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The Economics of Guided Pathways: Cost, Funding, and Value

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Abstract

This paper is the first to investigate the costs of institution-wide reforms at community colleges. Drawing on data from 12 community colleges implementing comprehensive guided pathways reforms, I use the ingredients method to analyze the resources required to implement such reforms and examine their feasibility and affordability, as well as their value for students.

For a typical college with 4,000 full-time equivalent students (FTEs) that implements guided pathways over four years, the total implementation cost beyond business-as-usual operations is estimated at $450 per student each year, or $7.1 million in total, which amounts to 12% of the college's annual budget, or approximately 3% per year. Around one third of this cost is for enhanced student advisement. Extra investments in information technology are also significant. Ongoing operating costs, primarily for student advisement and student success courses, are around $350 per FTE each year. Cost estimates vary depending on how colleges implement guided pathways, but the results are robust to alternative input prices and college characteristics. There is also some evidence of economies of scale. To finance guided pathways, colleges relied mainly on resource reallocation and efficiency gains, extra public funding, and external grants and funds. Increases in tuition/fees were modest, temporary, or delayed until after implementation; increases of just under 1% per year would suffice to support guided pathways reforms.

From the student perspective, guided pathways increases the affordability and value for money of community college. With enhanced advising, students take fewer unnecessary courses. Program mapping leads students to take the right courses both at the community college and at any transfer college. Improved advising help students access grants and in-kind services; they also assist with financial plans to pay for college. Overall, the savings these reforms allow for are likely to exceed the modest increase in tuition/fees from guided pathways.

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1. Introduction

Many community colleges are adopting institution-wide reforms to improve the quality of the education they provide. A leading reform is the guided pathways model: a transformation of how students navigate through programs of study to earn credentials and prepare for success in employment and further education (Bailey et al., 2015). Guided pathways involves the clear mapping of programs of study, with recommended term-by-term course sequences, progress milestones, and program learning outcomes. Newly enrolled students are helped to explore career and academic options, choose a program of study, and develop an individualized educational plan based on the college's program maps. With every student on a plan, colleges can provide more predictable course schedules, frequent feedback and advice, and targeted support. With clearly mapped programs, faculty are better able to ensure that students are building the skills they will need to succeed after college. In sum, guided pathways aims to substantially improve student outcomes through a comprehensive set of reforms to all aspects of the college and the student experience (Jenkins et al., 2017, 2018).

Implementing guided pathways necessitates significant adaptation and resource reallocation. Whereas most educational reforms involve small-scale, inexpensive, or light-touch interventions that target a group of students with specific needs, guided pathways affects the whole institution. Thus, it is important to consider whether guided pathways is feasible to implement, whether colleges can finance the reforms, and what value the changes have for students.

The body of research on resource allocation in community colleges is growing, albeit from a limited base (Kahlenberg et al., 2018). However, to my knowledge, no research studies have looked at the costs of institution-wide reforms within community colleges. Even were that not the case, current research on this topic is warranted because economic conditions across the community college sector have changed over the past two decades (Barr & Turner, 2013). Broadly, from 2000 to 2006, enrollments were stable, and real spending per full-time equivalent (FTE) student was flat (at around $13,000 per FTE). Enrollments—but not funding—surged during the Great Recession from 2007 to 2010; spending per FTE therefore fell dramatically. Since 2011, enrollments have fallen, and spending per FTE has risen to $15,000. However, the burden of paying for college has

trended more clearly in one direction: Students now pay a substantially higher fraction of total community college spending. The dollar amount from tuition and fees almost equals state funding (Denning, 2017). Community colleges also now compete more with four-year colleges, at which direct educational spending per FTE is more than double (Ma et al., 2019). Together, these trends increase the need for community colleges to implement reforms that are effective, affordable, and efficient and for research on how they might do so.

In this paper, drawing on data from 12 community colleges implementing comprehensive guided pathways reforms, I present an economic analysis of guided pathways. The primary objective of this analysis is to catalog the resources required and estimate the cost to fully implement guided pathways net of business-as-usual operations. In addition, I describe how colleges have financed guided pathways and demonstrate how guided pathways affects the economic benefits of attending a community college. An accompanying practitioner guide (Jenkins et al., 2020) describes the resourcing decisions colleges made to implement guided pathways.

2. Identifying Inputs for Guided Pathways Implementation

The primary economic calculation is the cost to implement guided pathways at a community college. Implementation is divided into four components that correspond to the model's theory of change (Jenkins et al., 2017):

1. *Clarifying paths to student end goals*: This component requires faculty input to devise, codify, and review program pathways; consultation with counselors; information technology (IT) personnel time to produce online program maps; organizational initiation; and review of pathways by senior college personnel (presidents, deans, and/or provosts).
2. *Helping students get on a program path*: This component requires advisor time to revise program entry protocols (e.g., developmental education placement processes), faculty time to create new assessments to gauge students' needs, creation and provision of student success courses, and new IT and computing software.

