

Redesigning Community Colleges for Student Success Overview of the Guided Pathways Approach*

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OVERVIEW

In most community colleges, students are left to navigate a complex and often confusing array of programs, courses and support services mostly on their own. Many students do not see a clear path to their end goals, become frustrated, and drop out. A growing number of colleges and universities are redesigning academic programs and support services to create more clearly structured and educationally coherent program pathways to student end goals, with built-in progress monitoring, feedback and support at each step along the way. These institutions are starting with the end in mind, working with education providers at the next level and with employers to ensure that program learning outcomes are clearly aligned with the requirements for success in further education and careers. And they are rethinking their new student intake systems to help students choose and successfully enter a program of study as quickly as possible. They are doing this in ways that help guide students' choices, but without limiting their options. These efforts are being implemented on a large scale—in some cases benefitting thousands of students. They are beginning to produce results in terms of increased student completion and learning.

This overview describes the barriers to student success created by the way most community colleges are currently organized. It describes the key design features of the guided pathways model, describes the process for implementing it and outlines reasons why college leaders should consider doing so despite the costs involved.

DESIGNED FOR ACCESS, NOT SUCCESS

Responding to the need to dramatically increase higher education access in the 1960s and 1970s, community colleges were designed to maximize enrollment at a low cost—and to do this with students many of whom are not well-prepared to succeed in college. They give students a broad menu of courses, programs and delivery modes to choose from. They make it easy for students to enroll when it is

* The main themes described here are explored in depth in a forthcoming book, *Redesigning America's Community Colleges: A Clearer Path to Student Success*, by Thomas Bailey, Shanna Smith Jaggars and Davis Jenkins, which will be published by Harvard University Press in early 2015.

convenient, allowing them to take only a couple courses at a time and to stop out and re-enroll at their convenience. They have also greatly expanded remedial offerings—over 60 percent of new college students take at least one remedial course. Colleges use standardized tests to place students in these courses, which are often taught by part-time instructors, so they are relatively inexpensive to offer. In recent years, community colleges have greatly expanded on-line offerings, again with a view to making it easy for students to access and (at least in theory) reduce the cost. However, the same features that have enabled these institutions to provide broad access to college make them poorly designed to facilitate completion of high-quality college programs—programs that foster deep student learning and prepare students for success in further education and employment. Specifically, the focus on low-cost enrollment has encouraged colleges to offer an array of often disconnected courses, programs and support services that students are expected to navigate mostly on their own. Students are confused by a plethora of poorly-explained program and transfer choices, and available programs often do not provide a clear path to success in further education and employment.

Too many choices, too little guidance.¹ Although most community colleges offer a prodigious array of courses and programs, they typically provide little guidance to help new students choose a program of study and develop a plan for completing it. This is the case despite the fact that many students arrive without clear goals for college and careers. Many if not most students, and especially those from disadvantaged backgrounds, may not have a clear idea even of the opportunities that are available to them. While career services and advising are provided to students who seek them out, studies suggest that those who need such services the most are the least likely to take advantage of them.

Paths to end goals unclear.² In addition, the paths into and through community college programs of study are often unclear and not well-aligned with student end goals. This problem is particularly acute in associate of arts programs intended to prepare students to transfer to four-year institutions. Students who want to obtain a bachelor's degree (or who do not have a clear program goal) are typically defaulted into "general education" coursework. However, even in states with policies guaranteeing transfer of general education credits, there is often no guarantee that these credits will be accepted toward junior standing in a particular major, as major requirements are often set by individual departments within transfer destination institutions. Thus students may have to take additional courses to satisfy bachelor's program requirements. To ensure that they can transfer their credits seamlessly, students need a clear idea early on in their community college studies not only of what four-year institution they intend to transfer to, but of what program they plan to transfer into. Too often the information provided by community colleges on transfer requirements is often complicated, hard to find, and unreliable.

Barriers to career advancement.³ The paths through community college occupational programs tend to be much clearer than those through transfer programs. This is especially true in fields such as nursing, automotive technology and protective services that are regulated by licensure or industry skills standards. However, many students may not be aware of the many occupational programs offered by community colleges. In many colleges, the majority of students in occupational programs are older. This

is in part a result of the fact that college advisors often steer younger students and those without clear goals to academic transfer programs. Still, to earn an associate degree and prepare for transfer, even students in occupational programs have to take general education courses in most cases. This is likely one key reason why the majority of students who earn an occupational certificate do not go on to earn an associate or bachelor's degree.

Developmental dead-end. Even before they can proceed with college-level courses, the majority of degree-seeking students in both academic and occupational programs are referred to developmental education. However, research suggests that, as it is typically designed, developmental education serves more to divert students into a remedial track than to build skills for college and help them choose and prepare to successfully enter a college-level program of study in a particular field.⁴ The most promising approaches to reforming developmental education involve mainstreaming students in college-level courses with support or providing alternative pathways, especially in math.⁵ But improving the success of students in passing college-level math and English is not sufficient to improve completion rates. These efforts need to be tied to efforts to strengthen supports for students to take and pass the key gatekeeper courses for their programs of study, and not only Math and English 101.

Students' progress not monitored.⁶ While community colleges departments closely monitor enrollment in their courses, they often do not know which students are pursuing programs of study in their fields and thus do not track students in their programs to ensure that they make steady progress toward achieving their goals for program completion and transfer. As a result, many students end up self-advising. A common exception is nursing and other selective enrollment programs, which closely monitor the progress of students who are accepted into them. But for nursing and other selective programs there are usually many more students who are trying to be admitted than who will be accepted. Colleges generally do not keep track of these "pre-select" students, even though many continue to take courses and harbor dreams of entering a selective program even when they do not have the grades in the prerequisite courses to be accepted into a the limited number of slots available.

Lost in the maze. With so many choices and without a clear roadmap or anyone monitoring their progress, it is not surprising that many community college students indicate that they are confused and often frustrated in trying to find their way through college.⁷ The lack of clear pathways and guidance can lead students to make costly mistakes.⁸ Indeed, there is evidence from research on course-taking patterns that many community college students are pursuing suboptimal pathways.⁹ When asked, students indicate that being in a program with a well-defined pathway would improve their chances of persisting, completing, and transferring.¹⁰

Curricular incoherence hurts learning. Studies on the psychology of learning show the importance of setting clear learning goals and providing students with a clear sense of how they are progressing toward those goals. Research on the elements of effective teaching in higher education also suggests that providing students with a "big picture" of the key topics within a specific course, and how they fit together, helps to improve learning. If students are to achieve meaningful learning outcomes for their programs of study, then they need to develop knowledge and skills systematically and cumulatively over

time, not in a haphazard fashion. By allowing students to cobble together a set of often disconnected courses to meet degree requirements, it is difficult to see how college programs could help students learn effectively and build skills across the.

