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CALCULATING THE COST OF NEW STUDENT MATRICULATION IN A MIDWESTERN  
COMMUNITY COLLEGE

DANIEL JOSEPH KELLY

70 Pages

This study examines the cost of new student matriculation at a Midwestern community college. Employing activity-based costing, the study allocates costs from the college's operating budget to determine the cost of new student matriculation, the matriculation cost per student, and the point at which, in credit-hours, the college recovers the matriculation cost. Efficiency is used as a conceptual framework to discuss the college's ability to move as many new students as possible through the matriculation activities at the lowest possible cost.

A key finding includes that the college is spending a considerable amount of time and money to matriculate new students and the ability to recover these costs is hamstrung by the limited margin earned by the college on a per credit-hour basis. The college must reconcile the fact that enrolling new students is at best a break-even endeavor with its mission as an open access institution.

**KEYWORDS:** community college, matriculation, activity-based costing, efficiency, cost, matriculation cost, new student

CALCULATING THE COST OF NEW STUDENT MATRICULATION IN A MIDWESTERN  
COMMUNITY COLLEGE

DANIEL JOSEPH KELLY

A Dissertation Submitted in Partial  
Fulfillment of the Requirements  
for the Degree of

DOCTOR OF PHILOSOPHY

Department of Educational Administration and Foundations

ILLINOIS STATE UNIVERSITY

2021

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CALCULATING THE COST OF NEW STUDENT MATRICULATION IN A MIDWESTERN  
COMMUNITY COLLEGE

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D.J.K

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## CHAPTER I: STUDENT MATRICULATION

### **Research Problem**

Community colleges spend considerable time, energy, and resources to recruit and matriculate students each year, yet many of these students do not persist and do not complete a credential. In the fall of 2016, over 1 million first-time students enrolled at community colleges (National Center for Education Statistics, n.d. a), yet less than 50% of these students remained enrolled in the same college one year later (National Student Clearinghouse Research Center, 2018 a). Longer-term data collected by the NCES (2018) suggests that while some of these students may transfer to other institutions, many simply leave higher education all together. Of the students entering community colleges in 2009, only 25% had earned any sort of postsecondary credential eight years later.

The reasons students leave are often beyond the control of the college and are related, for example, to scheduling conflicts with the student's employer, financial constraints, and health issues. In addition, many students enroll in community colleges simply to test the waters, determining if the college experience is something the student would like to pursue further (Cohen, Brawer, & Kisker, 2013). The wide-ranging goals and experiences of students are a function of the community college's open access character. As Cohen et al. (2013) point out: "It is difficult for an institution built on the theme of easy access to limit easy exit" (p. 75).

Although community colleges are not profit-seeking, knowing whether the investment in recruiting and enrolling a new student is recovered before the student leaves could benefit the college as it decides how to allocate finite financial resources. Are the upfront costs of student matriculation recovered by the college if the students leave before completion? What are the

upfront matriculation costs incurred by the institution? These are the questions this study answers to inform community college administrators about the costs of matriculation.

This study addresses cost-efficiency related to student matriculation head on. By matriculation, I am referring to the recruitment of new students and all the necessary steps taken to enroll them in courses at the start of the academic term. Using Illinois Central College (ICC) as a case study, I identified the activities that make up the matriculation process from the point of student recruitment to the student walking into his or her first class. From there, I established the cost of each of these activities and computed a cost of matriculation per student. Finally, I determined at what point in the student's tenure at the college (measured in credit-hours) the college recoups the cost of matriculation. It is important to note that this study focused only on degree-seeking students.

Arming community colleges with cost information on student matriculation creates opportunities for more informed decision making at these institutions. New student enrollment unquestionably brings in new revenue to the college, and this study provides insights into when the costs incurred for the recruitment and matriculation of new students are recouped. Knowing when the costs are recouped could lead to discussions around improving recruitment and matriculation within the college, as well as discussions around the most efficient use of resources in these same areas. In the resource-constrained environment most community colleges operate in, an effective use of resources is key to financial survival.

Studies of student matriculation processes or cost-efficiency in higher education are not new. A recent shift in the conversation from access to accountability in all sectors of higher education, including community colleges, has led to a focus on accountability measures such as graduation rates, transfer rates, persistence rates, and workforce readiness (e.g. Rosenbaum et al.,

2009; Mellow & Heelan, 2015; Levin, 2017). This reflects policymaker concerns for how effectively institutions use government funding (Dowd, 2007), and scholars have responded with analyses of student matriculation and cost-efficiency. For example, Rosenbaum, Deil-Amen, and Person (2009), Duniway (2012), and Scherer and Anson (2014) studied the matriculation activities of community colleges (e.g., admissions, testing, advising, etc.) and how they affect student success. Additionally, studies by Bailey et al. (2015); Manning and Crosta (2014); and Romano et al. (2010) have examined the various ways to account for the cost associated with educating community college students or how community colleges can become more efficient in this process. These and other studies are further examined in Chapter II of this document.

As I describe in Chapter III of this document, the costing technique employed in this study is activity-based costing. Activity-based costing emerged from the manufacturing industry in the 1980s as a means of better allocating indirect costs to products, services, or customers. Indirect costs are those costs not tied to a particular product or service but are necessary for the manufacturing of a product or providing of a service (Whitecotton et al., 2017). For example, the electricity used in a factory is not tied directly to any one particular product but it is necessary for producing all products, making it an indirect manufacturing cost. Activity-based costing attempts to allocate indirect costs at a more granular level when compared to traditional costing that allocates costs at a higher level. In higher education, indirect costs are those not directly related to the educating of students such as academic support, enrollment services, food and dining services, etc. Higher education institutions have attempted to employ activity-based costing in the past and a literature review is provided in Chapter II of this document.

This study is of interest to any community college administrator, faculty, or staff member who is concerned with the student matriculation process or how a college is spending its

resources. It is of interest to me as a faculty member in a community college concerned about the wellbeing of students and long-term financial viability of the college. As I explain in the next section, my personal journey has brought me to this topic as it combines two interests of mine – community colleges and improving cost-efficiency.

### **Positionality**

I came to this area of interest after spending time as a community college student during my academic career and working in a community college as an adjunct and eventual full-time faculty member for the last 10 years. Since leaving high school at the age of 18, I have spent over half of my time in a community college in some capacity, and I am a believer in the importance of community colleges in the higher education system.

I came from a lower to middle class family where the only college credential between my parents was my father's technical degree in jewelry repair. My parents started their own business, closed it, and then restarted another as they had little education to fall back on. The financial burden of owning a business caused my parents to carefully scrutinize the spending of every dime, and because of this tight financial situation, my parents pushed my three sisters and me into college (whether we wanted to go or not) in hopes that we would not endure the same struggles. The experience of watching their friends and family members with bachelor's degrees achieve economic prosperity inspired my parents to ensure that their children were afforded the same opportunities. As a mediocre-to-poorly-performing high school student, my only option was to continue my education at a community college.

As a student at Illinois Central College (ICC), I hit my educational stride. I began doing well on exams, and in my first semester, I earned the highest grade point average I had ever had. This success inspired me to apply to four-year institutions immediately and transfer after just one

year at ICC. My time at ICC taught me that I was college material and that I could succeed in higher education. This experience as a successful student shaped — and continues to shape — my view of the community college. Even before I started working in higher education, I saw ICC as the reason I was able to obtain bachelor's and master's degrees and secure a well-paying job immediately after graduation.

As my career and education evolved, I learned that my success in higher education was more obtainable than I thought when I first started. Despite having to work while I was in school, I was able to attend classes full-time, which greatly increased my chances of success (Attewell & Douglas, 2014). I had the support of family and friends who wanted to see me succeed, and because I am a white male, I never faced any form of discrimination or felt marginalized while I was in college. I believe in the power of the community college to change a student's life trajectory, but I realize now that — for many students — gender, race, and economic status play a significant role in their college experience.

My career as an accountant before moving into higher education also helped pique my interest in this subject. While working for a large manufacturer, I employed activity-based costing, the same methodology I applied in this study, to assign costs to various products and services. Although at the time I was assigning costs for the purpose of measuring a product's profitability, the experience of using activity-based costing stuck with me as an effective way of assigning costs. When I started my career at ICC, I heard a lot about how limited the college's financial resources were and began wondering if the college was using its resources efficiently. My interest piqued during the 2015-2017 budget impasse in Illinois when state funds for higher education were greatly reduced. I noticed that the administrators of the college were putting an emphasis on enrollment as a means of increasing revenue.

The emphasis on enrollment itself was not what concerned me, but rather that the college focused primarily on bringing in new students to increase enrollment and paid little attention to the students currently enrolled. I became concerned that a focus on enrolling new students might not be the best use of the college's resources and a term from my prior work experience, *customer acquisition cost*, came to mind. Customer acquisition costs are those costs incurred by a company to obtain a customer and are analogous to matriculation costs in higher education. The college had already incurred these acquisition costs on the current students, yet the emphasis was on finding new students, which meant more acquisition costs. This focus on new students got me thinking about the cost of enrollment or matriculation, as I refer to it in this study.

### **Conceptual Framework**

As I evaluate the cost of student matriculation in a community college setting, I do so through a lens of efficiency. No single author is attributed with the use of efficiency as a framework for examining higher education finance or how institutions use resources; however, there are examples of efficiency in higher education literature. Efficiency is often times incorrectly used as a synonym for productivity but these two terms do not have the same meaning (Belfield, 2012). Productivity varies from efficiency in that productivity measures outputs over inputs (Romano & Palmer, 2016) whereas efficiency can be defined as "the production of a given output at the lowest possible cost" (Belfield et al., 2013, p. 3). Said differently, productivity measures the level of output at a given level of input and an increase in productivity comes from either an increase in output at the same level of input, or maintaining the same output while decreasing input. For example, if a laborer who was able to make 2 widgets per day is replaced by a laborer who is able to make 4 widgets per day, there is an increase in productivity. Efficiency on the other hand considers not only the level of output from

a given level of input but also the cost of input needed to generate the output. If the laborer who makes 2 widgets per day is paid \$100 per day and his replacement, who makes 4 widgets per day, is paid \$240 per day, the cost of labor per widget increases from \$50 per widget ( $\$100/2$  widgets) to \$60 per widget ( $\$240/4$ ). This change may have increased productivity but it decreased efficiency since the labor cost of producing a widget increased by 20%.