3. *Keeping students on path*: This component involves senior faculty aligning program paths to other programs within the college or to majors at four-year colleges that are common transfer destinations, the creation of early-alert systems, and the expansion of student services offices.

4. *Ensuring that students are learning across programs:* This component necessitates new assessment systems created by faculty and senior personnel, new online educational supports created by IT personnel, and new pedagogies developed by faculty.

For each component, it is possible to identify the main inputs. Inputs are grouped according to each of the four components listed above. A separate resource category captures the management and infrastructure inputs that support these four components.

Institutional reforms may take multiple years to fully implement. To establish that colleges have implemented guided pathways, I relied on their self-reported data using CCRC's (2017) Scale of Adoption Assessment rubric. For essential practices within each component, colleges reported adoption in terms of "not occurring," "not systematic," "planning to scale," "scaling in progress," and "at scale." I designated implementation of guided pathways as when colleges reported being "at scale" or having "implementation in progress" across each of the components. I assumed that colleges previously had only rudimentary versions of the program components (or that the versions they had required substantial reorganization under guided pathways).

3. Economic Method

I calculated the cost to implement guided pathways using the ingredients method to estimate the cost of each resource used to implement the reform at each college (Levin et al., 2018). Costs are expressed relative to business-as-usual operations. That is, the cost estimate represents the value of additional resources required to implement guided pathways beyond what is usually spent.

The inputs used to implement guided pathways are distinguished from the prices of those inputs to ensure that the results are informative for future practice. For example, the amount of each input (e.g., faculty time) is calculated separately from the price of that

input (faculty salaries). The quantity of each input is determined based on colleges' actual implementation activities. Prices are calculated as what a college would be expected to pay for each input (based on prevailing wages or prices). The two are then combined to derive the estimated total cost of guided pathways. Costs are averaged across the study sample and expressed in constant 2020 U.S. dollars.

Using the ingredients method is preferable to using budgets to estimate costs. Institutional reforms require resource changes across many college departments, and there is no single budget document that accounts for all of these changes. If conducted thoroughly, an analysis using the ingredients method allows the researcher to identify all the resources used, even as they are spread across multiple agencies, colleges, or college departments. Importantly, the ingredients method helps identify resources that may have been used but were not directly paid for within college budgets (e.g., faculty time reallocated from other tasks).[1]

Implementation costs are distinguished from operating costs. Implementation costs include all the resources needed to plan and enact changes to college systems and practices so that guided pathways is embedded in the college. Operating costs include only the additional costs for a college that has an existing guided pathways organizational system.

Some resource changes are excluded from the cost analysis, including two changes to community college operations that may be related to guided pathways. First, developmental education reforms, such as the creation of math pathways aligned with students' program of interest, have some overlap with guided pathways, but these reforms are part of a wide agenda to affect college readiness. Second, dual enrollment reforms, such as improved advising to help high school students develop a full-program plan, have overlap, but dual enrollment reforms are in flux, and their funding is complex. Hence, resource changes in these areas are not included in the analysis. Finally, some institutional reforms are motivated by goals beyond improving students' program outcomes; improving access and enhancing equity are important parts of the community college mission. These changes are not sufficiently closely related to guided pathways reforms to merit inclusion.

[1] The main challenge in applying the ingredients method is that not all personnel can provide (or recall) information on how much time they spent on each activity and whether that activity's sole purpose was for the implementation of guided pathways. However, for all of the colleges in the sample, guided pathways had been implemented very recently.

4. Sample

The sample includes 12 colleges from across the United States. These colleges were selected based on their progress in implementing guided pathways and willingness to participate in the study. Five of the colleges comprise a unified community college district; two others share a governance structure. Analyses for these colleges are performed collectively, yielding seven reporting units for cost calculations. The colleges are from seven states (Michigan, New Jersey, New York, Ohio, Tennessee, Texas, and Washington). Nine are located in suburban areas, and three are located within or close to large metropolitan areas.[2]

Table A1 in the appendix shows that the sample colleges are broadly similar to the national community college sector. The student demographics of the sample colleges match the sector-wide demographics (with one exception: the sample colleges have a much higher representation of Hispanic students). In terms of finances, the sample colleges are similar to the national average: Their revenues are slightly lower, but they charge very similar tuition/fees. College outcomes for the sample are also close to the national average: Students' loan rates and earnings 10 years after college are very similar. However, the sample colleges reported 150% graduation rates of 17%, which is substantially lower than the national average of 23%. Also, with almost 5,700 FTE students per annual cohort, the sample colleges are approximately 20% larger than the average college.

