test and adopt new technologies than end-users who are less experienced with technology or who primarily rely on non-IT tools to perform their daily job tasks. Colleges in which individuals rely primarily on non-IT tools are likely to find it more challenging to encourage adoption than colleges in which end-users already use IT tools in their daily work processes. Moreover, members of various microcultures may be more or less inclined to adopt new technologies based on their level of technological knowledge.

An institution's *past experience with IT implementation* also influences its readiness for new technologies. Institutions with experience implementing technological tools similar to the proposed innovation may experience a smoother implementation and adoption process (Narwani & Arif, 2008). Experience breeds skill and capacity, laying the groundwork for more complex innovations. In general, the larger the leap in IT infrastructure or demands placed on end-users, the less successful a new technology is likely to be (Narwani & Arif, 2008; Twigg, 2000). Moreover, change is inherently risky. End-users feel that change is less risky when their institution has previously demonstrated proficiency in deploying and supporting constituent use of new technologies (McGee & Diaz, 2007).

### Technological Readiness in Practice

In our IPAS study, Lakeside College<sup>1</sup> displayed a high degree of technological readiness. Prior to engaging in its IPAS reform, the college evaluated its current technology landscape. It systematically examined the gaps in its student services technology platforms and identified potential vendor partners that addressed those gaps and also met the college's technology capabilities (for example, integrating with legacy systems).

Lakeside College also had a broad technology strategy for the entire college and sought to ensure that new IPAS products fit within this strategy. In assessing its strategy, the college reflected on its past technology rollouts and attempted to understand the impact of potential implementations from the end-user perspective. For instance, had end-users experienced changes recently, potentially reducing their likelihood of buy-in and adoption?

Lastly, Lakeside College considered its current level of IT expertise and whether its IT personnel could fully support the new product. The college evaluated ongoing demands on the IT department to ensure that the department could manage any additional workload resulting from the new technology. Ultimately, the college chose a system that fit its current organizational needs, was compatible with its legacy systems, and could be supported given its IT expertise and staffing capacity.

## Project Readiness

In addition to having sufficient technological resources in general, colleges must designate specific resources for the reform project. Technological and project readiness are both necessary for successful technology adoption. Readiness for a specific project is irrelevant if the underlying technological structure is lacking. Likewise, technological readiness is unlikely to overcome a lack of project-specific resources. An institution that is poised for technology adoption demonstrates careful attention to best practices of project management (Dooley & Murphrey, 2000). "Project readiness" includes the logistical and structural resources that are most directly related to ensuring a reform project is completed from planning to implementation.

We identified four project readiness components. First, adoption-ready colleges devote *administrative and technical resources* to support end-user adoption. That technology initiatives require financial outlays, in terms of hardware and software, is evident. However, adoption-ready colleges also budget for additional project management resources, including dedicated staff time for project planning and rollout, administrative support, and time for end-users to receive training and practice using the new technology (Adamy & Heinecke, 2005).

Second, adoption-ready institutions have established procedures for *training* end-users in order to provide dedicated opportunities to learn how to use new technologies. These may include end-user workshops, training sessions facilitated by vendors or more experienced peers (i.e., "train the trainer"), and trial periods (i.e., soft launches). Training should allow time for users to practice new technologies within the context of their specific job function (Dooley & Murphrey, 2000).

Third, adoption-ready colleges plan to provide *ongoing support* for a new technology (Brunner, 1992; Cooper & Bull, 1997; Zachariades & Roberts, 1995). Although introductory training can

1. The colleges in this study have been given fictitious names to maintain their anonymity.

help end-users develop a basic understanding of how a technology might be used in their work, questions are likely to arise once they begin to use the product on their own. The needs of staff evolve with their use of a new technology, and ongoing support addresses these needs, helping end-users as they encounter questions or challenges that were not addressed in the initial training program. Frequently, colleges focus on providing an initial orientation to a new product rather than providing ongoing support. Moreover, we have seen in our research that most institutions focus on ensuring that end-users are familiar with the various features of a technology and spend less time helping them learn to integrate the technology into their work processes. Adoption-ready institutions think about the ways that a new technology will require individuals to do their jobs differently, and they provide end-users with time, training, and support as they relearn some of their job functions (Fullan & Donnelly, 2013).