BUILDING GUIDED PATHWAYS TO STUDENT SUCCESS

Instead of letting students find their own paths through college, a growing number of colleges and universities nationally are taking a different approach. They are creating “guided pathways” for students. They are doing this by redesigning their offerings to simplify students’ decisions, creating more highly structured programs with default schedules and built-in feedback and supports that help students make better choices that will lead them toward their end goals, but without limiting their options.¹¹

Design Features

The key features of the guided pathways model are summarized as follows.

Degree maps. Academic programs are clearly mapped out by faculty to create educationally coherent pathways with clearly defined learning outcomes that are aligned with requirements for further education and, in occupational programs, for career advancement.

Exploratory or “meta-majors.” The goal of the new student in-take process is to help students choose and successfully enter a program of study. Students are helped to clarify their goals for college and careers and to create an academic plan based on program maps created by the faculty. Students who do not have a specific major in mind are required to choose an “exploratory major” or “meta-major” in a broad field of interest (such as business, allied health, education and social services, STEM, social and behavioral science, and English, arts and humanities), with a default curriculum that gives them a taste of the given field. Students are required to choose a specific major in the larger field of interest within a prescribed number of terms, or switch to another field.

Predictable schedules. Students are placed pre-sequenced, whole-program course schedules that will lead to on-time completion. Students can customize their plans, but they must see an advisor or faculty member to do so. Knowing how far along students are in their programs makes it easier for colleges to schedule classes and assign instructors well in advance. This predictability also makes it easier for colleges to block schedule courses for students in the same program, which some students say would make it easier for them to schedule their work and family obligations around school.¹²

Integrated instruction in foundation skills. In the guided pathways model, developmental education is redesigned as a critical part of the “on-ramp” to a college-level program of study, with the goal of helping students successfully complete the critical introductory college-level courses in their initial field of interest. For many if not most students, developmental education consists of co-requisite coursework designed to scaffold students’ success in critical college-level courses. For students who need an

extended pre-requisite approach, developmental instruction maintains high college-level expectations while providing more intensive support, and is ideally contextualized to students' program of interest.

Progress tracking, feedback and support. Students' progress relative to their academic plan is tracked, and frequent feedback is provided to them and to their advisors and instructors. Advising is reorganized to ensure that students are making progress based on academic and non-academic milestones, such as doing an internship or service learning project, applying for transfer, or updating a resume. Close cooperation between professional advisors and faculty ensures a smooth transition from initial general advising to advising in a program. "Early-alert" systems signal when students are struggling, and they set in motion appropriate support mechanisms. Advising and other necessary supports are designed as defaults that students are expected to use unless they opt out.

Bridges to college programs. The program maps that are central to the guided pathways approach can be used to give high school students (and their teachers and counselors) a clearer sense of the programs a college offers and where those programs are designed to lead in terms of further education and employment. Ideally, colleges should work with high schools to prepare students to enter programs of study. One way to do this, for example, is to require that students in dual high school – college enrollment programs take courses that are part of programs of study—not just whatever courses they want to take. Similar efforts can be made to bridge students in adult basic skills and non-credit workforce programs into college-level programs that lead to credentials and careers in high-demand fields.

Design Principles and Policies

The following are some principles for redesigning programs and support services following the guided pathways model:

- Require every student to have a clear roadmap to completion, further education and job advancement.
- Ensure that program learning goals are clearly articulated and are aligned with requirements for success in further education and employment (engaging employers and university colleagues to do so).
- Simplify choices for students, using program maps as the defaults for program plans that are required of every student but that students can customize with support from an advisor.
- Give students predictable course schedules that make it easier to organize their lives around school and graduate on-time.
- Redesign the new student intake process to help entering students who undecided about a major to choose a field of study as quickly as possible.
- Integrate teaching of foundation skills into college-level gatekeeper courses for major program areas to enable academically unprepared students to successfully enter a program of study as soon as possible.

- Monitor student progress on their program plans, providing frequent feedback and support as needed.
- Build bridges into college *programs* (as opposed to preparing students for college generally) from high schools, adult basic education and other feeders.

Larry Abele, provost emeritus at Florida State University, who led pioneering efforts at Florida State to develop guided pathways, recommends that colleges implement the following policies as part of guided pathways:¹³

- Academic policies
 - Require early declaration of major or meta-major.
 - Require every student without a major to attend a “choosing a major” workshop and select major by 30 hours
 - Establish milestones that students are required to achieve each term
 - Customize general education requirements for meta-majors
- Advising policies
 - Focus intake on helping students choose a meta-major or major
 - Monitor student registration and grades for critical/milestone courses
 - Every student “off-map” must be mandated to meet with an advisor in person
 - Students must change majors if they are “off-map” two consecutive terms
- Communication policies
 - Earning a credential is a one- or two- (or four-) year process
 - For students to finish on-time, they need to complete at least 30 college credits per year—they can’t easily do this if they are taking only 12 credits, which is often considered full-time for financial aid purposes.
 - Maps must be part of every communication with students, parents advisors and faculty
 - Maps must be easy to find on the website and easy to understand
 - Maps must be integrated into every aspect of the academic experience

THE EVIDENCE FOR GUIDED PATHWAYS

The research cited above about the complexity of choices facing students seeking to navigate college, the fact that little guidance is provided, and studies showing that students are often frustrated and make poor choices all provide prima facie evidence that students would benefit from having more clearly defined pathways to completion and their goals for further education and careers, and from better tracking of their progress along these pathways by advisors, faculty and students themselves.

Further evidence for the design principles underlying the guided pathways approach comes from studies in a variety of fields.

Behavioral science. A large body of rigorous research from behavioral psychology indicates that too many complex choices can lead to the sorts of behaviors that are often associated with students who fail to make steady progress: indecision, procrastination, self-doubt, and paralysis.¹⁴ In contrast, a simplified set of options that includes clear information on each option’s costs and benefits, or the provision of a “default option” designed by experts, can help people make more optimal decisions when confronted with lots of choices. Applied to community colleges, the findings from this research suggest that colleges would achieve better outcomes by simplifying bureaucratic procedures (such as registering for classes and applying for financial aid) and creating program maps or plans for students that clearly define a default sequence of courses and other milestones students should follow.¹⁵

Research on behavioral psychology has also shown that people better handle complex decisions if they are helped to think through the options hierarchically. One way to do this is by organizing complex choices into more manageable sets, requiring the chooser to select from among the sets.¹⁶ This “active choice” technique is evident in the exploratory or meta-majors described earlier, whereby students are required to select from the beginning a broad program stream in which specific programs in a field have been organized. These exploratory majors are designed to guide students through the process of choosing a specific major, and allow them to switch to another field if their initial field of interest is not a good fit. One benefit of this approach is that it helps students make decisions by getting a taste of a field—not just getting a lot of information and then making a decision on that basis. This approach likely helps students make better informed choices.