Community colleges often seek to improve efficiency by attempting to reduce the cost of outputs such as credit-hours. To reduce the cost-per-credit-hour, community college leaders might increase class sizes or rely more heavily on adjunct faculty members, who typically earn less than their full-time counterparts (Jenkins & Belfield, 2014; Romano & Palmer, 2016). These efficiency gains are short-sighted and improving efficiency in terms of a cost-per-credit-hour does not necessarily make the college more efficient if the output shifts credit-hours to degree completion (Bailey et al., 2015), something I discuss in Chapter II of this document. Along with potentially decreasing the efficiency of the college, increasing class size or relying on more adjunct faculty members can have an impact on the quality of education students receive. Quality remains “the elephant in the room” in the discussion of improving efficiency in higher education due to its ambiguous nature. Quality is difficult to measure and often the definition of quality is dependent upon the stakeholder’s vantage point (Romano & Palmer, 2016). Employers and politicians are likely to define quality differently when examining higher education, as the former is looking for skills-based outcomes like critical thinking or the ability to perform tasks, while the latter is looking for the social and economic outcomes of degree completion (Romano & Palmer, 2016).

Improving or even measuring efficiency can be challenging for community colleges. First, inputs (i.e. resources) used by the college can vary based on student characteristics,



behaviors, and choices. For example, students who sign up for science-oriented programs will take courses that require more resources than liberal arts courses, which typically require little to no equipment costs (Belfield, 2012). Additionally, it can be difficult to determine how much input goes into generating an output like degree completions. A 2012 National Research Center panel attempted to measure the inputs associated with productivity but found this difficult as most higher education institutions don't collect the necessary data (e.g. separating cost of labor into instruction, research, student support, etc.) for an accurate measurement (Jenkins & Rodriguez, 2013). Despite these challenges, attempts to measure productivity and efficiency forge ahead in the literature on community college and higher education costs. As I describe in Chapter II, this study of student matriculation, which focuses on one piece of the inputs needed to produce community college graduates, contributes to the literature on community college costs and efficiency.

### **Importance of Topic**

Community colleges generate revenues from three primary areas: tuition, local property tax appropriations, and state support. Compared to four-year institutions, community colleges are more dependent upon state and local governments for fiscal support largely because of the relative inability of community colleges to generate alternative monies through fund raising, research contracts, and other revenue sources that can make up for diminished government appropriations (Palmer & Romano, 2018). In 2013, community colleges depended on state and local governments for approximately 46% of their revenue per full-time-equivalent (FTE) student compared to 18% at public research universities. Additionally, public research institutions generated 36.8% of revenue per FTE student from gifts/donations and auxiliary services compared to only 10.8% at community colleges (Desrochers & Hurlburt, 2016). Despite

community colleges' heavy reliance on state support, they are often left at the short end of states' funding streams. Since the 1970s, community colleges have received less than 20% of all state support for higher education (Mullin, 2010) despite enrolling approximately one-third of all incoming first-time college students (National Center for Education Statistics, n.d. b) and spending less per student than four-year institutions (Mellow & Heelan, 2015).

Since community colleges have limited control over the state and local support they receive and limited abilities to raise external funds, tuition dollars driven by enrollment constitute the only revenue stream they can truly influence. But even the influence on enrollment can be limited by population and economic changes in the districts served by the colleges. The number of students enrolled at community colleges fell by 3.4% from the spring of 2018 to the spring of 2019, decreasing the tuition base these institutions can depend on (Fain, 2019). This illustrates the limited ability of community colleges to control revenue streams and, consequently, underscores the considerable pressure placed on the colleges to use their financial resources efficiently. The activity cost data generated in this study highlights one aspect of fiscal efficiency—the extent to which colleges recoup recruitment and matriculation outlays as a consequence of revenues subsequently generated as students take courses. Although a newly enrolled student is sure to bring more tuition dollars in the door, this study demonstrates how the increase in tuition compares to the upfront costs incurred to enroll the student. Comparing the incremental tuition revenue to the incremental cost of enrollment informs colleges of the financial impact of new student enrollment.

## CHAPTER II: REVIEW OF PRIOR LITERATURE

### **Background**

The matriculation process, or the process by which a student is recruited, admitted, and enrolled into courses at the college, serves as the first test students must complete when entering a community college. Karp and Bork (2012) observe when a student transitions into a community college, not only does his or her role as a student change, but so do the expectations of that role. Almost immediately, new students are required to navigate a complex process that ultimately admits, tests, advises, and enrolls them into courses (Karp & Bork, 2012). Just as understanding how to navigate the matriculation process is key for student success, understanding the matriculation process is also key for understanding how efficiently the college executes this process.

The literature on student matriculation in community colleges brings to light three major activities – marketing and recruitment, admission, and enrollment services. Each of these activities and the associated literature are described in the following pages.

### **Marketing and Recruitment**

Before students enter the community college, they must see the college as an option for higher education. Baston (2018) uses the term “connection” to describe the period that begins with a student’s initial interest in the college and ends with a student submitting an application. During this phase, students can either build momentum towards admission or lose interest, depending on how the college is able to engage with them (Baston, 2018). To get the attention of prospective students, colleges use traditional advertising methods like billboards, television commercials, or radio ads. In recent years, ICC has coupled these traditional techniques with more modern approaches, including an increased social media presence, ads on social media,

targeted digital ads, etc. While these tactics might help establish the college's brand awareness, the most effective techniques for student recruitment include personal interaction with the potential students themselves. According to a Noel-Levitz, Inc. (2011) report, community colleges reported open house events for prospective students and high school student visit days as some of the most effective strategies in student recruitment. Additionally, community colleges host information sessions in high schools in an attempt to develop potential students' interest in the college.

Working closely with area high schools might help attract traditional aged students, but different techniques are needed for nontraditional aged students. Non-traditional aged students typically include those over the traditional college age of 18-24 years old (Cohen et al., 2013). To reach these non-traditional students, Buckwalter and Togila (2019) observe that community colleges partner with employers and local community groups to highlight the programs of study available. This includes holding events at area employers to promote college programs in the same field or allowing employers and community organizations to host events on the college's campus, allowing potential students to come to campus in an informal manner (Buckwalter & Togila, 2019).

The biggest challenge community colleges face in engaging new students, much like any organization engaging in the pursuit of new customers, is knowing what marketing efforts (or combination of efforts) ultimately lead to students making the decision to apply. The face-to-face interactions might be seen as most effective per the research but what is unknown is if the radio ad the student heard or billboard they saw the week before or after the face-to-face interaction was a contributing factor as well. In 1988, Bogart and Galbraith's work observed that many community college leaders thought marketing and efforts would continue to increase in the

future (Bogart & Galbraith, 1988). Thirty years later, community colleges continue to engage in these activities to connect with students. Despite a willingness to welcome practically any student with an open access mission, it would seem community colleges will be forced to make marketing and recruitment a primary concern for the near future.

### **Admission**

The admission process in a community college is more than just an online or paper application. It is true that community colleges are open access institutions, meaning they will admit any student that applies; however, the admissions team in a community college can play a critical role in a student's success at the college (Roman, 2007). The admission officers often serve as a first point of human contact with potential students. As mentioned above, community colleges have the most success with recruiting students at face-to-face events (Noel-Levitz, Inc., 2011) and these events often include the admissions team. As a result, it is critical for the admissions team to be more than just college cheerleaders (Roman, 2007). Along with promoting the college, the team must help students understand the expectations of their chosen degree program and the various institutional supports that are available. Additionally, it is not just the Student Services area of the college but also the Academic Affairs personnel and faculty who are counting on the admissions team not to only enroll students but to ensure the students who do enroll are aware of what will be expected of them. To do this, the staff must be properly trained in assisting students of diverse backgrounds including first-generation students, traditional aged students, etc. (Roman, 2007).

As part of the admissions process, some institutions have moved to concierge like services, especially related to adult students. In community colleges, and other higher education institutions, the admissions process is geared towards a traditional aged student coming out of

high school, allowing adult students to become lost in the mix. The concierge employed at some community colleges, serves as a single point of contact for adult students as they navigate the admission and enrollment process (Michelau & Lane, 2010). The concierge, much like the admissions staff, can help students complete the application process and understand the expectations of them as new students. This assistance can make a huge difference for community college students as those who apply to the college may not be as technologically inclined (Chan, 2017), and may struggle to complete the application in the first place.

Rosenbaum et al. (2009) suggest that the community colleges need to take more responsibility in guiding the student through matriculation and career choice process. As Karp and Bork (2012) suggest, the student is expected to know how to navigate the college's many processes just to be able to sit down in a seat on the first day of class. The concierge service is a step in the right direction, but Rosenbaum et al. call for the community college to do more for the student. By acting more like occupational colleges, where students are effectively taken by the hand from the point of admission through post-graduation job searches, community colleges can improve student matriculation efficiency by reducing barriers for students and better educating them on the necessary steps to successful matriculation (Rosenbaum et al., 2009).

Completion of the admissions phase of matriculation includes the student submitting an online application and being accepted by the college. At ICC, once a student completes the application, an auto-generated email containing the student's identification number (a unique number identifying the student in the college enterprise system) is sent to the student. A second email, congratulating the student on acceptance to the college, is also sent. Unsurprisingly, there is no literature on this technical function that establishes the student within the college system.

Instead, the focus of the literature tends to be on the third function in matriculation – enrollment services.

### **Enrollment Services**

Duniway (2012) refers to the process of admitting, testing, advising, and orienting students as enrollment management. Institutions can measure the effectiveness of enrollment management practices by establishing benchmarks in the areas of admissions, testing, financial aid, and the like (Duniway, 2012). Benchmarks are often defined as industry or institutional standards for a set of metrics, but internal benchmarks can also be set and used for performance evaluation. The use of benchmarks allows institutions to identify specific areas where performance can be improved. For example, in the area of admissions, an institution should not just measure success based on the number of new students matriculating in an academic year; instead, it should measure the admissions yield – that is the percentage of students who were admitted who actually enroll in courses (Duniway, 2012).

Setting benchmarks for various matriculation activities is helpful to colleges as they seek to improve efficiency, but student input into the process of establishing these benchmarks cannot be ignored. Students often receive very little guidance on basic tasks like completing an application or having a photo taken for a student identification card and default to asking advisors for help with everything necessary to complete the process. This is troublesome since most colleges have advisor-to-student ratios between 800:1 and 1,200:1 (Jaggars & Fletcher, 2014).

If they are unable to ask an advisor, students also look for information online, making the college's website an important component of a student's successful matriculation. Many students believe online resources can contribute to their success in academia and in completing the

enrollment process; however, when they go online, they often find answers to questions the colleges think students might have instead of the questions students actually do have (Swett, 2016). In response to this, some institutions develop online resources with student input and make these resources part of the orientation process. These student-influenced online resources not only allow students to get questions answered in an efficient manner, but also free up advisors to focus on student questions related to career and program choices (Swett, 2016). Most of the literature related to student matriculation, or on-boarding as it often called, focuses on individual institutions as case studies that analyze how community colleges have tried to improve the matriculation process.