Lastly, *incentives* are an integral component of project readiness, as they provide a concrete way to encourage the adoption of new technology. Incentives serve as an important message from upper management, indicating to end-users that the adoption of the new technology is important and that their investment of time and effort in learning the technology will be worthwhile. Incentives can be monetary (e.g., bonuses for certain levels of usage or outcomes), recognition-based (e.g., employee awards), or role-based (e.g., assignment as a team member for new projects); they may also take the form of dedicated time to work on projects or funds for professional development (Adamy & Heinecke, 2005; Brunner, 1992; Cooper & Bull, 1997; Von Glinow, 1988). As discussed in the “Project Readiness in Practice” box, incentives can even include opportunities for faculty to provide meaningful feedback on the reform itself. The form of incentive is less important than its meaningfulness and ability to signal to the college community that the reform is important.

### **Project Readiness in Practice**

Forest Hill College, another member of the IPAS project, demonstrated a high level of project readiness. To prepare for IPAS implementation and adoption, college leaders thought about ways to get the work done and ensure that staff members would be supported over the course of the transition to a new technology. Describing the college's approach to project management, the president of the school noted that “any scheme that imagines we're going to help more students succeed just by working harder is not going to work, because people are working hard right now.”

Forest Hill College knew that if it wanted end-users to adopt new technology, it had to provide them with ample time and support. The college selected a technology that would complement end-user tasks and that would not require more effort to use than the previous system. Moreover, Forest Hill sought to ensure that tasks related to implementation and adoption were not piled on top of staff members' existing responsibilities. For example, individuals who were asked to develop and run training sessions for the new technology had their other job responsibilities reduced in order to ensure that they had ample time to devote to their new tasks.

A unique characteristic of this college is its focus on faculty as partners in the reform process. Faculty are included on implementation teams, and their feedback is used to refine reforms as they are implemented. Faculty are willing to explore new technologies because their feedback is valued and acted upon. They are also incentivized to adopt reforms because the reforms reflect their needs, opinions, and feedback.

## Organizational Readiness

Much of the literature on technology adoption focuses on the process of getting a product up and running. We hypothesize that although institutional and project-specific technology resources are critical and foundational aspects of an institution's overall readiness for adoption, they are not the only, or even the most important, precursors to success. As noted by Fullan and Donnelly (2013), merely acquiring a technology does not lead to improved learning unless the underlying practices and approaches to daily tasks are changed as well. We have seen numerous instances of colleges in which a technology was available, stable, and well implemented, but in which end-users did not integrate the technology into their daily work flow, thereby minimizing its potential impact. We theorize that technological readiness and project readiness are *necessary but not sufficient* to facilitate adoption and technology-oriented reform.

Social, economic, technological, organizational, and individual factors interact in complex ways and influence which technologies are adopted and how they are used after adoption (Pool, 1997). Even the most technologically ready college is unlikely to achieve successful adoption if it does not pay attention to the cultural components of readiness. Institutions in which the prevailing attitudes are not change-oriented, or do not support the reform effort, are unlikely to see changes in end-user practices, no matter how well-implemented the technology. In this section and the next, we therefore turn our attention to what organizations must do to achieve cultural readiness.

Organizational readiness includes the institutional-level cultural practices or characteristics that influence a college's ability to support and adopt reforms. Through our research, we identified five components contributing to organizational readiness.

First, an organization's *clarity of mission* contributes to its readiness to adopt new technologies. Colleges that lack clear missions are less likely to be able to identify areas of need or to understand how change could improve their functioning (Lehman et al., 2002). Colleges with clear missions are more likely to know which areas need improvement and how reforms can help them achieve their goals. Furthermore, when a college's administrators and staff understand the institution's goals and are united in valuing and pursuing those goals, they are more likely to support changes that could further their efforts. The shared values of the organization and increased likelihood of buy-in from faculty and staff strengthen the organization's position to successfully adopt a new technology (Jackson, 2011).