The sample colleges were motivated to implement guided pathways for various reasons. Primarily, they wanted to improve student outcomes (persistence, graduation, and transfer). In addition, there were two direct economic imperatives: the colleges' financial position and local economic conditions. Some colleges were concerned about financial deficits, particularly in the context of declines in public funding per student and states' moves toward performance funding formulae. Declining enrollments were also a concern for some of the colleges, given increasing competition from public four-year regional colleges. If guided pathways could increase persistence, that would increase enrollment numbers and revenues. With economies of scale, increasing enrollment would reduce cost per student and improve the college's financial position. Broader economic

[2] The colleges in this sample partially overlap with those discussed in the accompanying practitioner guide. Sample selection maximizes the number of colleges respectively for the paper and the guide.

conditions also played a role in colleges' motivations for adopting guided pathways. With changes in demand for specific occupations and sectoral changes after the Great Recession, colleges were concerned that some programs could become obsolete or need to be upgraded. However, these imperatives—declines in funding, financial pressures, and changing labor markets—appear similar for all colleges.

During site visits to the 12 sample colleges, CCRC researchers performed interviews with over 100 college personnel (including college presidents, senior management teams, finance and IT staff, and faculty) over the period from November 2019 through February 2020. Interviews were semistructured, with supporting documentary evidence and IT. The questions were directed toward obtaining information on the personnel time, IT, facilities, and learning materials used to implement guided pathways. In addition, CCRC researchers relied on evidence from prior site visits and evaluations at each college. These prior visits collected information using the Scale of Adoption Assessment rubric at each college (Jenkins et al., 2017, 2018).

5. Guided Pathways Inputs

5.1 Clarifying Paths to Student End Goals

The creation of program maps—which show what courses students need to take to complete program requirements—is an integral part of guided pathways. Creating program maps requires significant time input from senior personnel and faculty across the college. Many personnel—including faculty and managerial personnel—are involved in the research necessary to create these maps. Typically, senior personnel commit time to an intensive series of meetings and consultations within each college department. These activities lasted 3–9 months at our sample colleges; the time commitment depended on the number of maps, the extent of consultation, and the degree to which each program conformed to a preexisting program structure. Commonly, college personnel were reallocated from other managerial and instructional roles to devise the maps. In some colleges, faculty were paid a direct stipend (or given release time) per program map completed. At some colleges, mapping also involved the purchase of catalog software (e.g., CourseLeaf).

Program maps necessitate the creation and validation of transfer agreements between the community college and local universities. Teams of personnel at the sample colleges (including faculty, advisors, and senior college staff) undertook a significant overhaul of transfer agreements. These multiyear efforts included verification of existing agreements, liaison with universities, and creation of new transfer agreements.

After program maps are drawn up, they are formatted and designed so as to be clear for students and staff. The maps are then disseminated on the college website and merged with online catalogs. This last step required the colleges to involve IT workers, website technicians, and administrative officials. Personnel time was also necessary to explain the maps to a range of stakeholders (including staff at high schools and transfer colleges).

Concomitantly, college structures need to be reorganized to correspond to the program maps. Again, the extent of the organizational change depends on the number of program areas and the number of students affected by the mapping. At some of the sample colleges, organizational change required additional resources; at others, departmental structures were consolidated, and fewer resources were needed.

5.2 Helping Students Get on a Program Path

Each college significantly reformed its education and support services for onboarding new students. An important institutional change in onboarding was the provision of a student success course (sometimes called a “freshman year experience” or “first-year success seminar”). Such courses had existed before guided pathways, but they were less prominent.

Colleges expanded their student success courses in a number of ways. They enhanced and augmented the courses with more features (e.g., personal skills, financial management) and linked them to the components and theory of change of guided pathways (for example, by including activities based on utilizing program maps to create student plans). For these redesigns, faculty and senior college staff contributed significant time and expertise. Also, colleges expanded enrollment by making the course mandatory for all academic students. (Some colleges further expanded it to vocational or workforce students or added a second-semester pathway course). This expansion necessitated more faculty for instruction. Some colleges introduced orientation sessions linked to guided pathways, which required one-day (annual) contributions from many senior personnel and faculty.

For most colleges, an expanded student success course necessitated a full-time course coordinator. The coordinator provided managerial and instructional support services for faculty and senior personnel and ensured the course was standardized across class sections.

The cost of delivering student success courses to all students was significant. Student success courses were run with class sizes similar to those of regular college-level courses and were taught predominantly by full-time faculty. These instructors received professional development (or release time for faculty) as preparation.

5.3 Keeping Students on Path

Under guided pathways, advising students becomes a substantially more important activity. Advising encompasses much more than ensuring students are taking the right courses for their programs; it includes help with program choice and information on financing college, transfer options, and career opportunities. Some colleges hire a different set of advisors (called enrollment coaches) to help students enroll, after which there is a handoff to professional or faculty advisors in their program or meta-major. Some colleges adopt a case management approach to advising. Overall, advising for each student is more frequent and intensive under guided pathways.