Research from behavioral economics suggests that feedback can help improve students’ persistence in school. For example, studies of late fees demonstrate that timely reminders about upcoming loan payment deadlines significantly decrease late payments.¹⁷ Other research has shown that simple reminders can help reduce the “summer melt that occurs after high school graduation, when an estimated 15 percent of students generally fail to matriculate in the fall even after they have gained admission to college.”¹⁸ Similarly, short reminders for first-year college students to fill out financial aid forms have been shown to improve persistence.¹⁹ This research supports the practice of closely monitoring student’s progress along their pathways and providing frequent feedback and encouragement.

Cognitive Science. Studies on the psychology of learning show the importance of setting clear learning goals and providing students with a concrete sense of how they are progressing toward those goals.²⁰ For example, some studies indicate that the amount of time individuals spend in deliberate practice toward a specific goal is more predictive of learning in a given field than time spent in more generic practice.²¹ If a learning outcome is clearly specified, students have a concrete goal toward which to “practice.” Research on K–12 education finds that schools that are able to achieve greater gains in student learning, particularly with students from disadvantaged backgrounds, are characterized by higher levels of “instructional program coherence.”²² This is defined as “a set of interrelated programs for students and staff that are guided by a common framework for curriculum, instruction, assessment, and learning climate, and that are pursued over a sustained period of time.”²³ Research on the elements

of effective teaching in higher education also suggests that providing students with a “big picture” of the key topics within a specific course, and how they fit together, helps improve learning.²⁴ We speculate that this finding for individual coursework can be generalized, such that student learning across an entire program may be enhanced by showing them how the various program components are designed to help students build skills they will need to achieve their goals. From research on teaching and learning, we also find that feedback significantly improves student learning—but to be effective, feedback should be appropriate (the student needs it), timely (the student receives it in time to use it), and actionable (the student is willing and able to use it).²⁵

Organizational Science. Research on organizational effectiveness and improvement strongly indicates that to achieve large improvements in student outcomes, piecemeal changes will not suffice. Rather than trying to bring to scale discrete “best practices,” colleges and universities need to redesign their policies, programs, and services at scale.²⁶ Studies of organizational effectiveness in higher education and other sectors suggest that innovative organizational practices have the greatest effect on performance when they are implemented in concert with one another and are well aligned to achieve organizational goals.²⁷ If organizational goals—for example, enabling students to complete programs of study that prepare them for success in further education and employment—are not clearly defined, disparate units of the organization are less likely to work together to achieve those goals, and may instead turn inward toward their own unit’s more clearly understood goals. This fragmentation of resources and energy hampers institutional performance. In community colleges, clearly defining programs with a coherent set of learning outcomes aligned with the requirements for further education and career advancement helps to ensure that efforts by faculty to improve instruction in their courses pay off through improved learning across the curriculum. Similarly, having a full-program plan for each student based on academic maps created by the faculty helps to ensure that in advising and supporting students, advisors and other student services staff are providing information and support that effectively helps students advance along a path that leads to completion and success.

Research on organizational effectiveness in higher education and other sectors suggests that high-performing organizations use measurement to improve processes and better align them with organizational goals.²⁸ If colleges are unable to monitor students’ progress through the institution and have little idea of outcomes after students depart, then colleges do not have the information they need to improve programs and services in ways that promote student success. Tracking students’ progress over time in relation to their program map can enable colleges to gauge how well students are doing in general, pinpoint where students tend to struggle, and thereby identify which programs and support services need to be refined.

Higher Education Research. While rigorous research on the effectiveness of guided pathways in higher education is just beginning, the results are encouraging. For example, in preliminary findings from a random-assignment study of CUNY’s Accelerated Study in Associate Programs (ASAP), which requires students to attend college full-time in a block-scheduled course of study in their major, and which provides a rich array of supports and incentives for up to three years, MDRC found extraordinarily strong effects on student retention and credit accumulation.²⁹

Colleges and universities that have implemented guided pathways at scale have seen evidence of improved student outcomes. **Florida State University**, a pioneer in the use of guided pathways, began implementing academic program maps and required exploratory with proactive advising at key points along each student's path in the early 2000s in order to reduce the number of students who were graduating with more credits than required for their degrees. University officials believe that this was a major factor in the fact that, between 2000 and 2009, the year-to-year retention rate for first-time-in-college freshmen increased from 86% to 92% and the four-year graduation rate increased from 44% to 61%.³⁰ Just as impressive, the percentage of students graduating with "excess credits" dropped from 30% to 5% during this period.

In 2009, **Queensborough Community College (QCC)**, which is part of the City University of New York (CUNY) system, began requiring all first-time, full-time students (over 5,000 per year) to enroll in one of five "freshmen academies" based on their interests and goals. QCC currently offers five academies clustered around related majors and programs: business, visual and performing arts, STEM, health-related science, and liberal arts. Students are required to choose an academy before they enroll. Each academy is designed collaboratively, with at least one faculty coordinator responsible for working with faculty and student affairs staff to improve practice and build an academic community of students and faculty with similar interests and aspirations within their academy. A dean and former faculty member who oversaw the development of Queensborough academies said: "The idea is that students begin to see themselves as students in a particular field, pretty much from the start." According to the in-house researcher who is responsible for the academies, "Students say that being in an academy gives them a sense of identity as a student.... It causes them to reflect on what they want to do and what it will take to move ahead in the field."

Since Queensborough launched the academies for all first-time, full-time students, first-year retention rates have increased.³¹ In the baseline year of 2006, the rate was 65 percent. The rate was 72 percent in 2009 and 2010, and 69 percent in 2011. Queensborough research staff reports that the college's three-year graduation rate for the 2006 first-time, full-time cohort was 12 percent; the rate for the 2009 cohort was 16 percent.³² While it is impossible to determine the extent to which its academies might be responsible for this upward trend, Queensborough faculty and staff believe they are effective. In the fall of 2013, the college began requiring all new students, including part-timers, to select an academy upon entry.