Second, technology adoption is more likely to occur in environments characterized by open, active, and collaborative *communication*. Colleges that communicate their plans openly and that regularly provide accurate information to staff members throughout the organization are able to manage the adoption process more successfully. Importantly, adoption-ready colleges provide opportunities for collaboration among staff members, have leaders who are receptive to suggestions, and take advantage of information networks to achieve their goals (Adamy & Heinecke, 2005; Lehman et al., 2002; Sugar, Crawley, & Fine, 2004). Key to successful technology adoption, however, appears to be colleges' willingness to prioritize open communication and their commitment to engaging stakeholders at all levels, in particular when decisions will directly affect end-users. Communication occurs both vertically (i.e., up or down the organizational chart) and horizontally (i.e., between departments across the college) (Ash, 1997). Open and

active communication of both types is instrumental to the reform process. Adoption is hindered when the project teams leading the reform process become insulated from outside perspectives, thus reducing end-user involvement and eventual buy-in (Ahmed et al., 2007; Ash, 1997). Moreover, interdepartmental coordination, both to determine specific IT needs and to support implementation efforts, is an important factor affecting implementation (Ahmed et al., 2007).

A third component of organizational readiness is a college's *decision-making process*. Adoption-ready colleges include end-users in decisions from the beginning of the reform process in order to create early buy-in and support implementation efforts (Adamy & Heinecke, 2005). Generally speaking, decentralized decision making promotes discussion and collaboration within organizations (Williams van Rooij, 2011), which can facilitate successful technology adoption. However, we have also found that it is possible for a college's decision-making process to be too inclusive. In contrast with previous studies, our research shows that having more people involved may lengthen the time required to make decisions and impede adoption. Adoption-ready colleges are strategic in creating structures which encourage input and maintain momentum.

Though communication and decision-making are each important components of organizational readiness for reform, together they have a multiplicative effect. Strong communication and effective decision-making practices help to create a culture of trust within a campus community, which is an important precursor to successful adoption of new technologies (Lehman et al., 2002; Schneckenberg, 2009).

Lastly, the extent to which members of an organization have an *openness to change* greatly impacts the adoption of technology. Regardless of the technology to be implemented, the characteristics of the end-users and management will impact the likelihood of its adoption (Lehman et al., 2002; Rogers, 2003). Of particular import are college community members' general orientation toward change (Ahmed et al., 2007), attitudes toward technology (Sugar et al., 2004), and history of early adoption (Erdoğan & Esen, 2011). An organization is a complex social structure, and even though top-level leadership may champion a cause, the willingness and openness of other staff to change current practices may have ripple effects on the intended end-users.

## Organizational Readiness in Practice

Bluffview College is united in a shared vision. The college recently underwent a mission-framing exercise in order to understand where the primary focus of the school should be. One college official referred to this exercise as a “shared vehicle” for discussing and focusing the college’s efforts to improve student success. Through this process, the school aligned the missions of disparate departments toward one unified goal.

The manner in which Bluffview College undertook the mission-framing exercise was important to its success in creating a shared vision. The college was transparent about its reform plans and welcomed opinions from all members of the campus community. The leaders of Bluffview College prioritized open communication and realized the critical importance of engaging stakeholders at all levels to make decisions, in particular those decisions which would directly affect end-users. For example, Bluffview leaders invited staff from different departments and with different levels of authority to planning meetings. These efforts to engage stakeholders also built upon and contributed to the college’s overall open-mindedness toward change.

This shared focus was particularly important to Bluffview as it rolled out new technology. In particular, three key departments—instruction (faculty), student services (advisors), and IT—emerged from the mission-framing efforts with an understanding of the importance of the relationship between the technical and content sides of the reform. The IT director, for example, was not just involved in technical activities but also understood how technology met the larger needs of the institution—ultimately becoming a champion of the college’s efforts to reform end-user practice.

## Motivational Readiness

Motivational readiness refers to the project-level cultural elements that influence the specific reform being undertaken and that play a role in successful technology adoption. In terms of motivational readiness, whether end-users will adopt new technologies is determined by the vision they have of the technology and how they will use it in comparison with current practices, along with their motivation to move beyond the often-comfortable status quo. Through our literature review, we identified three components of motivational readiness.