The use of technology and online resources can make the matriculation process more efficient for the student and more cost-effective for the college. But when these resources are not up to par, advisors and other enrollment staff spend most of their time helping students navigate the process rather than advising them on career-related decisions (Jaggars & Fletcher, 2014). That said, not all community college students are going to be comfortable relying solely on a website for answers to their matriculation questions. One option is to triage the process by pushing students to the online component early in the process so that those who need face-to-face help can be identified quickly. To do this, institutions can establish a computer lab near the student service area that is monitored by enrollment staff who are available to help with questions. Students who do not need help can rapidly move through the matriculation process and those who do need help can be assisted in a more traditional method such as a one-on-one meeting with a staff member (Jaggars & Fletcher, 2014).

A second approach to improving the effectiveness of the matriculation process is using groups. Students can be tested, advised, or oriented in a group setting, which allows many



students to be served by a small number of college staff. While it might seem counter-intuitive that a group approach would lead to more student success, when comparing students who participated in group advising to those who did not, there is a modest increase in grade point average for the participants (Hollins Jr., 2009). In order for these efforts to be successful, the groups must be formed based on criteria that lead students with common characteristics to be placed in the same group. As Hollins Jr. (2009) demonstrates, a student's academic performance can serve as a measuring stick for the effectiveness of an institution's matriculation process. After all, if navigating the matriculation process is a barrier to student success, those who succeed academically are likely those who matriculated without many issues.

Upgrading technology or revamping the matriculation process can be difficult for community colleges. A lack of resources or even knowledge of the most effective practices can be serious barriers to success (Ritze, 2006). Ideally, community colleges would have technology that prepares students' schedules for them, provides early alerts when students start to flounder, and frees up advisors to use a case management approach to advising. The case management approach changes the advising function from preparing schedules or filling out forms to guiding students through the community college experience while preparing them for what comes next (Kemplin et al., 2019).

Along with the case studies, literature on specific functions within the matriculation process sheds light on how institutions are shifting their thinking in this area. Some community colleges have developed bridge programs between the college and area high schools. While some of these programs might work on student skill development, others seek to generate conversations between the college and high school employees around student expectations at the college level (Rodriquez, et al., 2017). Over two-thirds of incoming community college students

require some level of remediation in part because students are not aware of how the expectations made on them as students change as they move from high school to college (Kurlaender & Larsen, 2013). How students land in remedial courses is not only a function of the change in academic expectations or of their academic skills, but also a function of how community colleges measure student readiness. Many community colleges require incoming students to take a placement test, which unlike the ACT or SAT, most students do not prepare for, largely because they are not even aware of the exam until they are told to take it (Scott-Clayton, 2012).

In community colleges, placement tests have long been used as a way to measure a student's level of preparedness in subjects like math and English, despite their limited ability to predict future student success in these same areas (Scott-Clayton, 2012). These tests are relied upon for determining which students should be placed in remediation and college-level courses. This placement is critical as those who are placed into remedial courses are not likely to complete the remedial sequence and, in turn, not likely to complete a degree program (Scott-Clayton, 2012). Recently, the use of a multiple-measures approach to assessment is gaining popularity in community colleges. Using high school data, standardized test scores, and placement tests scores allows community colleges to gain a more complete picture of the student; however, like most changes in higher education, the upfront costs of collecting these data must be considered (Ganga & Mazzariello, 2019).

The literature on student on-boarding demonstrates the challenges community colleges face. Student matriculation is far from a standard process and the ability to keep up with the needs of students is often dependent upon the college's ability to upgrade its technology or increase staff time dedicated to on-boarding. While dedicating more staff time or upgrading technology might seem logical, cash-strapped community colleges must be cost-conscious when

making these decisions. This cost consciousness has led to conversations about how community college employees spend their time and how community colleges might measure cost-efficiency.

### **Review of Prior Research**

In line with this focus on efficiency, this study employed Activity-Based Costing (ABC) in an assessment of the costs associated with matriculating a new cohort of degree-seeking students at a community college, determining if and when the college recoups those costs through the tuition revenues paid by the newly admitted students as they take courses. The study therefore adds not only to the literature on onboarding, but also to the body of research on ABC applications in higher education. There are many studies about cost analysis in higher education, yet none of these studies specifically focus on the cost of student matriculation at a community college. The studies that do apply ABC as the tool of analysis tend to focus on using ABC to analyze the use of faculty time (Carducci, Kisker, Chang, & Schirmer, 2007) or the administrative activities of running graduate programs (DeHayes & Lovrinic, 1994). While no study specifically measures the cost of student matriculation at the community college level, the literature on ABC in higher education provides community colleges with a sampling of how this costing system might be used to understand the consumption of resources within any area of the institution.

### **The Use of Activity-Based Costing in Higher Education Institutions**

There is a growing body of literature on the use of activity-based costing in higher education. These works cover a wide variety of perspectives from international institutions (Lutlisky & Dragija, 2012; Berry, 2014; Hayati et al., 2018) to community colleges (Carducci et al., 2007) and from a partial adoption of the methodology (DeHayes & Lovrinic, 1994; Cox et al., 1999) to a full embrace of the ABC approach (Matkin, 1997; Milano, 2000; Ismail, 2010).

No matter the institution or the level of adoption, the use of activity-based costing has become more common in higher education, though writings tend to split between those strongly advocating for the implementation of ABC in higher education and those cautioning leaders on potential drawbacks.

A common theme running through the writings of those advocating for this approach to accounting is the admonition that without activity-based costing, colleges and universities cannot fully understand the costs of the services they are provide. The goal of costing systems is to capture direct costs of developing a product or providing a service and to allocate indirect costs (i.e., those costs not directly associated with providing a product or service) to various products, services, or customers. Traditional costing, first developed in the 1920s, takes a very simplistic approach in that it assumes all indirect costs are the function of the same cost driver, typically something related to labor (Lawrence, Gabriel, & Tuttle, 2010). Traditional costing doesn't accurately reflect the consumption of resources (Lawrence et al., 2010) and consequently is seen as inferior to activity-based costing (Matkin, 1997) especially as it relates to the functionality of the data each system uses and/or provides (Hashim, 2013). Activity-based costing on the other hand assumes that indirect costs can be grouped into specific cost buckets, each with its own cost driver. By grouping costs and identifying a driver for each group, activity-based costing provides a more detailed picture of how costs are consumed (Carducci et al., 2007). For example, in a community college, the cost of running the testing center is likely driven by the number of exams administered, whereas the cost of tutoring lab is likely to be driven by the number of student appointments. Each of these services is indirectly related to educating the student but have different cost drivers. In each scenario, the more demand for the service (i.e. the more placement exams or tutoring appointments requested), the greater the cost of providing the service.

Activity-based costing has been characterized by Lutlisky and Dragija (2012) as “the most significant costing innovation in higher education” (p. 36), providing a sense of the enthusiasm some scholars have for the costing methodology. Advocates promote it as far superior to traditional methods of accounting for costs and provide specific examples of where it can be applied. Determining how faculty and staff use their time can be calculated (and potentially improved) by using activity-based costing. For example, Cox et al. (1999) applied activity based costing to answer the question “how do faculty spend their time?” Specifically, the authors asked faculty at a research institution to project how their time could be split between the four major activities of instruction, research, public service, and administrative duties. Institutional resources, provided by the state, were then allocated to these activities (and subactivities identified in each) based on the faculty projections. The actual use of faculty time was then tracked for comparison purposes. When faculty received performance reviews, the expected time projections were then compared to how faculty actually spent their time and whether or not the faculty successfully completed tasks assigned to them at the start of the year. Activity-based costing allowed the institution to have a clearer picture of what faculty members are doing and to more accurately align fiscal support with the activities that consumed the faculty’s time (Cox et al., 1999).

ABC has also been used to assess the cost of using various course delivery models and determine the profitability of specific university departments. An example of the former can be seen in the work of Garbett (2001), who determined how various course delivery methods (face-to-face, hybrid, online, etc.) affect the cost of educating students in European institutions. An example of the latter can be seen in the analysis undertaken by Lawrence et al. (2010) who

illustrated how ABC could be used to understand the cost of athletic programs at Division I institutions.

Additionally, ABC can be used to measure the financial performance of certain majors or degree programs. As an example, Yakhou and Ulshafter's (2012) work used ABC to develop a balanced scorecard approach for institutional accountability measures. This balanced scorecard approach ensures the institution's strategic objectives are being achieved and uses ABC to measure progress and establish performance goals. Matkin (1997) demonstrated how ABC can be used more narrowly by applying it to continuing education courses. Matkin observes that ABC required administrators tasked with running a continuing education program to "understand the relationship between all activities and costs and forces an assessment of how resources are being allocated to strategic objectives" (Matkin, 1997, p. 62). In other words, ABC helps bring to light how resources are being used and allows administrators to see if the use of resources is in line with the institution's mission. These two studies show the bookend of possibilities to applying activity-based costing, from full institutional deployment to program specific usage. It is clear that activity-based costing has a place in higher education, but to what extent should higher education institutions deploy ABC? Some say it is time to dive all the way in by employing activity-based management.

Activity-based management represents a full embrace of activity-based costing. Instead of just using activity-based costing to understand how resources are consumed in the college, activity-based management calls for using activity-based costing as a means of establishing budgets, measuring performance, and complying with external reporting requirements. Those who advocate for activity-based management observe that embracing this management style won't just lead to a better understanding and allocation of resources, but also to an opportunity to

reduce financial waste while also improving quality (Lutlisky & Dragija, 2012). Activity-based management would be a significant shift in managerial styles for many higher education institutions, especially as it relates to not only gathering data but also acting on it (Milano, 2000). Despite the dramatic shift in managerial styles that comes with activity-based management, many institutions may not have a choice but to consider it.

The adoption of popular external management techniques can force higher education institutions into action in times of uncertainty (Birnbaum, 2000). In an age of accountability and unsteady financial support from state governments (Palmer & Romano, 2018), higher education has been thrust into an uncertain era. College administrators are now being forced to better reallocate resources rather than depend on new revenue as they have in the past. These same administrators seek reliable data on which to make these allocation decisions but find the data to be inaccurate or missing all together (Hurlburt, Kirshstein, & Rossol-Allison, 2014). The adoption of activity-based costing at some level, whether it is simply to understand resource consumption, or a full embrace of activity-based management would seem to be a viable way out of the financial issues these institutions face.