This type of advising significantly increases the resource requirements for guided pathways and the number of personnel with advising responsibilities. Across the sample colleges, some personnel were shifted from alternative roles, often as promotions. Most colleges hired additional advisors. The number of new hires depended on the change in the student–advisor ratio, but in all colleges, this ratio fell sharply. The change in the student–advisor ratio (adjusted for the increase in the intensity of advising) determines the additional expenditures required. Colleges employed a range of personnel to implement advising, including counselors, who generally have master's degrees; program navigators or success coaches, who often do not have as much formal education in counseling; and faculty mentors. Thus, there was flexibility in spending on advising personnel, depending on the seniority of the new advising roles.

Resources were also needed for activities beyond providing advice to students. Before hiring new advisors, colleges incurred costs related to the design and implementation of their advising structures. Advisors then had to be trained to perform

their new responsibilities or be certified as career counselors. To supplement advising, colleges organized daylong, college-wide information showcases with broad participation of personnel from across the college.

5.4 Ensuring That Students Are Learning Across Programs

In practice, guided pathways did not involve substantial pedagogical changes, at least directly in the classroom or online. Any pedagogical changes were either absorbed into general improvements faculty made in their instructional practices and materials or included in the cost of faculty professional development. Thus, pedagogical change was not a substantial cost for colleges implementing guided pathways.

5.5 Infrastructure to Support Guided Pathways Reforms

Institutional reforms such as guided pathways require changes in how a college is governed and managed; they also require changes in a college's culture and strategic goals. (Guided pathways does not require significant investment in physical facilities.)

These changes necessitated significant contributions of time by senior personnel, including:

- efforts by college presidents to ensure institutional reforms were implemented and accepted;
- the hiring of senior personnel (or new staff assignments) to coordinate planning and implementation of the reforms;
- time commitments from senior personnel working in new committees, on managerial restructuring, and on greater collaboration; and
- the hiring of external consultants (typically part-time or short-term) to support change management and provide guidance on the components of guided pathways.

All colleges also increased their professional development budgets or shifted the focus of professional development toward guided pathways. At some colleges, there were significant increases in resources for professional development for faculty; at others, professional development was folded into faculty release time. Professional development

was needed for new advising and counseling positions, especially if those advisors were to become certified career counselors.

Moreover, most colleges made extra investments in new information technologies. These investments included basic revisions to college websites and information portals. More significant were investments in new software systems to monitor and track students' progress through college. Typically, these systems replace older student records systems and provide more information and enhanced functionality for staff and students. In addition, several colleges explored software that was more user-friendly for students to interact with the college (such as chatbots) and for faculty to obtain information (e.g., via intranets). Several software programs are complementary to guided pathways, including DegreeWorks, Recruiter, CourseLeaf, Colleague, JetStream, Starfish, and OneRecord (as well as niche software, such as Mongoose). Colleges that adopted such software programs incurred new costs related to software design and development, software purchase, within-college time commitments by IT personnel to embed the software into college operations, and time costs of personnel in using the new software.

Other infrastructure resources included additional personnel and computing systems to collect, analyze, and interpret student-level data, as well as direct information campaigns to ensure all college personnel were aware of guided pathways and its importance to the college's mission.

6. Resources for Guided Pathways

Implementation total resource cost (ITRC) is the complete amount (value) of personnel, facilities, materials, and other inputs needed to implement guided pathways. Operational total resource cost (OTRC) is the amount needed for guided pathways reforms to be sustained once fully implemented. ITRC and OTRC are calculated separately for each component at each college. (Not all colleges required resources for each component.) Total resource costs do not take into account college revenues associated with guided pathways (e.g., from students enrolling in more courses), and they are not budgetary amounts that colleges would necessarily have to spend to implement guided pathways.

Estimated ITRC is shown in Table 1. The main cost estimates are standardized to a representative college with 4,000 FTE students (close to the median size of community colleges nationally). Table 1 also includes cost estimates for a small college with 2,000 FTEs and a large college with 10,000 FTEs.[3]

Table 1
Implementation Costs for Guided Pathways

Category	Representative (4,000 FTEs)		Small (2,000 FTEs)		Large (10,000 FTEs)	
Program mapping	$855,600	12%	$770,800	17%	$2,006,900	11%
Student success courses	$360,900	5%	$72,600	2%	$ 954,600	5%
Student advisement	$ 3,699,500	52%	$ 2,205,400	49%	$9,526,300	54%
Teaching and learning	$173,600	2%	$152,200	3%	$ 431,700	2%
Governance and management	$587,800	8%	$544,000	12%	$ 971,400	5%
IT investments	$681,400	10%	$153,700	3%	$1,801,200	10%
Professional development	$474,100	7%	$487,200	11%	$1,123,600	6%
Other direct costs	$311,700	4%	$81,900	2%	$ 899,700	5%
Total resource cost	$7,144,600		$4,467,900		$17,715,600	
Total cost per FTE	$ 450		$670		$370	

Note. Costs are presented in undiscounted, nominal 2020 dollars.