In fall 2012, the City University of New York (CUNY) opened a new two-year college in Manhattan that is now named **Guttman Community College**. The college's design team was challenged to create a model that would substantially improve student graduation rates, particularly among populations traditionally underserved in higher education. What the team came up with was an intentional, whole-school model in which students would be guided through prescribed academic paths and participate in a variety of high-touch support services. When they first enter the college, students have few options. All first-time students are required to attend a summer bridge program, to enroll full-time, and to join predetermined cohorts. Each cohort is guided by an instructional team comprised of faculty, student

support staff, and librarians. All students take a common core curriculum embedded within a learning community; courses include a “City Seminar” and an “Ethnography of Work” course, which allow students to connect to issues that affect their urban community, and explore their own career interests. Remedial instruction is embedded into college-credit coursework, which is intended to accelerate accumulation of credit that will count toward a degree. In their second year, however, students are allowed to choose a program of study in a particular field. The college’s designers selected the fields for these programs of study after conducting extensive research on the city’s labor market projections and after consultation with experts. All programs were also designed to articulate with bachelor’s degree programs in related fields at senior CUNY institutions.

At implementation of guided pathways at Guttman is too recent to track students’ long-term degree completion outcomes. However, Guttman’s goal for its inaugural cohort was to achieve a three-year graduation rate of 35 percent. According to data reported to the Integrated Postsecondary Education Data System, the median three-year graduation rate for the latest available entering cohort (2009) for degree-granting two-year public institutions located in large cities was 12.9 percent.³³ In August 2014, Guttman announced that 28 percent of its inaugural class completed an associate degree within two years, and reported that it was on track to meet or exceed its three-year goal.³⁴ Although these measures do not constitute a definitive evaluation, the preliminary descriptive data are encouraging.

PROCESS FOR REDESIGNING COLLEGES ON THE GUIDED PATHWAYS MODEL

Getting Started

Start with the end in mind: map student pathways to end goals. The first step in creating guided pathways is to engage the faculty, with input from advisors, in mapping out programs. Program maps should:

- Describe in detail the further education and employment outcomes the program is designed to prepare students for—if further education is needed to enter career-path employment in a given field, indicate that as well.
- Include clear learning outcomes that are aligned with the requirements for success in the next level of education and career advancement.
- Specify default sequence of courses to ensure that students are building skills across the curriculum.
- Identify “critical courses” that are highly correlated with success in a particular field and that students must pass to be allowed to proceed in that major.
- Require students who have not decided on a specific major to choose an exploratory major.
- Include academic and non-academic milestones by term for the entire program that students are expected to achieve to ensure timely program completion.

Simplifying and clarifying program pathways requires complementary changes to other college practices, particularly in how the college approaches instruction, students support services, and the new

student intake process. The program pathway maps provide a framework for faculty and staff to work together to redesign these other key college functions to support student learning and success.

Engaging faculty and staff in the process

Collaboration is important to any major organizational reform, but it is critical to efforts to implement guided pathways. To map out program pathways, faculty and advisors must consult with transfer institutions and employers in order to define meaningful learning outcomes. And they must also collaborate within and across departments to systematically build those outcomes across a clearly defined sequence of courses. To help guide students into program pathways and to keep them on track, faculty and student services staff need to work together to monitor and support students as they enter and make progress.

For guided pathways reforms to be successful, therefore, college leaders must create time and support for faculty and staff to collaborate. Currently, professional development at community colleges is often viewed either as information sharing geared to a wide audience on campus—such as at the typical faculty development day—or as an activity designed to build the skills and knowledge of individual faculty members. Colleges might consider redirecting at least some resources currently spent on conventional forms of professional development toward collaborative efforts, such as providing training, facilitation, and other support as needed by teams of faculty and staff working together to create guided pathways. Doing so would reframe professional development as a strategic activity that supports the collective involvement of faculty and staff in organizational improvement as well as one that supports the professional growth of individual faculty and staff.

To build an infrastructure that will support ongoing efforts to implement and improve guided pathways, colleges need to rethink not only their approach to professional development, but also their committee structures, institutional research activities, program review processes, budgeting practices, and policies for employee hiring, performance review, and incentives. All such practices should be reviewed to ensure that efforts to increase the rate at which students enter and complete a program of study become an integral part of the way community colleges do business.

Timeline for Implementation

Based on our experience with colleges involved with the Gates-funded Completion by Design initiative and our research on colleges and universities that have undertaken reforms on the guided pathways model, we estimate that the process takes at least four to five years. The steps involved are outlined in Figure 1. By this timetable, improvements in early indicators of student progression (such as the percentage of students taking and passing at least 30 college-level credits in year 1) would not be evident until the end of year 3 (and the data would not be available until year 4). Thus, the expected returns to guided pathways reforms in terms of improved student retention will take time to be realized.

Year 1. The objective of the first year is to make the case for change to faculty and staff. Colleges that have been successful at this have taken multipronged approach. This includes presenting data from longitudinal cohort analyses showing that many students leave after one or two terms, many of those who remain take courses that do not add up to a coherent program of study, many students “linger,” earning college credits but not earning a degree within a reasonable timeframe, and among students who transfer to four-year programs, the majority do so without having completed an associate degree, despite the advantages of doing so.¹ It also helps to present the student perspective, for example, by conducting focus groups with students on their experience choosing a program of study. Finally, involving faculty and staff in exercises designed to help them see the process of choosing a program of study through the students’ eyes (see the Miami Dade case study) can be very useful in persuading faculty and others of the need to create clearer pathways. Throughout the process, regular, transparent communication, building consensus, and creating a sense of urgency are essential to creating shared ownership and generating progress and momentum.

Year 2. A central of the second year is engaging faculty from across disciplines with assistance from advisors to create maps for the college’s main programs. The maps should include four main components: 1) a description of the program including special admission requirements; 2) a full-program sequence of courses that would serve as a default plan for students who intend to pursue the major; 3) critical courses (those that students must pass to progress in the given program) along with other key expectations that students need to meet to stay on track; and 4) a detailed listing of the particular job types and transfer programs (with details on requirements) that each program is designed to prepare students for. Faculty and advisor teams should work with employers and university academic departments to ensure that the program learning outcomes are aligned with the requirements for success in careers and further education. The maps should also lay out “exploratory majors” with a prescribed curriculum designed to help students explore what program to pursue.

In concert with the development of program maps, advisors and academic departments need to rethink student advising, progress monitoring and support from the start to support students as they progress through programs and provide supports for those who are struggling. Research by CCRC on the implementation of e-advising systems by college indicates that colleges need to pay as much attention to the underlying business processes as to the technology that would support it. If the underlying practices are not well aligned to help students progress along program pathways, then even powerful technology tools are unlikely to lead to improved student outcomes. Making these changes requires a change not only in practice, but in institutional culture. Finally, colleges will need to begin to think about reengineering colleges business processes such as orientation, financial aid, etc. and enhancing IT systems to mentation of guided pathways.

¹ For a guide to conducting such analyses, see the “pathways analysis toolkit” developed by CCRC and JBL Associates at <http://completionbydesign.org/our-approach/step-3-diagnose-the-issues/pathway-analyses-toolkit>.