Those who caution against using activity-based costing are not necessarily against using it as a costing system but note there are considerable risks and drawbacks. ABC requires, for example, a significant upfront financial investment, especially in the area of data collection (Berry, 2014). To establish an activity rate for a given activity, data needs to be gathered around the products or services or customers consume as well as the corresponding cost drivers for these products and services (Ismail, 2010). Often times the data gathering requires asking faculty and staff how they are using their time on a daily basis, which they might resist or may not be able to do accurately (Cropper & Cook, 2000; Berry, 2014). Additionally, software to track and store

activity costs, rates, data, and alike is scarce, especially in the areas of human resources and payroll (Berry, 2014). To address these issues, higher education leaders who are interested in implementing ABC should attempt to use software currently owned by the college that is capable of data collection, storage, and analysis. Simple programs like Microsoft Excel or Access can be tested before making the jump to a larger enterprise system. Further, institutions should define to what level of detail they wish to collect data. Cokins (2000) observes that when banking institutions implement ABC, they tend to assume more detail leads to better results when, in reality, too much detail can lead to organizations becoming overburdened by the ABC system, offsetting the benefits of implementation. Despite the challenges of implementation and data management, if the data is collected properly, it can lead to an uncovering of inefficiencies and may surprise institutional leaders as to exactly how much each service costs to provide (DeHayes & Lovrinic, 1994).

Along with the financial and logistical issues that come from adopting activity-based costing, the cultural impact on the adopting institution can be significant and long-lasting. Activity-based costing requires a change in how the institution thinks about costs (Simmons, Wright, & Jones, 2006), shifting from a world where very little is measured to one where almost everything is measured. Furthermore, identifying the process of a manufacturing outfit is usually easy since each product follows a standard path; however, this is more difficult in higher education where procedures can be less clear (Berry, 2014). Faculty and staff may feel threatened by the way activity-based costing begins to question how their time is spent, which could lead to a resistance to its implementation (Cropper & Cook, 2000).

In summary, activity-based costing, like any other new management technique that comes to higher education, has its supporters and its dissenters. If done properly, activity-based



costing provides an insightful perspective on the true cost of educational offerings (Carducci, et al., 2007) but institutions must weigh the cost of implementation against the benefits of adoption. These implementation costs include both the financial and cultural impact on the institution (Berry, 2014). In a time where higher education institutions are forced to “do more with less” (Hurlburt et al., 2014, p. 1), the leaders of these institutions are forced to decide if the benefits of activity-based costing outweigh the financial and cultural costs.

### **Cost Per Completion**

Cost-efficiency is a primary goal of those advocating for the application of ABC techniques in higher education. For community colleges, cost-efficiency means providing the highest quality educational services to students at the lowest possible cost. But how do community colleges measure cost-efficiency? Should it be measured on a per credit-hour basis? Is a cost per course or per degree completion basis more appropriate? Computing the cost per course or degree completion basis is challenging in an industry as complex as higher education, and there is a need for a more consistent vocabulary and measuring system as each state or institution measures cost-efficiency differently (Johnson, 2009).

Traditional cost-efficiency metrics typically start with the cost-per-credit-hour calculation, which takes the cost of instruction over the number of credit-hours, ignoring any non-instructional costs (Romano et al., 2010). Focusing on the cost-per-credit-hour in any given semester leads administrators to make decisions that may improve cost-efficiency in the short term but hurt the long-term cost efficiency and often lead to poor student outcomes (Bailey et al., 2015). For example, colleges may decide to increase class sizes or the employment of part-time faculty members at the expense of full-timers. Both would reduce costs per credit-hour but potentially lower the probability of student persistence and completion.

Consequently, and in the spirit of activity-based costing, researchers have begun to calculate completion costs; that is, the costs borne by the institution in leading students to completion of a credential. One pioneering study conducted by Romano et al. (2010) at a New York community college calculated the cost of leading students to associate's degrees in two ways. The first was the "catalog method" whereby the authors calculated the cost of a degree by measuring the number of required program credits hours listed in the college catalog and multiplying it by the cost-per-credit-hour. The second approach was the "transcript method," whereby the authors calculated the cost of a degree by using the total hours listed on a student's transcript and multiplying by the cost-per-credit-hour. The former assumes that students enroll in and complete only those courses prescribed by the course of study published in the college catalog. The latter is based on courses listed on the graduate's transcripts and reflects actual student behavior. Romano et al. (2010) found that the average catalog cost per degree was lower than the average transcript cost per degree, suggesting that students often take more courses than necessary.

Bailey et al. (2015) make the case for using cost-per-completion by arguing that student completion should be a primary goal of any community college and that using cost-per-completion is a more accurate measurement of the college's efficiency in achieving this goal. Unlike Romano et al. (2010), who examined the completion costs of students graduating in a given semester, Bailey et al. (2015) calculated completion costs for those in a cohort of first-time students who were admitted to a large community college at a single point in time. To compute cost-per-completion, all costs related to educating students in this cohort over X years, including those who dropped out, are summed and then divided by the number of successful completions from the same cohort. Bailey et al. (2015) define successful completions as "associate degree

equivalents” (p. 177) since not every student who achieves success in a community college earns an associates degree. Along with conferred associates degrees, students who earned certificates were counted as a half associate degree and those who made successful progress toward an associate degree but transferred to a four-year institution before completing the degree are included. Using cost-per-completion forces administrators to think about both the numerator - the costs of educating students- and the denominator - the number of completions (Bailey et al., 2015). The cost-per-completion approach runs contrary to the way many community college administrators currently think about costs because funding of these colleges is often dependent upon enrollment in any given year rather than on student progress over time (Jenkins & Rodriguez, 2013). This enrollment mindset leads to a focus on reducing costs (in the numerator of the equation) without considering to the impact on completions (the denominator).

Manning and Crosta (2014) contribute to the conversation by suggesting when the cost-per-completion metric is understood; administrators can manage the cost in ways that will not affect student success. Rather than reducing costs in the short-term by relying on adjunct faculty members or increasing class size, administrators can focus on long-term factors like updating curriculum or sharing equipment across programs (Manning & Crosta, 2014).

The cost-per-completion metric calculated by Bailey et al. (2015) seeks not only to compute the cost of student completion but also to compute the cost of student completion while accounting for student attrition. Attrition is when a student leaves higher education without completing a degree or certificate program first (Johnson, 2012). Up to the point of leaving the institution, the students who do not complete consume the same amount of resources as those who do; consequently, the cost of educating these students should be considered when determining cost-efficiency. Johnson’s (2012) cost of attrition study, like the analysis conducted

by Bailey et al. (2015), considered the cost of educating non-completing students, but did not specifically break out the upfront matriculation costs. This study did just that, breaking out the cost of matriculation to inform community college leaders.

Both the activity-based costing literature and the cost-per-completion literature contribute to a meta-conversation surrounding accountability within community colleges. As the focus of the community college in the United States has shifted from access to completion, works like Bailey et al. (2015), Manning and Crosta (2014), and others have contributed to conversations about what community colleges are doing with the resources provided to them. The activity-based cost studies contribute by asking what those who work in the community college, specifically faculty, are doing with their time and how they might use their time more efficiently. The cost-per-completion studies offer community colleges a new efficiency metric that addresses demand for greater accountability in terms of helping students transfer or earn credentials. The prior works in these two fields provide a solid foundation for my study.

### **Gap Analysis**

This study helps fill a gap in these three lines of literature. The activity-based costing literature focuses on how colleges use resources, but these studies primarily focus on the use of faculty time, not the time of those employees assisting students with matriculation. Further, many of the studies in this line of literature are not specific to community colleges. Because community colleges are open access institutions, meaning they admit any student who applies no matter his or her academic resume and skills, they face a different set of challenges related to matriculation compared to other higher education institutions. Four-year institutions are often selective, choosing which students to admit; as a result, the student mix and matriculation process is likely very different from a community college. Four-year institutions primarily enroll

traditional college-age students, those who often come directly from high school or transfer from a community college. Community colleges enroll a larger population of nontraditional aged students (National Student Clearinghouse Research Center, 2018 b), which can complicate the matriculation process. Of the 213,000 students age 24 and older who enrolled in higher education for the first time in the Fall 2018 semester, over 60% did so by enrolling in a community college (National Student Clearinghouse Research Center, 2018 b). Students 24 and older are at least five years removed from high school, making retrieving high school transcripts, standard test scores, etc., more of a challenge. Additionally, it is not a stretch to say that those age 24 and older are likely to have a more complex financial life than that of an 18-year-old, making the financial aid process more difficult.

The cost-per-completion works do not specifically break out the upfront cost of student matriculation. The cost-per-completion formula championed by Bailey et al. (2015) and Manning and Crosta (2014) does consider non-instructional costs but the upfront costs of student matriculation incurred by the college are not called out by name. Community colleges spend time and money helping students through the matriculation process, and an understanding of these upfront costs will contribute to the cost-per-completion conversation by demonstrating how the college spends resources outside of instruction. Johnson (2012) views student attrition from an institutional perspective but, like others, does not call out the upfront cost of student matriculation. This study builds off the work of Johnson (2012) by specifically identifying the institutional investment of time and resources made into each student's matriculation.

Many of the studies on student on-boarding highlight the areas where community colleges erect barriers to student matriculation and suggest opportunities for improvement; however, no study measures the costs of these activities. Jaggars and Fletcher's (2014) work

analyzes the various activities of one community college's matriculation process, but it does not discuss the institutional cost of these activities or how the proposed changes might improve the matriculation cost on a per-student basis. Additionally, this study not only computes the cost of matriculation but also allows the institution to establish a benchmark for student matriculation. As Duniway (2012) observed, benchmarking allows institutions that make changes to measure the degree of improvement; consequently, the establishment of benchmarks is key to measuring improvement in the student matriculation process.

In summary, this study contributes to the student on-boarding discussion by bringing the cost element into the discussion. While community colleges are not profit-seeking, they are institutions that must be cognizant of their costs and often find themselves strapped for financial resources. As a result, any time the college consumes resources, the rate of efficient use of these resources should be considered. That is not to say that cost-efficiency should be the deciding factor in how the college runs its operations; however, it is certainly something that cannot be ignored by the leaders of community colleges.

## CHAPTER III: METHODOLOGY

Community colleges have little influence over their revenue streams (Palmer & Romano, 2018) and consequently, they must use these limited resources efficiently. Further, community colleges are spending significant resources each year on student matriculation activities, only to watch many newly admitted students walk out the door in less than a year (National Center for Education Statistics, n.d. a). Based on these facts, the questions that guided my research are as follows:

1. What are the activities and costs associated with the matriculation process at a community college?
2. What is the cost of matriculation per student during the Fall 2019 admission period at Illinois Central College?
3. At what point during the student's academic tenure does the college recoup the matriculation cost?