The total cost to implement guided pathways at a community college with around 4,000 full-time students is estimated at $7.14 million over four years ($1.8 million per year). Given a budget of approximately $60 million for a college this size, the ITRC for guided pathways is approximately 12% of the annual college budget. This amount represents the total amount needed to implement guided pathways. It may be spread over multiple years, such that a four-year implementation period would require an additional 3% of the college's total expenditure per year on guided pathways; a three-year implementation period would equate to 4% extra per year, and so forth. Expressed per FTE at the college, additional resources required for guided pathways net of business-as-usual are estimated at $450 for each of four years.

[3] ITRC was standardized as the average ITRC per student across all the colleges, multiplied by 4,000. ITRC for a small college was calculated from three colleges with average FTEs close to 2,000 and then standardized. ITRC for a large college was calculated from three colleges with average FTEs close to 10,000 and then standardized.

The student advisement component is the largest resource requirement for guided pathways; 52% of the ITRC is for new advisors and advising systems. Program mapping activities represent 10% of the ITRC. Infrastructure to support guided pathways is significant, at 28% of the ITRC, with 10% of the ITRC for IT investments. Resource requirements for student success courses are modest at 6%. Resource requirements for teaching and learning are small at 3%. The estimates for small and large colleges show that there are some economies of scale. Despite serving five times as many students, large colleges have implementation costs that are only four times as high as those for small colleges. Per student, small colleges spend proportionately more on program mapping and governance and management of guided pathways. However, amounts for advisement are broadly proportionate to the number of students.

OTRC is reported in Table 2, again by college size. The aggregate annual OTRC for a college of 4,000 FTEs is estimated at $1.41 million, or $350 per student. Based on a college budget of $60 million, the operating cost for guided pathways is just over 2% annually. The primary component of OTRC is student advisement (at almost two thirds of the total resource for guided pathways). Modest resources are required for the remaining components. The OTRC per FTE exhibits modest economies of scale. For a small college, the estimate is $450 per year; for a large college, it is $350 per year. As most of the OTRC is allocated for advising, which is generally determined by student numbers, there are fewer opportunities for economies of scale once guided pathways is implemented.

Table 2
Operational Costs for Guided Pathways

Category	Representative (4,000 FTEs)		Small (2,000 FTEs)		Large (10,000 FTEs)	
Program mapping	$89,700	6%	$104,700	12%	$190,200	5%
Student success courses	$90,100	6%	$13,500	2%	$240,100	7%
Student advisement	$894,500	63%	$492,700	55%	$2,331,700	67%
Teaching and learning	$43,400	3%	$38,000	4%	$107,900	3%
Governance and management	$96,400	7%	$115,100	13%	$109,200	3%
IT investments	$81,900	6%	$19,500	2%	$201,600	6%
Professional development	$99,100	7%	$99,200	11%	$237,900	7%
Other direct costs	$14,900	1%	$7,400	1%	$39,800	1%
Total resource cost	$1,410,000		$890,100		$3,458,400	
Total cost per FTE	$350		$450		$350	

Note. Costs are presented in undiscounted, nominal 2020 dollars.

To test the sensitivity of the cost estimates to alternative assumptions, I applied parameter-based sensitivity to identify upper and lower bound estimates for ITRC and OTRC. I tested for robustness based on the variation in cost estimates across the 12 colleges. Overall, the cost estimates are robust to alternative assumptions. (Full results are given in Table A2.) When outliers are eliminated from the sample, the implementation cost changes by only 4%. Using higher input prices increases the ITRC by 22%; using lower input prices reduces the IRTC by 17%. However, the college with the highest IRTC allocated 83% more resources to guided pathways, and the college with the lowest IRTC allocated 73% less than reported in Table 2.

7. Funding Guided Pathways

Obviously, colleges need funds to implement guided pathways. There are three sources of direct funding: state and local public funding, revenue from tuition/fees, and external grants or funds. Further, colleges could obviate the need for additional funds by reallocating existing resources or making efficiency gains. Table 3 summarizes how colleges obtained sufficient resources to implement guided pathways.

Table 3
Colleges' Approaches to Funding Guided Pathways

Funding Source	Economic Impact on Colleges	Annual Budget Change	
Total implementation cost	Resource requirements	3.0%	$1.80m
Resource reallocation	Current personnel in new roles; new personnel in unfilled roles	1.4%	$0.84m
Efficiency gains	Intradepartmental savings; program/organizational consolidation; senior positions filled at junior levels; renegotiated union contracts		
Public funding	Earmarked state or local funding; dual enrollments	0.4%	$0.24m
External grants	Earmarked grants (e.g., for advisors); IT upgrades/software	0.3%	$0.18m
Tuition/fees	Increased price per credit	0.9%	$0.54m
FTE-driven funding	Enrollment changes; economies of scale; cost per credit	—	—

As much as possible, colleges attempted to fund guided pathways without obtaining additional revenue. To do this, they began by reallocating resources within the college; most then made efficiency gains to college operations. These actions reduced the pressure to fund guided pathways by raising tuition/fees or requesting additional funds from state or local governments. Overall, most colleges relied on each of the direct sources of funding as well as reallocation and efficiency savings.