Year 3. In year 3, colleges begin implementation at scale of the degree maps and redesigned intake and advising systems. Some colleges have started with a limited number of broad program areas, such as business, STEM, education, and so on, and built on them over time. What colleges should avoid is developing a set of programs that run parallel to the college’s main degree programs. Implementing guided pathways reforms requires extensive training of faculty, staff and others so that they understand their roles and can use technology tools effectively.

Years 4 and 5. Years 4 and 5 are devoted to completing the scale implementation of the key guided pathways at scale. Not surprisingly this required continued training and professional development, and broad-based communications and support. During this period, the college should also put in place processes for reviewing and continuing to improve the effectiveness of guided pathways at the college.

Figure 1. Hypothetical Timeline for Institution-Wide Guided Pathway Implementation

Year 1	Engagement / High-level Planning	<ul style="list-style-type: none"> • Make case for change • Broadly engage faculty and staff in scrutinizing current practice, planning scale redesign • Constantly communicate vision and goals
Year 2	In-depth Planning / Initial Implementation	<ul style="list-style-type: none"> • Map pathways for largest programs • Plan redesign of intake system, including dev ed, into program “on-ramp” • Plan reorg of advising to support timely program progress and completion • Plan upgrade of SIS to support student progress monitoring and e-advising • Continue broad communications & engagement • Train advisors and faculty for year 3 implementation
Year 3	Initial Scale Implementation	<ul style="list-style-type: none"> • Begin scale implementation of: <ul style="list-style-type: none"> - Redesigned pathways for largest programs - Reorganized intake system - Program advising system - Student e-advising system • Provide training to support initial implementation • Formatively evaluate initial implementation • Continue broad communications & engagement
Year 4	Improved Scale Implementation	<ul style="list-style-type: none"> • Refine and expand scale implementation • Continue training to support implementation • Continue formative evaluation • Continue broad communications & engagement
Year 5	Scale Implementation	<ul style="list-style-type: none"> • Institutionalize structures & processes for formative evaluation and improvement

THE ECONOMICS OF IMPLEMENTING GUIDED PATHWAYS

Cost and Revenue Implications

Using a method developed to measure the costs incurred by students as they progress over time, CCRC found that, to the extent that guided pathways reforms improves student retention, they will likely improve college efficiency by reducing the cost per completion. At the same time, they will also likely increase costs. This is because as more students persist, the college has to provide them with more instruction and support services. These improvements will also increase revenue, but probably not enough to cover the increase in expenditures. One likely reason for this is that students who persist are more likely than those who drop out early to take more expensive upper-level courses, which often involve more experienced full-time faculty (as opposed to the low-cost adjuncts, who commonly teach most remedial and many introductory courses). Upper-level courses in technical fields especially are more likely than liberal arts and sciences courses to require small class sizes, high-paid faculty, and expensive equipment.

Although the estimated shortfall in revenue is not large, CCRC's research did not account for the up-front investment required to implement reforms needed to strengthen student pathways. These include costs for faculty and staff training, upgraded computer systems for improved student-progress tracking, and the coordination needed to support the systemic changes in organizational practice and culture that are entailed in such reforms. Colleges and universities that have implemented guided pathways have also hired more advisors to help students on the front-end choose a program path and to help faculty and academic departments with students who fall off-map. We do not yet have a full accounting of such costs, but they are likely to be substantial.

To cover the extra costs of implementing guided pathways, colleges will likely have to reallocate existing resources. They should take a hard look at programs with weak employment and transfer outcomes, particularly if such programs are relatively expensive to maintain. Moreover, colleges should question the value of programs and services that are not closely tied to the college's academic programs. Also, a growing number of colleges are exploring ways to more directly connect their developmental instruction and learning support programs to their college-level programs in order to help students take and pass college-level gatekeeper courses in their desired program area.

Why Make the Investment?

Given the costs of implementing guided pathways, why would college leaders want to make the necessary investment to bring about what are admittedly major changes in college practice.

Response to enrollment pressures. One motivation is that community colleges in many parts of the country are facing stagnating or declining enrollments as a result of a several factors. The boom in enrollment following the Great Recession has ended now that the job market is improving. The infusion of funding for training and education in some states following the recession has also tapered off.

Community colleges may also see large drops in enrollment as efforts to accelerate students into college-level coursework result in declines in developmental courses. And finally increasing restrictions on financial aid, particularly the limits on the number of terms students are eligible for Pell grants (reduced from 18 to 12) and stricter rules around Satisfactory Academic Progress (SAP), are putting pressure on colleges to help students move through more quickly and to intervene more quickly to help students who are struggling academically to prevent them from dropping out.

Performance funding. Performance funding in many states, and the threat of it in others, is at least focusing attention on the desire of policy makers to see colleges improve outcomes. At the same time, cuts in state funding have led to increases in tuition and Federal funding for financial aid, which also surged after the recession has now levelled off, even there are more students competing for it. The more students pay out of their own pockets for a college education, the more they will demand outcomes. Thus, in many states, tuition has become the most effective form of performance funding.³⁵

Key to recruitment and retention is placement. Colleges will no longer be able to rely exclusively on their low cost and high accessibility to recruit students. Increasingly, to attract and retain students, colleges will have to offer programs that enable students to earn credentials of value in a timely fashion. The guided pathways approach is intended to help colleges do just that.

RESOURCES

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Guides

Changing Course: A Guide to Increasing Student Completion in Community Colleges. By Thad Nodine, Andrea Venezia, and Kathy Bracco for Completion by Design. http://knowledgecenter.completionbydesign.org/sites/default/files/changing_course_V1_fb_10032011.pdf

Pathways Analysis Toolkit by Sue Clery, Elif Bor, Davis Jenkins, and Sung-Woo Cho for Completion by Design. <http://completionbydesign.org/our-approach/step-3-diagnose-the-issues/pathway-analyses-toolkit>.

On-line toolkit designed for use by community college institutional researchers and other data-oriented personnel have a better understanding of how their students progress through the institution, where they struggle, and how their forward progress can be improved. The toolkit describes the process and model analyses that Completion by Design colleges use to analyze students' pathways, and design and evaluate their reforms. The toolkit includes interactive templates, data definitions, and programming guidelines so colleges can conduct these model analyses with their own data. Sample analyses and case studies are provided throughout to illustrate the uses of these analytics.

Providing Structured Pathways to Guide Students Toward Completion. By Mina Dadgar, Andrea Venezia, Thad Nodine, and Kathy Reeves Bracco for Completion by Design. http://www.wested.org/online_pubs/resource1280.pdf

This brief outlines some of the major issues that colleges are discussing or experimenting with that are related to the creation of more structured student pathways, including: a) Mandating intake processes that provide educational and career counseling, inform students about programs that are related to their interests, and help students explore and develop educational goals, career goals, and a degree plan; b) balancing flexibility and prescription in student selection of courses and majors; and c) defining clear instructional programs so that students can complete a program as quickly as possible.