### **Research Approach**

This study relied on a cost accounting method known as Activity-Based Costing. In Activity-Based Costing, costs required to make a product or provide a service that are used by multiple products or customers, are grouped into various activities (Whitecotton et al., 2017). These costs are then allocated to products or customers based on how the products or customers consume the costs. One way to allocate the costs is to establish a rate for each activity and then apply the rate as a customer consumes the cost. For example, in a manufacturing environment, a company might have a quality inspection team that tests a sample of products to ensure quality standards are met. If the cost of the team is \$100,000 per year and the team performs 10,000 inspections a year, the cost per inspection is \$10 ( $\$100,000/10,000$ ). If product A requires 2,000 inspections, then \$20,000 ( $2,000 \times \$10$ ) of the inspection cost is allocated to product A. Alternatively, a proportional approach can be used to assign costs. Since product A consumes 2,000 of the 10,000 inspections, it consumes 20% ( $2,000/10,000$ ) of the total inspections.

Consequently, product A should be allocated 20% of the inspection team cost or \$20,000 (\$100,000 x 20%). Each approach allocates product A the same amount of cost for inspections. Relating back to my study of the cost of student matriculation, I employed the proportional approach when allocating the cost of matriculation activities to first-time degree-seeking students. For each activity, I determined what percentage of the resources is spent on first-time degree-seeking students and allocated the cost of the activity accordingly.

I collected accounting and matriculation data for the Fall 2019 semester at Illinois Central College (ICC) for this study. Data from March 1, 2019 to August 18, 2019 was used as this is considered the fall 2019 semester's "enrollment window." March 1, 2019 is the date the fall schedule first became available, allowing students to see what courses the college would offer along with what days of the week and times the courses would be offered. August 18, 2019 is the day before the first day of classes and represents the last day a student can enroll in a course without the instructor's permission.

The study specifically focused on students who are degree-seeking and matriculating in college for the first time by choosing ICC. Matriculating students include those who fully completed the enrollment steps, signed up for courses, and attended these courses as the academic term began. Those students who completed only some of the enrollment steps and ultimately did not enroll are not included in this study. Also not included are Early College students (students who are still in high school and taking ICC courses) or Visiting Students (students who are enrolled at another institution but are taking a course at ICC).

### **Identifying Matriculation Activities at ICC**

The first step in determining the matriculation activities at ICC was to have conversations with college leaders in the enrollment area of the college. To do this, I had informal discussions



with my colleagues at ICC in order to understand the matriculation process. I spoke with the Dean of Enrollment Management at ICC to determine the meta-activities involved in the matriculation process. The meta-activities that came out of the discussion included the following: marketing, on-boarding (also known as admissions), placement testing, advising, and course enrollment/financial aid (also known as enrollment services). Additionally, I spoke with the Dean of Students (who oversees advising), the Director of Admissions, the Director of Testing Services, the Director of Marketing, and the Director of Enterprise Systems.

In each of these conversations, my colleagues provided a description of the steps necessary for student matriculation. Based on these conversations, I have outlined each of the activities necessary to matriculate a student at ICC, as well as a cost driver for each.

1. Marketing – The marketing department is responsible for generating awareness of the college in the community, informing the community of the offerings at ICC, and attracting future students. Marketing activities include using direct mail, radio, TV, billboards, social media etc. These campaigns are often targeted at a specific group of students based on location and the time of year. For example, as the start of the semester approaches, a targeted mailing is sent out to those students who have enrolled in courses for the upcoming term but have not established a payment plan. These students have completed nearly every step in the matriculation process but without a payment plan in place, they will not be able to remain enrolled when the semester begins. Costs for the marketing activity include the salaries and benefits of the marketing staff and any costs incurred for ads directed at potential new students during the enrollment period.

*Cost Allocation* – Allocating the cost of marketing was one of the more difficult tasks in this calculation. ICC has a relationship with a vendor in which it simply pays the vendor a lump-sum and the vendor provides radio & television commercials, billboards, and social media ads. While

the target audiences can vary from former students who did not complete to high school students exploring college options, a breakout of marketing spend into these categories is not available. Further, despite a shift toward online advertising where more data is gathered, it is virtually impossible to know what means of advertising ultimately made the difference to the student. A postcard sent to a working mother who once attended ICC might land on the kitchen table, only to be picked up by a high school sophomore who then becomes interested in attending ICC. As a result, in the primary calculation, I included the full cost of the marketing team and advertising spend during the enrollment period. In the alternative calculations, I included a percentage of each as not every dollar is definitively attributable to new students.

2. Admission/Student On-boarding – ICC’s admissions office serves as the first point of institutional contact for many students. The staff spends all its time, energy, and resources on the recruitment of new students. This includes contacting students during the application process and meeting with students face-to-face at various events. For example, the office staffs an individual in some of the local high schools a few days a week, focusing on the recruitment of low-income and first-generation students. It also holds enrollment days for high school students in the college’s district where groups of 20-30 students come to campus to complete their matriculation process. Additionally, the admissions office offers informational events in the smaller towns within the district, answering questions from potential students and informing them about the programs ICC has to offer. Costs for the student on-boarding activity include the salaries and benefits of the staff associated with admission to ICC.

*Cost Allocation* – The admissions team is tasked with recruitment of new students to ICC. Although the admissions team works with all students, students who are not degree-seeking are not included in this study. To allocate the cost of this team, I looked at the number of new

degree-seeking students as a percentage of new students to ICC in the fall of 2019. This allocation excluded those new students who are nondegree seeking.

3. Placement Testing – Students who wish to enroll in English or Math courses must either submit standardized test scores or take a placement exam in the testing center. The testing center performs three primary functions:

1. Placement testing – for students enrolling at ICC for the first time
2. Exam proctoring – for students currently enrolled
3. In state/Out of State extensions – for non-ICC related exams

Students who have standardized test scores from the ACT or SAT may be able to bypass the placement exam; however, any student who wants to start with courses beyond the first level of transfer courses must take the exam. Costs associated with the placement testing activity include the salaries and benefits of the testing center staff during the enrollment period.

*Cost Allocation* - I found the number of placement exams administered during the enrollment window as a percentage of total exams administered across the three testing center services during the enrollment window and multiplied by the cost of the placement testing department.

4. Advising – After a student has been accepted and either tests or submits test scores, he or she will typically meet with an advisor to select courses. Advisors assist students in program and course selection as part of this process. Costs for the advising activity include the salaries and benefits of the advising staff during the enrollment period.

*Cost Allocation* - I allocated the cost of advising by multiplying the total cost of advising services by the number of new student advising appointments divided by the total number of advising appointments during the enrollment period. Like other activities, this approach captured the cost of advising students who matriculate as well as the cost of those who do not.

5. Course Enrollment/Financial Aid – ICC has a student services area dedicated to answering most student services questions. The enrollment and financial aid department is the

area where considerable resources can be spent on the student. Enrolling in courses can be done online once the student is eligible to do so, but in order to become eligible, the student needs to establish a payment plan, which typically means filing for financial aid. The financial aid process can be very cumbersome for students who have messy financial lives or do not have access to the necessary documentation, making it a major roadblock to matriculation. Goldrick-Rab (2010) observed “Student financial aid is the single largest investment governments make in community colleges. Yet many of the rules and guidelines governing the distribution of aid make it difficult for community college students to access and keep their financial aid” (p. 444). The Dean of Enrollment Management echoed the same idea by saying, “We are basically an extension of the IRS” when describing how this team must help students sort out their financial lives – which can include filing overdue tax returns. Costs for the enrollment services activity include the salaries and benefits of the enrollment services staff during the enrollment period.

*Cost Allocation* – ICC does not collect student identification information at the time of appointments within enrollment services. However, it does track the number of appointments and duration of the appointment grouped by the reason the student visits the enrollment services team. When students check in for an appointment, they are asked to enter their first name and choose a reason code, indicating the purpose of their visit. I determined the total amount of time for all appointments in the enrollment window, grouped by reason code. Next, I split the appointment reason codes into the following three categories:

1. Current Students Only - All appointment time that falls under this category is excluded. An example of a “Current Students Only” appointment includes reloading the students’ printing balance for use in campus libraries and computer labs.

2. Both Current and New Students - To determine what portion of appointment time to include in the study, I took the number of new degree seeking students in the Fall 2019 semester/total students in the Fall 2019 semester x the appointment time for the “Both Current and New Students” category. An example of a “Both Current and New Students” appointment might include making a tuition payment or financial aid questions.

3. New Students Only – All appointments in the “New Students Only” category is included in the allocation. An example of a “New Students Only” appointment includes submitting paperwork (like a high school transcript) to the college.

This allocation of Enrollment Services time is an important assumption in this study. Assumptions are not uncommon in activity-based costing studies because, as Berry (2014) noted, there are many challenges with data collection and storage when implementing activity-based costing. Ismail (2010) ran into a similar challenge when seeking to allocate the cost of faculty salaries. In his study, Ismail found some faculty teach across multiple departments, but the cost of the salaries and benefits of those faculty members were only charged to one department. As a result, the assumption was made that the cost of employing these faculty who teach across departments were solely for the purpose of performing duties in the department receiving the corresponding charges (Ismail, 2010). In a similar way, I am assuming that the percentage of time spent by the Enrollment Services staff serving first-time degree seeking students in the “Both New and Current Student” category is similar to the first-time degree-seeking students as a percentage of the total students enrolled.

As I dug through the enrollment services appointment data, I found that nearly 89% of the appointment time falls into the “Both Current and New Students” category, with 7% in the “New Students Only” category and the remaining 4% in the “Current Students Only” category.

As a result, I provided an alternative calculation. Excluding the “both current and new students” category, new students appointment time outstretches current student appointment time by a factor of almost 2:1. Consequently, I took the “New students only” appointment time over the sum of the “New students only appointment time” and “Current students only time” to allocate the “Both current and new student” appointment time. The formula is as follows:

**New Student Only Appointment Time in Minutes**

**New Student Only Appointment Time in Minutes + Current Student Only Appointment Time in Minutes**

Once I had this new allocation percentage, I multiplied it by the “Both current and new student” appointment time to determine how much of the mixed time to allocate to new students. I then added that allocation to the “new students only” time. Once I had the new student time, I divided it by all appointment time to allocate the cost of enrollment services.

In each of these five areas, the employees of ICC spend time, energy, and resources to assist students with matriculation. Apart from possibly skipping the placement exam by submitting standardized test scores, each of these steps is necessary for a student to be able to attend classes at ICC. My study, which calculated the cost of performing these activities, informs ICC how many resources are spent on a per-student basis, which allows the institution to set a benchmark for performance and evaluate the cost-efficiency of the matriculation process.