Table 3 shows approximate reliance on each funding source for the stereotypical or representative college of 4,000 students. Clearly, the specific numbers will vary depending on the strategic decisions made by a given college. Thus, Table 3 is illustrative of the economic feasibility of guided pathways and is not prescriptive as to how colleges should fund their reforms. To implement guided pathways, a college with 4,000 FTEs requires approximately 3% more funds—equal to $1.8 million—over its initial budget each year. With resource reallocation and efficiency gains, colleges can offset 1.4 percentage points—equal to $0.84 million—of the newly required funds. Of the remaining $0.96 million, just below half is covered by additional public funds and external grants, with public funding somewhat more important than external grants. The residual amount—$0.54 million—is obtained through tuition increases. Thus, tuition increases of approximately 1% per year fund guided pathways. Negligible funding comes from changes in the funding of FTEs.

Reallocation of personnel was the primary method for ensuring sufficient resources for guided pathways. At some colleges, the fundamental operating goal was that guided pathways should be expenditure-neutral—that is, that there should be no additional spending and that the reform should be funded entirely by moving personnel across tasks or by replacing personnel. Across the sample colleges, guided pathways was not expenditure-neutral, but the colleges were able to fund a significant proportion of organizational reform by reallocating existing resources.

Many guided pathways components involve new roles and responsibilities in place of existing ones. These components were mostly implemented by reallocating staff rather than replacing staff. Reallocation was used for the following components: governance and management, program mapping and concomitant organizational change, faculty redeployment, professional development, data analytics, intracollege

communications, and pedagogical change. Other components, such as student success courses, were partially implemented through resource reallocation. The need for new resources for these components depended on how enrollment numbers changed. A few components, such as advising and student support services and IT investments, were mainly implemented with new money.

Colleges adopted a range of approaches to reallocating resources. For example, colleges reorganized program administration (e.g., by consolidating academic and workforce departments within meta-major fields and by realigning annual budgeting and program reviews). Colleges also redefined staff roles—for example, by consolidating part-time positions and filling open positions. Some colleges reassigned faculty to serve as advisors or mentors to students once they had chosen a program of study. Besides making changes to personnel, some colleges redeployed software that they already owned but that was underutilized.

Most colleges partially funded guided pathways with efficiency gains (i.e., by reducing the cost of delivering existing programs). In fact, institutional reform was often the catalyst for the implementation of more productive activities. Many college departments were expected to make efficiency gains each year, and a portion of these were applied to the implementation of guided pathways. Efficiency gains were often combined with resource reallocation. That is, resources were moved around in ways that improved educational outcomes but did not cost more (or in ways that maintained outcomes but cost less). In light of historical pay structures, new personnel may cost less per hour of productivity. Thus, hiring more junior personnel as senior personnel retired represents an efficiency gain. More faculty release time was devoted to guided pathways. Finally, guided pathways offered an opportunity to streamline some administrative functions and organizational structures. At some colleges, this reorganization was substantial. For example, at one college, the number of departmental units was halved, with approximately 10 full-time staff reassigned. Larger departmental units reduced the need for senior faculty to perform managerial roles.

Almost all colleges needed to secure additional funding to implement guided pathways. In terms of additional public funding, more colleges accessed state funding than accessed local funding, but both sources were relied on across the site colleges. This

public funding may have been earmarked, in some cases directly for guided pathways and in others for specific components (e.g., new advisors). Otherwise, colleges relied on money from general increases in public funding. For example, if funding was increased for faculty release time or the implementation of new software, colleges would apply the additional funding in a way that supported guided pathways. The amount of public funding from these two sources ranged from one FTE staff member up to over $1 million.

Colleges also used existing public funds to support guided pathways, including net operating fund balance reserves or reinvested performance funding gains. They also leveraged external grant funding to implement guided pathways. Again, these amounts varied across colleges (and were not always explicitly tied to guided pathways or its components). Local community funding was also drawn on (e.g., to fund a Career Skills Academy), although the amounts were typically modest. Similarly, these additional funds were not always explicitly tied to guided pathways but were allocated to that purpose.