First, adoption-ready colleges have a clearly defined *need* and a consistent understanding of how the new technology will address that need. Without a clear sense of what need is being addressed and why it is important, end-users may struggle to understand why and how they should incorporate the reform into their daily practice (Kezar, 2011). Colleges in which a new technology addresses a specific problem are likely to have greater success in encouraging end-user adoption (Rogers, 2003). Additionally, institutions in which end-users are dissatisfied with the status quo may have greater success because end-users will have a stronger motivation to adopt new the technology. Because the perceived need for innovation may vary among different stakeholders (Dooley & Murphrey, 2000; Lehman et al., 2002; Williams van Rooij, 2011), adoption-ready institutions develop a clear and consistent understanding of why they are engaging in the reform (Lehman et al., 2002; Rogers, 2003). When end-users feel that the need for reform is clear, has a credible rationale, and addresses a specific problem, they are more likely to buy into the reform and incorporate it into their workflow (Kyratsis, Ahmad, & Holmes, 2012; Nanayakkara, 2007; Williams van Rooij, 2011).

Second, the users' *vision of benefits* of the technology influences the likelihood of its adoption. The vision of benefits is the extent to which end-users view the product as potentially beneficial to their work and the college's goals, and the ways in which they expect it will be useful (Adamy & Heinecke, 2005). The perceived usefulness of an innovation has been identified as a "critical determinant" of user acceptance (Hu, Clark, & Ma, 2003; Nanayakkara, 2007). There is a wide range of perceived potential benefits that can motivate end-user adoption, including job relevance (Hu et al., 2003), increased levels of student engagement (Williams van Rooij, 2011), benefits to students (Sugar et al., 2004), enhancement of learning, and the expansion of services (Dooley & Murphrey, 2000). In adoption-ready institutions, end-users have a sense of the specific benefits that will result from their use of a new product.

Finally, end-users' *perception of functioning* of both the new technology and of the college units that are responsible for its implementation will influence adoption. If a new technology is perceived as improving upon the status quo, end-users will be more like to adopt it. Additionally, end-users need to believe that the college will be able to implement and support the new technology (Rogers, 2003); importantly, this belief may or may not be accurate. What matters is not whether the technology is *objectively* useful or able to be implemented but whether end-users *believe this to be the case*. Moreover, unlike vision of benefits, which relates to end-users' belief in the potential outcomes of a reform, perception of functioning involves end-users' belief that the college will be able to engage with the product in such a way that the benefits will actually be realized. Thus, the magnitude of the change, in terms of its potential advantages and end-users' confidence in the implementation team, influences adoption.

### Motivational Readiness in Practice

Treetop College had a clearly identified need that reform leaders sought to address via their IPAS project. At this college, mid-level staff drove reform efforts; because these staff members were also end-users and directly affected by the new technologies, they had a clear sense of the problems current technologies posed. This enabled them to articulate the weaknesses of their current system as well as what was needed from their new IPAS project. For example, their old system was inefficient, paper-based, and unwieldy—resulting in a large amount of work for end-users without a proportional improvement in student outcomes.

When proposing the new IPAS system to their colleagues, these mid-level administrators were able to explain why the new system would improve upon legacy systems and address weaknesses. This increased buy-in and enthusiasm among other end-users, who had a clear vision of what the IPAS project might accomplish. Reform leaders at Treetop College also spent significant time thinking through what changes might occur and what decisions would most benefit end-users; this led them to build an implementation team that was respected campus-wide, reinforcing end-users' perceptions of the reform's benefits.

Lastly, Treetop College did not understate the potential value the new technology, which it perceived had the capability of fundamentally changing student advising processes. Whereas some colleges try to send the message that new technologies are simply add-ons, Treetop College did not shy away from highlighting the effects the implementation might have for end-users. Underselling a new technology can lead end-users to maintain their old patterns of usage, even if the new technology has greater advantages.

# Microcultures

A key difference between the framework outlined here and other theories of adoption is our recognition that institutions—particularly colleges—are not monolithic. We assume that within a single college, there are multiple groups of individuals, each with their own culture, norms, and attitudes toward technology. Social scientists refer to such groups as “microcultures” (McCurdy, 2006).