Simplifying Complexity in the Student Experience. CCRC Practitioner Packet. By: Shanna Smith Jaggars, Jeffrey Fletcher, Georgia West Stacey, & Jill M. Little. Community Colleges Research Center, Teachers College, Columbia University, June 2014

http://ccrc.tc.columbia.edu/publications/simplifying-complexity-student-experience.html?utm_source=ASEE+conf&utm_campaign=UA-2832117-7&utm_medium=email

Part one describes data-gathering methods colleges can use to help them understand how students experience intake, orientation, registration, advising, and the overall process of academic decision-making. Part two describes how colleges can use these data to identify areas of confusion, and to engage stakeholders in devising and implementing solutions. Part three describes how to evaluate redesigned processes and procedures in order to assess their impact and further refine them. Part four is an appendix that includes detailed examples of data collection and project management materials.

Understanding the Student Experience through the Loss/Momentum Framework: Clearing the Path to Completion, by Elisa Rassen, Priyadarshini Chaplot, Davis Jenkins and Rob Johnstone, for Completion by Design. <http://completionbydesign.org//sites/default/files/site-uploads/main-site/pdf/ncii-inquiry-guides-understanding-the-student-experience-lmf.pdf>

Videos and Presentations

Lumina Strategy Labs interview with Fred Corey, ASU Vice Provost re: pathways at ASU:

<http://strategylabs.luminafoundation.org/champion/frederick-corey/>

Lumina Strategy Labs interview with Tristan Denley, vice chancellor, Tennessee Board of Regents, former provost, Austin Peay University: <http://strategylabs.luminafoundation.org/champion/dr-tristan-denley/>

Lumina Strategy Labs interview with Cheryl Hyman, City Colleges of Chicago Chancellor:

<http://strategylabs.luminafoundation.org/champion/cheryl-hyman/>

Lumina Strategy Labs webinar by Davis Jenkins, Community College Research Center, "Start with the End in Mind: Building Guided Pathways to Accelerate Student Success"

<http://strategylabs.luminafoundation.org/higher-education-state-policy-agenda/core-element-three/action-13/>

"Guided Pathways to Success" (PowerPoint) by Complete College America,

<http://www.completecollege.org/docs/GPS%20BOOKLET%2006-14%20FINAL.pdf>

Case Studies

The following institutions have implemented guided pathways (or key aspects of them) at scale. Links to published case study information are indicated below each.

Arizona State University (ASU) - To help students choose from among the more than 300 majors it offers, in 2006 ASU began asking faculty members to map out the path to a degree in each program. These maps identify the courses that are most important to the major and indicate which one of a group of “critical courses” should be taken early in a student’s program, since they have been found to predict success in the major. The maps provide a default curriculum for students to follow each semester. In addition to the course sequences, the maps also list milestones that students are expected to achieve, such as completing college math by a particular semester, if they are to stay on track. New ASU students who are undecided on a major are required to enter an “exploratory major” in one of the five most popular program areas: social and behavioral sciences, arts and humanities, STEM, business, and health and life sciences. Administrators and faculty believe that requiring students to choose an exploratory major, instead of allowing them to be “undecided,” helps to overcome inertia and procrastination. Students’ progress is tracked using an information system called eAdvisor.

Through a partnership initially with the Maricopa Community College System (Phoenix), ASU has extended its program maps down into the community colleges. Each MAPP specifies all the courses students must take to complete the requirements for the Arizona General Education Curriculum (AGEC) and their associate degree, while also completing the lower-division prerequisites for their intended major at ASU. According to an ASU brochure on transfer partnerships with community colleges, the mantra is “No surprises.” ASU has developed transfer program maps for over 200 majors and built transfer relationships with all community colleges in Arizona and some in California. This example shows how universities can extend pathways back down the “supply chain” to help build strong transfer pathways for students.

Resources:

- Lumina Strategy Labs interview with Fred Corey, ASU Vice Provost re: pathways at ASU: <http://strategylabs.luminafoundation.org/champion/frederick-corey/>
- ASU’s eAdvisor system described on this website: <https://eadvisor.asu.edu/>

City Colleges of Chicago. In 2009, under the leadership of Chancellor Cheryl Hyman, and with strong support from Chicago Mayor Rahm Emanuel and Chicago’s business and philanthropic communities, the City Colleges launched a major “reinvention” designed to dramatically increase rates of degree completion, successful transfer to bachelor’s programs, and career advancement for students. As a result of their work on Reinvention and the related College to Careers initiative, CCC has already begun to move the needle on student success, nearly doubling completion rates and increasing the number of credentials awarded by over 70 percent in four years. Just as important, CCC has worked to ensure that the credentials they are award of high quality in that they prepare students to succeed in further education and employment.

In 2014, CCC began implementation of a new five-year strategic plan, the goal of which is to nearly double graduation rates once again (from the current level of 13 percent to the mid-20s) and further increase awards in fields of economic value. A central thrust of this strategy is to create more clearly structured programmatic pathways (aligned with requirements for success in careers and further education) with integrated supports, to help students enter and complete a program of study as quickly as possible. Starting fall 2014, *all* degree-seeking students are required to choose one of ten focus areas (each aligned with a major area of occupational demand in Chicago) and to follow a default full-program plan. The plan is intended to enable students to graduate on time and secure career-path employment in a related field, or to transfer with junior standing in targeted major programs at partner universities.

Resources:

- Article from Governing magazine on the City College Reinvention:
<http://www.governing.com/topics/education/gov-chicago-reinvents-community-college.html>
- Lumina Strategy Labs interview with Cheryl Hyman, City Colleges of Chicago Chancellor:
<http://strategylabs.luminafoundation.org/champion/cheryl-hyman/>

Guttman Community College. Opened in fall 2012, this new community college in the City University of New York (CUNY) system is characterized by highly structured academic programs and support services designed to give students so much guidance and support that they are unlikely to leave the college or make any serious academic missteps. When they first enter the college, students have few options. All first-time students are required to attend a summer bridge program, to enroll full-time, and to join predetermined cohorts. Each cohort is guided by an instructional team comprised of faculty, student support staff, and librarians. All students take a common core curriculum embedded within a learning community; courses include a “City Seminar” and an “Ethnography of Work” course, which allow students to connect to issues that affect their urban community, and explore their own career interests. Remedial instruction is embedded into college-credit coursework, which is intended to accelerate accumulation of credit that will count toward a degree. In their second year, however, students are allowed to choose a program of study in a particular field chosen based on job projections for New York City. All programs were also designed to articulate with bachelor’s degree programs in related fields at senior CUNY institutions.