Most colleges did increase tuition per credit hour to fund guided pathways. When levied, these tuition increases ranged from 2% to 15% per year over multiple years. However, increases were not imposed every year that guided pathways was being implemented, and they were typically delayed until after the start of implementation (although one college increased tuition in advance of guided pathways reforms). Increases in tuition were not tied directly and solely to guided pathways; in most cases, there were other cost pressures that necessitated increases in tuition (e.g., declining enrollments or decreased state aid). Moreover, these were nominal increases; a 5% increase in tuition corresponds to a real increase of 2–3%. Overall, tuition increases were an important way to fund guided pathways, but they were neither essential nor the only funding source.

Tuition/fees rates were not calibrated in precise proportion to any specific increase in resource needs. Colleges did not explicitly set tuition/fees based on the additional resources required for guided pathways. Nevertheless, tuition/fee increases did support guided pathways in a strategic way, generating almost 1% more for the college budget each year to offset guided pathways.

Guided pathways reforms affect enrollments, which in turn affect total revenues and expenditures. Enrollments may increase, and with guided pathways, there are many opportunities for students to enroll in additional courses. However, if course placement

on entry becomes more accurate, overall enrollments in introductory courses and developmental education typically fall. Moreover, if students are more accurately advised and on a clear program plan, they are likely to take fewer surplus or redundant college-level courses. In fact, at several colleges, the reduction in surplus credits is an indicator of the success of guided pathways. CCRC's fieldwork shows that, on average across the colleges, net enrollments only modestly changed with guided pathways. It is unlikely that guided pathways colleges would be able to obtain additional revenue from enrollment changes and economies of scale.

8. The Value of Guided Pathways for Students

For guided pathways, the theory of change is that clearer structures and guidance affect student behavior in ways that lead to faster academic progress and higher rates of credential completion. First, under guided pathways, students should make better choices, taking courses that are aligned with their program goals. This should reduce the number of surplus courses they take (Attewell & Monaghan, 2016). Second, if students have full-program educational plans (derived from program maps), advisors can provide accurate, timely, and more frequent feedback. Improved advisement should also affect the courses students take. Importantly, students should take more courses because they are more motivated and can see their end goal. Guided pathways may increase the efficiency of students' progression and thus reduce the total financial burden of college. It may also help reduce the direct expense of attending college via changes in pricing policies. Hence, guided pathways affects the value of college for students through several mechanisms.

The ways in which guided pathways has economic value for students are summarized in Table 4. These mechanisms did not apply to all students at each college, and again, these figures are illustrative of the economic consequences for a student at a typical community college.

To fund guided pathways, most colleges increased the general price of tuition per credit hour by 2% to 15% per year (nominal figures). However, these increases were sometimes either short-run or postponed until guided pathways was partially implemented (and most were below 5%). Moreover, tuition increases often took place in response to

other cost pressures (e.g., declining state aid). Overall, colleges did not pass on the full cost of guided pathways to students. Hence, I approximate the increase in tuition/fees to fund guided pathways at 2% or $400 per FTE over two years at community college.

Table 4
Economic Value of Guided Pathways to Students

Reform	Economic Value for Students	Estimated Value per FTE
Increased tuition	Tuition increases to offset additional costs for guided pathways	−$400 (2% increase p.a.)
Advising (courses)	Fewer unnecessary courses taken at community college; higher course pass rates	+$500 (2+ credits)
Program maps	Fewer unnecessary courses taken at transfer colleges; higher course pass rates	+$750 (3+ credits)
Advising (college)	Access to grants and in-kind services; financial guidance	+≥$100
Progression	Tuition caps; price guarantees; enrollment incentives/discounts	+≥$100
IT analytics	College credits applied to awards	Sheepskin returns

With guided pathways, it is feasible for colleges to adopt several approaches to offset the financial burden for students. First, students' aggregate expenditure on college is directly reduced when students pay for fewer surplus credits. More intensive advising and program mapping reduce the number of unnecessary college-level courses students take (either outside their program area or beyond their program requirements or at transfer colleges). Respectively, based on reports from college personnel, I approximate the gains from advising to be at least 2 credits (equivalent to $500 in tuition/fees over two years in college) and the gains from program plans to be at least 3 credits (equivalent to $750). Furthermore, where guided pathways increases course pass rates, students are generally getting more value from each course.

Guided pathways reforms may also directly reduce student expenditures for college. One approach is to subsidize marginal courses (e.g., if students take a full course load instead of partial course load per semester). Some colleges invested in success initiatives that encouraged enrollment at discounted rates (e.g., via discounts on summer enrollments) or penalized inefficient credits (e.g., by capping aid-eligible credit hours).