In addition to the activities outlined above, ICC performs an automatic admission process via PeopleSoft, its enterprise resource system. Once a student successfully completes an application, the system uses the student’s social security number to ensure the student has not attended ICC in the past. If the applicant is a new student, two automated emails are generated and sent to the student. The first is an email that welcomes the student to ICC and confirms his or her admission to the college. The second provides the student with an identification number and

login credentials for PeopleSoft, which the student will use throughout his or her tenure at ICC. Updates to PeopleSoft made in 2017 enhanced this automated process as part of a larger upgrade to the entire PeopleSoft system. As such, breaking out the cost of this process would be difficult and it is likely the cost of the upgrade on a per applicant basis is an immaterial amount (B. Finley, personal communication, March 25, 2020). Further, Carducci et al. (2007) observe there is benefit in excluding costs that are outside of the control of the front-line manager. The Director of Admissions can increase or reduce wage costs for the employees working in the admissions area but cannot do anything about the cost of automated admissions system. Consequently, excluding the cost from the study puts a focus on costs that can be changed if necessary.

#### **Determining Matriculation Costs per Student and Cost Recovery**

Once the cost of each activity was allocated to first-time degree-seeking students, I then divided the total costs of all activities allocated to first-time degree-seeking students by the number of first-time degree seeking students who matriculated in the fall 2019 semester. It is likely that some of the time, effort, and resources spent on some first-time degree-seeking students did not culminate in the student matriculating but these costs of serving these students are captured under my approach. The formula used to compute the cost of matriculation per student is as follows:

$$\begin{aligned}
 & \text{(Cost of marketing department) + (Cost of Admissions x \# new degree seeking students in} \\
 & \text{Fall 2019/new students in Fall 2019) + (Cost of Testing Services x \# of placement} \\
 & \text{exams/total exams administered) + (Cost of Advising area x \# of new student} \\
 & \text{appointments/total advising appointments) + (Cost of Course Enrollment/Financial Aid x \#} \\
 & \text{appointment time related to first-time enrollment activity/total appointment time)} \\
 \hline
 & \text{\# First-time degree-seeking students}
 \end{aligned}$$

To determine if the matriculation cost is recovered by the college, I calculated the margin per credit-hour. Margin per credit-hour, in this case, represents the price of tuition per credit-hour at ICC less the cost of instruction per credit-hour. As noted in previous studies, using a cost per credit-hour is limiting as it does not include the full cost of educating a student; however, determining the margin on a per completion basis is beyond the scope of this study. Measuring the margin per credit-hour is akin to calculating the profit per credit-hour. To calculate the margin per credit-hour, I used the following formula:

$$\begin{aligned}
 & \text{\underline{\underline{(Total Fall 2019 Tuition Revenue – Total Fall 2019 Cost of Instruction)}}} \\
 & \text{\# Total Fall 2019 Credit-hours}
 \end{aligned}$$

Tuition revenue was calculated using the total number of credit-hours attempted in the Fall 2019 semester at ICC x ICC's \$150/credit-hour tuition rate. The Fall 2019 cost of instruction calculation includes direct costs, made up of faculty salaries and benefits and any equipment necessary to complete instruction, as well as any indirect costs the college assigns to the academic departments. Indirect costs include the salary and benefits of academic deans and department administrative assistants as well the academic departments' general office expenses like supplies, printing costs, etc. The Fall 2019 instructional costs include direct and indirect



instructional costs for the months of August – December 2019. This full cost approach (including both direct and indirect costs) to calculate the cost of instruction is consistent with costing approaches used by Romano et al. (2010) and Bailey et al. (2015).

Once the margin per credit-hour was known, I divided it into the matriculation cost per student to determine, on average, how long it takes ICC to recover the matriculation cost. The formula used to determine the number of credit-hours required to recover the matriculation cost is as follows:

**Credit-hours Required to Recover Matriculation Cost per Student = Matriculation Cost per Student/ Margin per-Credit-Hour**

Understanding the matriculation cost and how long it takes the college to recover it allows the administration at ICC to make informed decisions when allocating resources. Depending on how ICC interprets the numbers, it may be that the administration is better off using resources to push enrollment or it may be the administration should reallocate those resources toward improving current student completion. Knowing the matriculation cost per student puts the decision makers in a position to make better decisions.

As is the case in many activity-based costing exercises, the results are only as good as the data allowed for. When digging through the data at ICC, I found two areas, marketing and enrollment services, where the data wasn't as complete as I had hoped for. As a result, I created a primary calculation, which uses the allocation methods described above, and three alternative calculations. In the alternative calculations, I suggest other ways the cost of marketing and enrollment services might be considered, which alters the cost of new student matriculation and the number of credit-hours required to recover this cost. A full explanation of the calculations and the corresponding results are found in Chapter 4 of this document.

## **Risks and Benefits**

Framing this study as a case study brought some benefits to the institution included in the study, Illinois Central College (ICC). Since I worked with ICC personnel to understand the matriculation activities and the associated costs, ICC benefited from an internal review of these same activities and costs. Further, this study informed ICC about its matriculation cost per student and how long the recovery period is for this upfront cost.

As with any study, there are risks involved. Specifically, a misinterpretation of the findings of the study could lead to decisions by the administration that influences student outcomes. To reduce this risk, I was diligent in my communication to ICC regarding the methodology of the study and the related assumptions. Despite this risk, the benefit to ICC of having an internal review of the matriculation process outweighs the risk of misinterpreting the findings. There were no risks to human participants in this study as participants simply provided information about the process and any data that was available. All cost data is available on ICC's website, and although the costs of matriculation include some salary and benefits of the employees working in this area, no identifying information is available and individual compensation cannot be deduced from the information used in the study.

There was also a risk that some academic departments might feel threatened by the study or the data, especially those with low margins. This risk was mitigated because I used a weighted average margin for the entire college, rather than individual academic departments.

## **Limitations**

This study is limited in that it only focuses on one community college in the Midwestern part of the United States. The matriculation processes in place at this college may or may not be the same as at other community colleges across the country. Further, this study focuses on

degree-seeking students who have no prior college experience. Students who come to the college with credit earned in high school, who transfer from another institution, or who are returning to the college after a break in their academic career are not included in this study.

Secondly, any study using activity-based costing comes with limitations, especially as it relates to data availability. Activity-based costing attempts to assign costs based on the departments, customers, products, or services that consume these costs, but rarely does it do so perfectly. Assumptions made about the data used in the study are documented in Chapters III and IV of this document.

In summary, by determining the matriculation activities, the cost of matriculating a student into the college, and how long it takes the college to recover the cost of matriculation, this study informs the leadership at Illinois Central College and other institutions. Specifically, it helps establish benchmarks for cost-efficiency related to student matriculation, identifies areas for improvement, and forces community college leaders to consider the effectiveness of recruiting new students instead of improving completion rates of current students.

## CHAPTER IV: FINDINGS

This study set out to understand the matriculation activities at a community college, the cost associated with providing these services to new students, and at what point, if ever, the community college recoups these costs. The study's research questions were as follows:

1. What are the activities and costs associated with the matriculation process at a community college?
2. What is the cost of matriculation per student during the Fall 2019 admission period at Illinois Central College?
3. At what point during the student's academic tenure does the college recoup the matriculation cost?

The study's findings are provided in this chapter and further analysis is provided in the following chapter.

### **Matriculation Activities and Costs Associated**

Five primary matriculation activities related to new student enrollment at a community college were identified in this study. These activities include marketing, admission, testing, advising, and enrollment services. A summary of the costs related to these activities is provided below.

#### **Gross Costs**

During the enrollment period (3/1/19 – 8/18/19), ICC incurred expenses of \$2,077,080 for services related to student matriculation. This number represents the total cost to run each of the departments identified in the study for the months of March, April, May, June, July, and half of August in 2019. Since the day the enrollment period ended, 8/18/19, was a Sunday, the true enrollment period ended on 8/17/19 which is roughly half of the month of August. Any cost adjustments related to using half of the month instead of 17 of 31 days would be minimal. The cost per activity detail is provided in Table 1 below:

Table 1 – Gross Costs

	Gross Costs
Marketing	\$ 579,299
Admissions	\$ 285,131
Testing	\$ 109,749
Advising	\$ 407,558
Enr. Services	\$ 695,343
Total Cost	\$ 2,077,080

The gross cost of the activities includes all cost-related to the activity during the enrollment period, including those that might be applicable to current students. The gross costs provide a basis for which to allocate new student matriculation costs.

### **Marketing Costs**

During the enrollment period, ICC incurred \$579,299 of costs related to the marketing department. This number includes both the salaries and benefits of the marketing personnel and the cost of advertising. A breakout of the advertising costs by target audience (new students, current students, former students, brand development, etc.) is not available. Consequently, the entire cost of the marketing department is included in the primary calculation. While it is safe to assume that not all marketing directly impacts new students, it is also impossible to know which billboard, radio ad, postcard, etc. was the determining factor in a student’s decision to investigate ICC as an option for higher education.

The Vice President of marketing suggested that not all marketing costs are aimed at new students and estimated 55% was for sure. Although there is no data to back-up this 55% number, it does directionally line up with the data point provided by the National Student Clearinghouse Research Center (2018 a), which states that less than 50% of community college students remain

enrolled in the same community college 12 months later. Consequently, it is used as an alternative calculation but should be noted as a limitation of the study.

**Primary Calculation Marketing Costs - \$579,299**

**Alternative Calculation Marketing Costs - \$318,614 ( $\$579,299 \times 55\%$ )**

### **Admissions Costs**

During the enrollment period, ICC incurred \$285,131 of costs related to the admissions department. This cost includes the salaries and benefits of the admissions team, as well as any expenses incurred related to hosting enrollment events. The cost of the admissions team is allocated based on the number of new degree-seeking students as a percentage of new students in the Fall 2019 semester. At the start of the 2019 Fall semester, 1,608 students enrolled in college for the first time at ICC and 1,437 of these students (89.37%) were degree-seeking.

**Primary Calculation Admissions Costs - \$254,810 ( $\$285,131 \times 89.37\%$ )**

### **Testing Costs**

During the enrollment period, ICC incurred \$109,749 of costs related to the testing department. This cost is primarily made up of the salary and benefits associated with the testing center. The testing center at ICC provides placement exam services for new students, as well as various services to current students. Costs of the testing center are allocated to new students based on the number of placement exam appointments as a percentage of total appointments. During the enrollment period, ICC administered 5,455 total appointments of which 3,691 (67.66%) were related to placement exams.

**Primary Calculation Testing Costs - \$74,259 (\$109,749 x 67.66%)**

**Advising Costs**

During the enrollment period, ICC incurred \$407,588 of costs related to the advising department. This cost is primarily made up of the salaries and benefits associated with the advising department. The advising department sees both current and new students and costs are allocated using new student appointments as a percentage of all appointments. From 3/1/19 – 7/28/19, the advising team kept meticulous records regarding whom it was advising, including a breakout of new vs. current students. From the time period of 7/29/19 - 8/17/19, the advising team moved to a walk-in only model. During the walk-in only time, 1,171 students were advised but records were not kept on which students were new vs. current. I obtained a sample of 191 student ID numbers and, using ICC's student database, 164 students (85.86%) were identified as new students. I then applied this percentage to the 1,171 appointments during the walk-in time and added the results to the new student count from 3/1/19 – 7/28/19. The calculation is shown below:

Walk-in Total Appointments of 1,171 x New student % of 85.86% = 1,005 new students

1,005 Walk-in new students + 618 new students from prior period = 1,623 new students

In total, ICC had 3,914 advising appointments and 1,623 of these appointments (41.47%) were for new students.