Resources:

- Case study of the creation of the new CUNY cc:
<http://www1.cuny.edu/mu/ncc/2013/04/22/case-study-published-about-creation-of-the-new-community-college-at-cuny/>. *Rethinking Community College for the 21st Century* reviews the planning of the NCC, including building the college model, infrastructure, accreditation, and outreach across the university and at the state level. Authors Alexandra Weinbaum, Camille Rodriguez, and Nan Bauer-Maglin spent four years studying and documenting the complex work of developing an innovative new community college focused on student learning and success within the City University of New York, the largest U.S. urban university.

Florida State University. Florida State was a pioneer in using program maps to guide students' progress. Created by faculty, these maps lay out course schedules for students and other non-academic milestones they must achieve over every term from the beginning of the program to the end. FSU finds that many of its traditional-age students are not ready to make a choice of major when they first enter. Students who are undecided are required to choose an "exploratory major" in one of four fields: creative arts, humanities and letters; education and teaching; communications, human services and social sciences; or science, technology and engineering. FSU decided to use the word "exploratory" rather than "undecided" to convey to students the importance of actively seeking a field of interest. The exploratory majors give students a structured path for choosing a major. The curriculum is designed to create opportunities for self-exploration, career exploration and exploration of majors within the broader field. Even though they are labeled "exploratory," the curriculum in each exploratory major is prescribed and students are expected to attend mandatory advising sessions. Students can only be in a pre-major for up to three terms, after which they have to choose a specific major.

FSU found that even with the guidance provided by program maps and a tracking system, a robust system of advising and other supports is still needed. Human advising is especially needed to help undecided students select majors, for transfer students, Veterans and other special populations, and for students who go off-course or are not making progress. As a result, since FSU first implemented program maps, the university has restructured its approach to advising to help students complete the pathways laid out by the maps. FSU advisors are hired by the undergraduate studies division, but many are "embedded" in specific academic departments. Advisors are part of an enrollment management group that meets regularly to identify bottlenecks in student progression and success and to assist with program planning and course scheduling.

Resources:

- *Graduation is Everyone's Responsibility: Lessons from Florida State University*, by Jennifer Engle, case study for the Replenishing Opportunity in America: 2012 Midterm Report of Public Higher Education Systems in the Access to Success Initiative, The Education Trust.
http://www.edtrust.org/sites/edtrust.org/files/publications/files/2012%20A2S%20Case%20Study_Florida_FINAL.pdf
- Website on the FSU Academic Interest Mapping System: <http://artsandsciences.fsu.edu/For-Undergraduate-Students/Current-undergraduate-students/Academic-Interest-Mapping-System>
- Yeado, J., Haycock, K., Johnstone, R., and Chaplot, P. (2014). *Learning from High-Performing and Fast-Gaining Institutions*. Washington, DC: The Education Trust.

Miami-Dade College. In academic year 2012–13, MDC convened a task force of 27 faculty members who, in consultation with their departments and college-wide instructional committees, mapped out program pathways in the five largest program areas, which account for over 80 percent of degree-seeking students at the college. The charge to the pathways mapping team was to create maps that specify a default sequence of courses for students pursuing degrees in those fields. The college

revamped its intake system so that all entering students are now required to see an advisor and develop an academic plan based on the pathway maps created by the faculty. MDC is also creating “communities of interest,” which are designed to introduce students to the field so that they can evaluate whether they want to pursue more specialized study or switch to another field.

Resources:

- Rodicio, L., Mayer, S., & Jenkins, D. Strengthening Program Pathways through Transformative Change at Miami Dade College. In., Hughes, K., and Venezia, A. Eds., *New Directions in Community Colleges*, no. 167, Fall 2014, 63-72.

Queensborough Community College (CUNY). In 2009, Queensborough began requiring all first-time, full-time students (over 5,000 per year) to enroll in one of five “freshmen academies” based on their interests and goals. QCC currently offers five academies clustered around related majors and programs: business, visual and performing arts, STEM, health-related science, and liberal arts. Students are required to choose an academy before they enroll. Each academy is designed collaboratively, with at least one faculty coordinator responsible for working with faculty and student affairs staff to improve practice and build an academic community of students and faculty with similar interests and aspirations within their academy. As a result of this and other innovations, QCC has seen increases in student retention and graduation rates.

Resources:

- Excellent overview of QCC freshman academies in 2011 AACU newsletter: http://www.aacu.org/aacu_news/aacunews11/november11/feature.cfm

ENDNOTES

¹ For a review of the literature, see Melinda Mechur Karp, *Entering a Program: Helping Students Make Academic and Career Decisions* (CCRC Working Paper No. 59, Assessment of Evidence Series). New York, NY: Columbia University, Teachers College, Community College Research Center, May 2013.

² See Davis Jenkins, Alison Kadlec, and James Votruba, J, *The Business Case for Regional Public Universities to Strengthen Community College Transfer Pathways (with Guidance on Leading the Process)*, Maximizing Resources for Student Success, HCM Strategists, July 2014. See also Stephen J. Handel and Ronald A. Williams, *The Promise of the Transfer Pathway: Opportunities and Challenges for Community College Students Seeking the Baccalaureate Degree*, The College Board, October 2012.

³ Davis Jenkins and Madeline J. Trimble, *Charting Pathways to Completion for Low-Income Community College Students*. (CCRC Working Paper No. 34). New York: Community College Research Center, Teachers College, Columbia University, September 2011.

⁴ Judith Scott-Clayton and Olga Rodriguez, O., *Development, Discouragement, or Diversion? New Evidence on the Effects of College Remediation.* NBER Working Paper No. 18328. National Bureau of Economic Research. August, 2012.

⁵ For research on “co-requisite” approach: Sung-Woo Cho, Elizabeth Kopko, Davis Jenkins, and Shanna Smith Jaggars. *New Evidence of Success for Community College Remedial English Students: Tracking the Outcomes of Students in the Accelerated Learning Program (ALP)* (CCRC Working Paper No. 53), New York: Community College Research Center, Teachers College, Columbia University December 2012. For a study of the cost-effectiveness of alternative math pathways, see Robert Johnstone *Fiscal Considerations of Statway® and Quantway®: We should be doing this anyway, but here’s how it may help the bottom line*. National Center for Inquiry & Improvement, November 2013.

⁶ Karp, *Entering a Program*, 2013.

⁷ Shanna Jaggars, and Jeffrey Fletcher, *Redesigning the Student Intake and Information Provision Processes at a Large Comprehensive Community College*. (CCRC Working Paper 72.) Community Colleges Research Center, Teachers College, Columbia University.