A related approach is to secure extra funding tied directly to guided pathways reforms. At some colleges, this money flows directly to students as discretionary cash

awards to help them stay in college or overcome temporary financial setbacks. At most colleges, this extra funding supports in-kind services, especially wraparound services and other services students may need outside the classroom. (Not all these services are provided at the college; for example, some colleges provide access to student bus passes.) Also, some colleges sought to minimize student expenses on learning materials (e.g., by using e-learning bundles) so that expenses may be capped or so that students could access open-source materials. Other colleges capped tuition (e.g., through tuition guarantee programs). Although these caps might be applied independent of guided pathways, the reforms help to clarify prices for students and so make a price cap more overt. Finally, financial advising helps students better understand the monetary consequences of their education plans. The amounts of these financial incentives varied across colleges. Conservatively, I estimate their value at $100 per FTE for advising and pricing systems.[4]

Together, these changes to tuition, expenses, and subsidies represent a significant new calculus for students at community college. On average, the implementation of guided pathways is likely to result in net savings to students. Importantly, this gain does not consider the overall effect on degree completion from guided pathways.

9. Conclusion

Guided pathways is an institution-wide reform that affects how community colleges enroll, instruct, and guide students through their postsecondary education. Unlike many educational reforms, it is not limited to one element of the college experience or one organizational practice (or implemented within a short time period). The scope of the reform makes guided pathways challenging to evaluate; it also raises the stakes for implementation in that guided pathways involves significant changes and increases in resource use.

This paper provides new evidence on the total resource cost of implementing guided pathways at community colleges across the United States. Based on interviews, case notes, and data from 12 community colleges, I cost out each of the components of

[4] Enhanced data analytics may cause more students to receive awards for a given accumulation of credits, boosting their "sheepskin" returns to college. Also, students may save time at college and gain from the certainty that their courses are valid. Monetary value for these effects cannot be precisely estimated.

guided pathways. I then calculated all the resources required to fully implement guided pathways. Evidence from this analysis establishes the extent to which guided pathways is affordable within existing college budgets.

Sample colleges obtained the resources for guided pathways from a range of sources. All 12 colleges reallocated resources from existing operations and practices; most also sought efficiency gains across departments and operating units. However, reallocated resources and efficiency gains were not sufficient to fully support the implementation of guided pathways. Colleges had to obtain additional funding, some of which came from public finances and external sources. Critically, almost all colleges needed to increase tuition/fees for students. This increase was often modest; it did not have to cover the entire resource cost of guided pathways. Having a range of funding opportunities available meant that colleges were able to secure sufficient resources for guided pathways.

From the student perspective, evidence suggests that guided pathways is a valuable reform. Tuition and fees are modestly higher, but the reform offers a series of direct and immediate benefits, including faster academic progression, fewer redundant credits, and more efficient transfer to four-year colleges. Further, most of the sample colleges offered economic incentives for students to complete college-level courses. The exact dollar benefit to each student varies significantly, but it seems very likely that it exceeds the increase in tuition and fees. By eliminating wasteful or inefficient spending on courses, guided pathways represents a valuable investment for students.

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Appendix

Table A1
Characteristics of Sample Colleges Versus Community Colleges Nationally

	Sample Colleges (*N* = 11)		U.S. Community Colleges (*N* = 908)	
	Mean	(*SD*)	Mean	(*SD*)
College characteristics				
Enrollment (FTEs)	5,688	(4,389)	4,529	(4,750)
Total revenue per FTE	$14,203	(3,148)	$15,370	(4,337)
Tuition revenue per FTE	$5,140	(961)	$4,486	(1,827)
Revenue from tuition/fees (%)	45	(9)	39	(16)
Student characteristics				
Female (%)	66	(5)	64	(8)
First generation (%)	53	(8)	53	(8)
White (%)	75	(12)	75	(18)
African American (%)	10	(10)	13	(14)
Hispanic—any race (%)	24	(26)	11	(15)
Asian (%)	2	(20)	3	(5)
Family income	$32,930	(6,920)	$31,850	(10,630)
Average age on entry	25.9	(1.2)	25.7	(1.6)
Student outcomes				
Loan rate (%)	39	(11)	41	(28)
Earnings 10 years post-college	$37,130	(3,540)	$35,830	(4,960)
Graduation rate, 150% of normal time (%)	17	(8)	23	(11)

Note. Data are from the U.S. Department of Education's College Scorecard and IPEDS database for the academic year 2013–14. The U.S. community colleges column excludes guided pathways sample colleges. All dollar values are expressed in 2018 dollars.

Table A2
Implementation Total Resource Costs: Sensitivity Analysis

	Total Resource Cost Per College (4,000 FTEs) [$ millions]	Per FTE
Baseline	$7.14	$450
Eliminating high/low cost colleges	$6.85	$430
Prices		
Quartile 3	$8.72	$550
Quartile 1	$5.93	$370
FTEs		
Quartile 3	$7.14	$340
Quartile 1	$7.14	$510
Employer costs of compensation/overheads		
Quartile 3	$5.50	$350
Quartile 1	$8.29	$520
Highest cost college	$13.07	$820
Lowest cost college	$1.93	$120

Note. Costs are presented in undiscounted, nominal 2020 dollars. FTE quartiles are based on the range from 2012 to 2017.