**Primary Calculation Advising Costs - \$169,000 (\$407,558 x 41.47%)**

## Enrollment Services Costs

During the enrollment period, ICC incurred \$695,343 of costs related to the enrollment services department. This cost is primarily made up of the salaries and benefits associated with the enrollment services department. Costs for the enrollment services department are allocated based on the time serving new students as a percentage of time serving all students. During the enrollment period, ICC served all students for a total of 197,957 minutes during appointments (with some appointments happening concurrently). Of the 197,957 minutes spent serving students, 13,121 minutes were spent on services categorized as “New Students Only,” 177,169 minutes were spent on services categorized as “Both New and Current Students,” and the remaining 7,667 minutes were spent on services categorized as “Current Students Only.” To allocate the cost in the primary calculation, I multiplied the 177,169 minutes from the “Both New and Current Students” by the number of new students at ICC over the number of total students and added the result to the “New Students Only” time.

$$\begin{aligned} &= (177,169 \text{ minutes} \times (1,437 \text{ new students} / 8,598 \text{ total students})) + 13,121 \text{ minutes} \\ &= (177,169 \times 16.71\%) + 13,121 \text{ minutes} \\ &= 29,611 \text{ minutes} + 13,121 \text{ minutes} \\ &= 42,732 \text{ minutes related to new students} \end{aligned}$$

The 42,732 minutes allocated to new students represents 21.59% of the total minutes spent serving students. In the primary calculation, the cost associated with enrollment services is allocated using this percentage.

The 177,169 minutes spent serving “Both New and Current Students” makes up 89.5% of all time spent in enrollment services. Since students only choose one reason code for their visit



and student identifying information is not available, it is unknown exactly how many of these students are new vs. current. As a result, an alternative calculation is needed for this department. When the “Both New and Current Students” category is excluded, the time spent serving new students (13,121 minutes) outpaces the time spent serving current students (7,667 minutes) by a ratio of almost 2:1.

$$\begin{aligned} &=13,121/(13,121 + 7,667) \\ &=13,121/20,788 \\ &=63.12\% \text{ (rounded) time spent on new students} \end{aligned}$$

When excluding the “Both New and Current Students” category, the enrollment services team spends 63.12% of its time serving new students and when this percentage is applied to the “Both New and Current Students” category, a larger portion is attributed to the time spent serving new students.

$$\begin{aligned} &= (177,169 \text{ minutes} \times 63.12\%) + 13,121 \text{ minutes} \\ &= 111,829 \text{ minutes} + 13,121 \text{ minutes} \\ &= 124,950 \text{ minutes related to new students} \end{aligned}$$

Allocating 124,950 minutes to new students leads to 63.12% of the cost being allocated to new students. The alternative calculation assigns a much larger percentage of the time and cost to new students in comparison to the primary calculation.

**Primary Calculation Enrollment Services Costs - \$126,067 (\$695,343 x 21.59%)**

**Alternative Calculation Enrollment Services Costs - \$438,888 (\$695,343 x 63.12%)**

### **Summary of Costs Related to Student Matriculation**

A summary of the total costs to provide matriculation services is provided in Table 2 below:

Table 2 – Total Cost Summary

	Gross Costs	Primary Allocation	Alternate Allocation 1	Alternate Allocation 2	Alternate Allocation 3
Marketing	\$ 579,299	\$ 579,299	\$ 318,614	\$ 318,614	\$ 579,299
Admissions	\$ 285,131	\$ 254,810	\$ 254,810	\$ 254,810	\$ 254,810
Testing	\$ 109,749	\$ 74,259	\$ 74,259	\$ 74,259	\$ 74,259
Advising	\$ 407,558	\$ 169,000	\$ 169,000	\$ 169,000	\$ 169,000
Enr. Services	\$ 695,343	\$ 126,067	\$ 126,067	\$ 438,888	\$ 438,888
<b>Total Cost</b>	<b>\$ 2,077,080</b>	<b>\$ 1,203,435</b>	<b>\$ 942,751</b>	<b>\$ 1,255,572</b>	<b>\$ 1,516,256</b>
Alternate Allocation 1 - Marketing costs at 55%, Enr. Services using Primary Allocation					
Alternate Allocation 2 - Marketing costs at 55%, Enr. Services using Alt Allocation					
Alternate Allocation 3 - Marketing costs at 100%, Enr. Services using Alt Allocation					

### Matriculation Cost Per Student

To determine the cost per student, the costs allocated to new students is divided by the number of new first-time-in-college students who enrolled at ICC during the Fall 2019 semester (1,437 students). The cost per student calculation is provided in Table 3 below:

Table 3 – Matriculation Cost per Student

	Gross Costs	Primary Allocation	Alternate Allocation 1	Alternate Allocation 2	Alternate Allocation 3
Marketing	\$ 579,299	\$ 579,299	\$ 318,614	\$ 318,614	\$ 579,299
Admissions	\$ 285,131	\$ 254,810	\$ 254,810	\$ 254,810	\$ 254,810
Testing	\$ 109,749	\$ 74,259	\$ 74,259	\$ 74,259	\$ 74,259
Advising	\$ 407,558	\$ 169,000	\$ 169,000	\$ 169,000	\$ 169,000
Enr. Services	\$ 695,343	\$ 126,067	\$ 126,067	\$ 438,888	\$ 438,888
Total Cost	\$ 2,077,080	\$ 1,203,435	\$ 942,751	\$ 1,255,572	\$ 1,516,256
First-time Degree-seeking Students	1,437	1,437	1,437	1,437	1,437
<b>Cost/Student</b>	<b>\$ 1,445</b>	<b>\$ 837</b>	<b>\$ 656</b>	<b>\$ 874</b>	<b>\$ 1,055</b>
Alternate Allocation 1 - Marketing costs at 55%, Enr. Services using Primary Allocation					
Alternate Allocation 2 - Marketing costs at 55%, Enr. Services using Alt Allocation					
Alternate Allocation 3 - Marketing costs at 100%, Enr. Services using Alt Allocation					

## **Recouping The Cost of Student Matriculation**

To determine when the cost of student matriculation is recovered, the margin per credit-hour during the Fall 2019 semester is needed. Margin is equal to the revenue associated with each credit-hour (tuition charged per hour) less the cost of providing each credit-hour (the cost of instruction) during the Fall 2019 semester. During the Fall 2019 semester, ICC spent \$9,386,644 on instruction (A. Young, personal communication, April 7, 2020). This cost includes salaries and benefits of employees in the various academic departments of the college, as well as any equipment costs. In total, ICC provided 73,723 credit-hours as of its Fall 2019 census day (T. Mummadi, personal communication, December 3, 2020). ICC charged students \$150 per credit-hour in the Fall 2019 semester, yielding \$11,058,450 in tuition revenue. \$11,058,450 of revenue less the cost of instruction of \$9,386,644 provides ICC with \$1,671,806 of margin on its tuition revenue. The margin per credit-hour is  $\$1,671,806/73,723 = \$22.68$  (rounded). Alternatively, the calculation could be done on a per credit-hour basis by taking the \$150 per credit-hour during the Fall 2019 semester, less the cost of instruction per credit-hour of \$127.32 ( $\$9,386,644/73,723$  credit-hours). This leads to the same margin of \$22.68 per credit-hour ( $\$150 - \$127.32$ ). It should be noted both calculations exclude any reimbursement, related to credit-hours, ICC received from the State of Illinois.

The cost of matriculation per student is divided by the margin per credit-hour of \$22.68 to determine, in credit-hours, how long it takes ICC to recover the cost of student matriculation. This calculation is shown below in Table 4:

Table 4 – Hours to Recover

	Gross Costs	Primary Allocation	Alternate Allocation 1	Alternate Allocation 2	Alternate Allocation 3
Marketing	\$ 579,299	\$ 579,299	\$ 318,614	\$ 318,614	\$ 579,299
Admissions	\$ 285,131	\$ 254,810	\$ 254,810	\$ 254,810	\$ 254,810
Testing	\$ 109,749	\$ 74,259	\$ 74,259	\$ 74,259	\$ 74,259
Advising	\$ 407,558	\$ 169,000	\$ 169,000	\$ 169,000	\$ 169,000
Enr. Services	\$ 695,343	\$ 126,067	\$ 126,067	\$ 438,888	\$ 438,888
Total Cost	\$ 2,077,080	\$ 1,203,435	\$ 942,751	\$ 1,255,572	\$ 1,516,256
First-time Degree-seeking Students	1,437	1,437	1,437	1,437	1,437
Cost/Student	\$ 1,445	\$ 837	\$ 656	\$ 874	\$ 1,055
Margin/Credit-hour	\$ 22.68	\$ 22.68	\$ 22.68	\$ 22.68	\$ 22.68
<b>Hours to Recover</b>	63.73	36.93	28.93	38.52	46.52
Alternate Allocation 1 - Marketing costs at 55%, Enr. Services using Primary Allocation					
Alternate Allocation 2 - Marketing costs at 55%, Enr. Services using Alt Allocation					
Alternate Allocation 3 - Marketing costs at 100%, Enr. Services using Alt Allocation					

## CHAPTER V: ANALYSIS, RECOMMENDATIONS, AND FUTURE RESEARCH

I began this paper by citing a statistic from the National Student Clearinghouse Research Center, stating that less than 50% of students who enroll in a community college remain enrolled in the same community college 12 months later (2018, a). This statistic provides context for which to look at the results of this study. There are many reasons for a student to leave a community college, including graduation, transfer to another institution, and dropping out due to either poor academic performance, disinterest in higher education, or extenuating circumstances. Regardless of the reason for a student's departure, community colleges bear considerable cost in student matriculation and the recovery of those costs are far from guaranteed. In the remaining pages of this paper, I provide analysis of the data, recommendations, and implications for future research.

### **Analysis**

It is clear from the data that ICC incurs considerable costs to matriculate new students every year. That said, without new matriculation of students, ICC would cease to exist so the matriculation activities must continue, but the time it takes ICC to recover the matriculation costs is especially concerning. ICC, like many community colleges, is a resource-constrained institution with limited abilities to raise external funds (Palmer & Romano, 2018). As a result, it must look to be efficient with the funds it has available and, in the student matriculation area, it appears ICC is lacking in efficiencies. It also seems that the low margin per credit-hour and data availability played a role in these results. In this section of the manuscript, I focus on the primary themes that arise from the data collection and calculations performed in the study.