We hypothesize that within a given institution, different departments or stakeholder groups are likely to display different cultural attributes and therefore have different propensities to adopt a new technology. For example, different departments may vary in their understandings of the need for or desirability of new technology. In one college we visited, IT staff and advising staff viewed the goals of the new technology differently. In another, affinity groups—such as younger workers or long-time employees—had different reactions to new technologies. Therefore, gauging an organization’s readiness for technology adoption requires understanding the multiplicity of attitudes and norms that make up the college’s overall culture.

Our review of the literature and our past experiences working with colleges lead us to believe that even small microcultures can exert a large influence over whether a technology is adopted. A particularly resistant group of individuals, for example, can create a significant challenge to institution-wide adoption. Thus, it is not enough for college leaders to have a clear vision of the benefits of reform. The vision of benefits needs to permeate the organization’s multiple microcultures. Similarly, having a small number of technologically savvy and reform-minded individuals may not be enough to ensure that all end-users adopt a new reform if some of those end-users are resistant to change, new technology, or both.

Identifying institutional microcultures and their attitudes toward new technologies, and assessing their relative influence, is therefore a key step in assessing a college’s readiness for technology adoption. Institutions that are very culturally or technologically heterogeneous may require differentiated strategies to foster adoption. It is particularly important for colleges to recognize the presence of influential groups of individuals likely to resist reform. If a college can identify reluctant microcultures and work with them on becoming more open to technology-based reforms, the likelihood of successful adoption may increase.

## Conclusion

The Readiness for Technology Adoption (RTA) framework presented here provides a way of thinking about whether a college is likely to have successful experiences with new technologies. It is particularly focused on ensuring that technology-based reforms lead to end-user adoption and changed practice. Our assumption is that new technologies will not influence student outcomes if they do not change the way that colleges engage in their core activities related to supporting students in their learning as they progress toward a degree.

This framework is based on previous literature from a wide array of disciplines. Thus, from a research perspective, the next step is to revise this framework based on data gathered from colleges engaged in IPAS reforms. CCRC is already engaged in such work. Our future reports will focus on the ways that various components of readiness for technology adoption interact with colleges' and end-users' implementation and adoption experiences. Additional important questions for future research include the following:

- **To what extent is the framework relevant for reforms not related to technology?** Other CCRC work on reform implementation (Edgecombe, Cormier, Bickerstaff, & Barragan, 2013) explores similar themes, suggesting that a modified version of the RTA framework could be applicable to other institutional reforms, such as faculty-led initiatives to improve teaching and learning.
- **Does the usefulness of the framework vary depending on a college's approach to adoption?** We assume that technology adoption, or any reform effort, is intended to be transformational, such that it will lead to substantial changes in the ways that college personnel go about their jobs in order to meaningfully improve student success. But some reforms may be merely transactional—that is, they may replace an outmoded technology with a more efficient one without requiring a change in work processes. The RTA framework's focus on culture, in particular, may be less relevant for the latter type of reform.
- **Can strength in one area of readiness overcome weaknesses in others?** Currently, we do not know if colleges must be ready in all areas to successfully encourage adoption. It is plausible that colleges with exceptional strengths in some areas could overcome weaknesses in others and still succeed in their technology-based reform efforts. But we do not know the extent to which this is the case, nor do we know if any weaknesses will stymie success regardless of other institutional strengths.

Ultimately, colleges preparing to embark on technology-based reforms want to know if they are likely to be successful before devoting significant time and financial resources to them. The RTA framework can provide an important vehicle for self-assessment. Using the four areas of the RTA framework and their components, we recommend that colleges examine their technological and cultural characteristics to generate a sense of whether they will likely be able to encourage end-user adoption. CCRC will also release a self-assessment tool for colleges based on the RTA framework, which will provide a series of rubrics for gauging readiness in each of

the four areas. Engaging in a self-assessment process will highlight areas for development or improvement and provide a roadmap for colleges to develop the conditions that will enable their success in technology-based reforms.

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