⁸ Judith Scott-Clayton, *The Shapeless River: Does a Lack of Structure Inhibit Students’ Progress at Community Colleges?* (CCRC Working Paper No. 25, Assessment of Evidence Series). New York, NY: Columbia University, Teachers College, Community College Research Center, 2011.

⁹ Peter M. Crosta, *Intensity and Attachment: How the Chaotic Enrollment Patterns of Community College Students Affect Educational Outcomes*. *Community College Review*, in press.

¹⁰ Public Agenda. *Student Voices On the Higher Education Pathway: Preliminary Insights and Stakeholder Engagement Considerations*. San Francisco, CA: WestEd, 2012. See also Kathy Booth, Darla Cooper, D., Kelley Karandjeff, Rogear Purnell, Eva Schiorring, and Terrence Willet, *What Students Say They Need to Succeed: Key Themes from a Study of Student Support*. RP Group: The Research and Planning Group for the California Community Colleges, January 2013.

¹¹ Davis Jenkins, and Sung-Woo Cho, *Get With the Program...and Finish It: Building Guided Pathways to Accelerate Student Learning and Success*. In Phillips, B., & Horowitz, J. (Eds.), *New Directions for Community Colleges* (Special Issue: The College Completion Agenda: Practical Approaches for Reaching the Big Goal.), Winter 2013(164): 27-35. See also Josh Wyner, J. S. (2014). *What Excellent Community Colleges Do: Preparing All Students For Success*. Cambridge, MA: Harvard Education Press.

¹² Alison Kadlec, John Immerwahr, and Jyoti Gupta, *Guided Pathways to Student Success Perspectives from Indiana College Students and Advisors*. New York: Public Agenda, March 2014.

¹³ From an undated PowerPoint presentation by Larry Abele, provost emeritus, Florida State University.

¹⁴ Richard H. Thaler and Cass R. Sunstein, *Nudge: Improving Decisions About Health, Wealth, and Happiness*. New Haven, CT: Yale University Press, 2008.

¹⁵ Judith Scott-Clayton, *The Shapeless River: Does a Lack of Structure Inhibit Students’ Progress at Community Colleges?* (CCRC Working Paper No. 25, Assessment of Evidence Series), New York, NY: Columbia University, Teachers College, Community College Research Center, 2011.

¹⁶ Punam Anand Keller, Bari Harlam, George Loewenstein, Kevin G. Volpp, *Enhanced Active Choice: A New Method To Motivate Behavior Change*, *Journal of Consumer Psychology*, 21(4), 376–383, 2011.

¹⁷ Cass R. Sunstein, *Simpler: The Future Of Government*. New York: Simon & Schuster, 2013: 64.

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- ¹⁸ Rebecca Ross, Shannon White, Josh Wright, and Lori Knapp, *Using Behavioral Economics For Postsecondary Success*. New York: ideas42, 2013: 29–30.
- ¹⁹ Benjamin L. Castleman and Lindsay C. Page, Freshman Year Financial Aid Nudges: An Experiment To Increase FAFSA Renewal And College Persistence. (EdPolicy Works Working Paper No. 28) Charlottesville: University of Virginia, Center for Education Policy and Workforce Competitiveness, 2014.
- ²⁰ Heidi Grant and Carol S. Dweck, Clarifying Achievement Goals and Their Impact. *Journal of Personality and Social Psychology* 85(3): 541–553, 2003.
- ²¹ K. Anders Ericsson, Ralf Th. Krampe, and Clemes Tesch-Römer, The Role of Deliberate Practice in the Acquisition of Expert Performance, *Psychological Review* 100(3): 363–406, 1993.
- ²² Fred M. Newmann, BetsAnn Smith, Elaine Allensworth, and Anthony S. Bryk, Instructional Program Coherence: What It Is and Why It Should Guide School Improvement Policy, *Educational Evaluation and Policy Analysis*, 23(4), 297–321, 2001. See also Anthony S. Bryk, Penny B. Sebring, Elaine Allensworth, Stuart Luppescu, and John Q. Easton, *Organizing Schools For Improvement: Lessons From Chicago*. Chicago: University of Chicago Press, 2010.
- ²³ Newmann, Smith, Allensworth, & Bryk (2001), p. 299.
- ²⁴ Susan A. Ambrose, Michael W. Bridges, Michele DiPietro, Marsha C. Lovett, Marie K. Norman, and Richard E. Mayer, *How Learning Works: 7 Research-Based Principles For Smart Teaching*. San Francisco: Jossey-Bass.
- ²⁵ Valerie J. Shute, Focus on Formative Feedback, *Review of Educational Research* 78(1): 153–189, 2008.
- ²⁶ Adrianna Kezar, What Is the Best Way to Achieve Broader Reach of Improved Practices In Higher Education? *Innovative Higher Education*. 36: 325-247, 2011. See also Davis Jenkins, Redesigning Community Colleges For Completion: Lessons From Research On High-Performance Organizations (CCRC Working Paper No. 24) New York: Columbia University, Teachers College, Community College Research Center, 2011.
- ²⁷ Jim Collins and Jerry I. Porras, *Built To Last: Successful Habits Of Visionary Companies*, New York: Harper Business Essentials, 1994.
- ²⁸ Davis Jenkins, Jenkins, D. Redesigning Community Colleges For Completion: Lessons From Research On High-Performance Organizations (CCRC Working Paper No. 24) New York: Columbia University, Teachers College, Community College Research Center, 2011: 2–12.
- ²⁹ Susan Scrivener, Michael J. Weiss, *More Graduates: Two-Year Results From A Evaluation Of Accelerated Study In Associate Programs (ASAP) For Developmental Education Students*. Policy Brief. New York: MDRC, 2013.
- ³⁰ Data from on Florida State University from the National Center for Education Statistics (NCES) Integrated Postsecondary Data System (IPEDS). Data on reduction in excess credit were provided by Larry Abele, provost emeritus, FSU.
- ³¹ Queensborough data from undated PowerPoint presentation shared by Victor Fichera, principal investigator for Academy Assessment Protocol, Queensborough Community College.
- ³² City University of New York, Office of Institutional Research and Assessment, System retention and graduation rates of full-time first-time freshmen in associate programs by year of entry: Queensborough, 2014.

³³ Authors' calculations using the Integrated Postsecondary Education Data System (IPEDS). See <http://nces.ed.gov/ipeds/>.

³⁴ Guttman Community College. Guttman Community College to mark its inaugural commencement on Wednesday, August 27, 2014, Press release, 2014.

³⁵ In states such as California and North Carolina, where tuition is low and colleges return their tuition revenue to the state to be distributed across the respective system, tuition is less of an incentive for improvement.