## **Lack of Efficiencies**

The first theme to come out of the data is that ICC is not very efficient at student matriculation. Even the most conservative of views in the study, Alternative Allocation 1, concluded it takes the college over 28 semester hours to cover the cost of student matriculation. For further context, most certificate programs at ICC require students to complete at least 30 credit-hours. This means ICC is effectively breaking even on every certificate graduate and losing money on every student who begins a certificate but doesn't complete it. ICC's mission is not to profit off its students and tuition is not the only source of revenue at the college; however, these figures paint a bleak picture for the finances of ICC.

The recovery of matriculation cost in terms of credit-hours also varies based on how many hours student enroll in each semester. A student taking 15 hours will reach the matriculation recovery point a lot faster than one taking only 6. Unfortunately for ICC, many students are part-time, meaning they take only a few classes each term. In the Fall 2019 semester, the average credits taken by a student at ICC was 8.4 hours (T. Mummadi, personal communication, December 3, 2020). If this same rate applied for the following Spring semester, and assuming the student completed every credit he or she was enrolled in, the average student would have completed only 16.8 hours in an academic year. This means it would take, on average, four semesters of the student's enrollment for ICC to approach the point of recovering the student matriculation cost.

On the other extreme, ICC is spending over \$1,000 per student matriculation and is requiring over 46 hours (or more than 75% of an associate's degree requirement) to recoup this cost. Using the same average enrollment of 8.4 hours cited previously means it is 5 to 6 semesters before ICC recovers the cost of matriculation, assuming the student remains enrolled

that long. This time to recovery illustrates how the college is fronting the student matriculation cost with only a small chance at recovering it down the road.

### **Impact of Margin**

A second theme in the analysis relates to margin per credit-hour and its impact on matriculation cost recovery. The time it takes ICC to recover the student matriculation cost is not only a function of the matriculation costs but also of the margin earned per credit-hour. Simple math shows that doubling of the margin per credit-hour, while holding the student matriculation cost constant, cuts the time to recovery of the matriculation cost in half. What the simple math does not show is that in order to double the margin per credit-hour, ICC would either need a significant increase in tuition or decrease in the cost of instruction, both coming with their own political and cultural ramifications.

In the business world, margin receives a significant amount of attention from company management as it ultimately speaks to the efficiency of the company. Typically, companies in the business world benchmark their margin against companies competing in the same market or of similar size. In education, institutions often benchmark against peer institutions using metrics like percentage and completion rates, but not margin. Margin does not get nearly as much attention, as the mission of higher education institutions is not to maximize it. The “not for profit” label attached to many higher education institutions often moves a metric like margin to the backburner when it comes to performance measurement. That said, increasing the margin per credit-hour does not necessarily mean colleges are taking advantage of students or misrepresenting the mission of the institution. Rather, increasing margin allows the college to further serve students and the community by providing academic support, investing in new technologies for classrooms, etc. It is clear from the data the \$22.68 of margin earned per credit-

hour primarily goes toward recovering student matriculation costs at ICC, leaving very little to go towards further serving students.

### **Data Concerns and Activity-Based Costing**

The final theme in this analysis centers around data concerns. As I described in Ch 4, there were many times where assumptions needed to be made about the data that was available, especially related to enrollment services and advising. In the enrollment services area, where a considerable amount of resources are consumed by new students, ICC collects only the student's first name and primary reason for visiting. By not collecting student ID numbers or more about the student's reason for visiting, ICC is missing out an opportunity to understand student behavior and improve student matriculation processes.

Additionally, this study proves using activity-based costing is possible for something like student matriculation cost in a community college but the analysis of any data using activity-based costing will only be as good as the data available at the college. Any study using activity-based costing comes with some set of assumptions about the data and caveats to the results, but improving the data availability can improve the results of such studies. Although activity-based costing has its drawbacks, namely the time and effort to collect data, ICC could consider using it in other areas of the college to analyze cost efficiencies. If ICC chooses to use activity-based costing elsewhere in the college, it first must be intentional about what data will be collected and how it will be collected to maximize the benefit of implementing activity-based costing.

### **Recommendations**

Throughout this study, I have used the lens of efficiency to look at student matriculation in community colleges. Earlier in the manuscript, I defined efficiency as “the production of a given output at the lowest possible cost” (Belfield et al., 2013, p. 3). In this context, improving



efficiency in student matriculation at ICC would mean maintaining or improving the number of new degree-seeking students but doing so at a lower cost. To do this, ICC leadership would need to consider which of these areas could see cost reductions without having a negative impact on new student matriculation. Perhaps the easiest target of the five matriculation activities identified is marketing. Because marketing is so difficult to track and the true outcome almost impossible to know, the return of the investment in marketing is also unknown. That said, ICC could consider surveying students, asking whether the marketing efforts made by the college were influential in their decision to enroll, or whether they would have enrolled anyway. Marketing makes up over 27% of the gross costs of the matriculation activities at the college, making it an easy place to start to look for efficiency gains.

The other target for efficiency gains is Enrollment Services. This area is also challenging as the administrators and staff who work in this area provide key assistance for students who are attempting to matriculate. Financial aid can be a critical piece to a student's matriculation and the Enrollment Services team assists students with this process. ICC would have a difficult time changing the financial aid requirements given that they are passed down from the federal government; however, other services provided like enrolling students in classes or facilitating tuition payments could potentially be improved. Enrollment services makes up over 33% of the gross costs of the matriculation activities at the college. When coupling this with the Marketing department, 60% of the costs spent on matriculation of students are spent on these two activities.

In addition to looking to improve efficiency in matriculation, ICC could also reduce the number of hours required to recoup the student matriculation investment by increasing its margin per credit-hour. Margin is a term synonymous with profit, something often scoffed at in higher education, but margin does have its place in the higher education system. In the community

college setting, margin is what remains after taking the cost of instruction away from tuition revenues. Increasing margin can either come from increasing tuition or decreasing the cost of instruction. Many studies have examined both sides of this coin.

Regarding increases to tuition, ICC could consider a high-tuition, high-aid model as described by Curs & Singell Jr. (2010). The high-tuition, high-aid model increases the list price of tuition while also offsetting it with more institutional aid. The idea behind the model is for those with financial need to still pay a lower tuition rate and the more affluent students to pay a higher rate. Curs and Signell Jr. (2010) caution against the use of this model in state universities as these institutions likely want to remain competitive with peer institutions; however, a community college like ICC does not have to be concerned about this. Students are often not choosing between community colleges, but rather choosing between a community college and the four-year institutions in the same region. At ICC, students are faced with the choice of paying ICC's rate of \$150 per credit-hour or paying substantially more to attend local institutions like Illinois State University, Bradley University, etc. A high-tuition, high-aid model could allow ICC to generate more tuition dollars while still maintaining a low cost of attendance for those in need.

On the side of reducing instruction, Jenkins & Belfield (2014) find that community colleges attempt to reduce the cost of instruction by increasing class size, holding more online courses, and relying more heavily on adjunct instead of full-time instructors. Each of these measures does succeed in reducing the cost of instruction, and as a result, increases the margin per credit-hour; however, the authors find these measures to be short-sighted and to have negative impacts on student completion. While ICC might be interested in increasing margin, it should not look to do so at the expense of student completion.

A shift in focus away from new student matriculation to completion could serve the college well from a financial perspective. I am not insisting ICC should stop enrolling new students, as this would be a disservice to the community ICC serves; however, a focus on helping current students complete their degree programs not only benefits the college but also the students it serves. As the data shows, the college spends considerable resources to enroll new students and it isn't until these students reach 29-46 hours of credit before the cost of matriculation is recouped. For students who are already enrolled, the cost of keeping them enrolled is minimal. Current students might be influenced by some of ICC's marketing, might meet with an advisor, or might need help ironing out tuition payment issues, but since they have already navigated the student matriculation process once, they are likely to get through these tasks in a more efficient manner. An adaptation of the cost-per-completion metric designed by Bailey et al. (2015) and Manning & Crosta (2014) could be of considerable benefit to ICC.

A final recommendation revolves around improving data collection. This might be difficult in areas like marketing where measuring the impact of a radio spot or social media ad can be difficult, but in other areas, improved data collection could help ICC better understand student matriculation. This is especially true in enrollment services where students spend significant time with ICC's staff working through things like financial aid. Updating technology or - at a minimum - the required information for an appointment could greatly improve the data and allow ICC to understand student behavior, especially as it relates to matriculation.

### **Future Research**

The opportunities for future research of this topic are many. First and foremost, there is a dearth of studies looking at student matriculation costs, especially in the community college sector. This study focused on one community college in the Midwest and there are numerous

other community colleges in different states or population densities that could benefit from an analysis of institutional student matriculation costs.

Secondly, the global pandemic of 2020, commonly referred to as COVID-19, has changed the world of higher education since its onset. The data for this study was collected in 2019 at the start of the last “pre-pandemic” academic year. The pandemic forced almost every college to figure out how to provide these matriculation services in a primarily, if not entirely, virtual setting. The cost ramifications of this shift to virtual services could provide a unique contribution to the literature on student matriculation and the costs associated with it. A mere recreation of this study in the post-COVID world could provide such a contribution.

Finally, any study that continues to analyze the cost community colleges bear as the gateway to higher education is worth pursuing. Dowd (2007) observes community colleges serve as both the gateway and gatekeeper of higher education. Community colleges are a gateway because they provide affordable access to higher education and gatekeepers because they allow for four-year institutions to remain selective in admissions because students have community colleges to fall back on (Dowd, 2007). This leaves the community college shouldering the burden of student matriculation costs for students who may not have had access to higher education elsewhere or merely wanted to test the waters of higher education. The ability of four-year institutions to remain selective in admission, something the community college system allows for, also reduces the number of students who might start but not complete the matriculation process at four-year institutions. While there are certainly matriculation costs when students attend four-year institutions, community colleges minimize these costs for students who transfer to four-year institutions after attending a community college. A study analyzing the cost

savings that community colleges provide four-year institutions in terms of reduced matriculation costs would be an interesting contribution to this line of literature.

### **Closing**

In closing, this study of matriculation costs in a community college helps inform community college leaders about the costs incurred to simply bring a student into the college. It is clear from the study that community colleges, like Illinois Central College, are spending considerable resources including time, energy, and money on student matriculation. The recovery of these costs takes time and seems unlikely to happen as many students leave before the recovery threshold is met. ICC may be able to improve these figures by looking for efficiencies in areas like marketing or enrollment services, increasing the margin earned per credit-hour, or focusing more on completion for students currently enrolled. A costing system like activity-based costing could be useful in helping understand student matriculation costs, but only if the data is properly collected and understood. ICC can continue to provide access to higher education to its community but can also stand to do so at a lower matriculation cost per student.

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