

# Competency-Based Education at Peirce College: Bachelor of Science in Information Technology

## A CBE case study

*This case study is part of a series on competency-based degree programs that have been emerging in recent years. The case studies are prepared by the Council for Adult and Experiential Learning (CAEL) with funding from Lumina Foundation.*

### AN OVERVIEW

Scheduled to launch in September 2016, Peirce College's Bachelor of Science in information technology (networking, administration, and information security) is a competency-based degree program that will provide experienced adult learners with an affordable path to degree completion and professional success in the IT field.

According to the college's website, Peirce "equips adult learners, in a personalized, student-centered environment, to achieve their goals and successfully fulfill workforce needs." In pursuit of this mission, Peirce converted an existing Bachelor of Science in information technology degree to the non-traditional, competency-based format designed specifically for working adults pursuing degrees on a part-time basis. The traditional IT program was chosen as the target for the CBE initiative due to the high workforce demand for jobs in information technology as well as the robust nature of the existing degree structure. Dr. Rita Toliver-Roberts, one of the leaders of the initiative says, "Peirce's CBE program focuses on what matters the most to adult learners and their employers—gaining the actual skills and knowledge to do their job better or advance in their careers."<sup>1</sup>

<sup>1</sup> Peirce College. (2016, May 25). *Peirce College introduces faster, cheaper path to degree completion*. Retrieved from <https://www.peirce.edu/news-and-media/newsdetail/index/peirce-college-introduces-competency-based-education>

The learning outcomes within the traditional degree were used to develop a set of corresponding competencies for the CBE program that emphasize industry relevance. The competencies were used to guide the development of credit-based, self-paced courses

### PROGRAM SNAPSHOT

- A competency-based model and all-you-can-learn tuition structure allow students to earn a more affordable and timely degree
- Information technology competencies are delivered in an online, self-paced format through Flat World
- Associate degree embedded within Bachelor of Science degree, providing students with useful milestone
- Degree contains courses that align with IT certification exams, allowing students to accumulate credentials even before graduation
- Students are provided with a transferable credit-hour transcript as well as a list of completed competencies
- A CBE coach monitors student progress and provides one-on-one support for program participants

that students interact with on an online learning platform developed by Flat World. Competency mastery is assessed through a variety of objective and subjective methods which are graded by program faculty. The all-you-can-learn model allows students to advance through the program at their own pace, taking as many or as few courses as they can manage, while being charged the same flat rate per term.

## BACKGROUND

Throughout its history, Peirce College has demonstrated a commitment to the adult learner and to fulfilling workforce needs. In the past, this commitment led Peirce to be one of the first institutions to offer all programs in an online format, positioning the college as an expert in online learning delivery. The strategic plan for the CBE Bachelor of Science in information technology with a concentration in networking, administration, and information security was designed with the same mission in mind, to serve as an innovative workforce solution for adult students. Dr. Rita Toliver-Roberts, vice president of academic achievement, said, “We spent some time looking at our history and reflecting on prideful times in which we were leading in online education. We saw CBE as an opportunity to continue that legacy of innovation.”

Likewise, Peirce College has always emphasized flexible and affordable academic options. However, with an understanding of the impact that high tuition costs have on accessibility and degree completion, Peirce administrators identified competency-based education as the natural next step in fostering an adult-friendly institution. Under the leadership of Brian Finnegan, assistant dean of information technology and general education, and Dr. Rita Toliver-Roberts, faculty and staff set out to create a bachelor’s program that would attract experienced professionals without credentials and reach students unable to pursue a traditional degree.

Due to a high workforce demand for jobs in information technology and the quality of

the traditional Bachelor of Science degree, this program was chosen as the starting point for the CBE team. Toliver-Roberts, Finnegan, a CBE program development team, an internal instructional design team, the learning management system vendor Flat World, faculty, and a CBE coach were involved early on in the process of transitioning the traditional program to a competency-based one. The non-CBE degree’s focus on career-relevant learning outcomes, reviewed and revised by faculty every three years, proved invaluable in the development of the competencies and the concomitant strength of the new CBE program. However, particularly important was the support of such a robust team spanning multiple departments committed to and experienced with the unique needs of the adult learner.

## THE PROGRAM COMPETENCIES

Instead of starting from scratch, Peirce was able to benefit from the rigorous review and accreditation of its traditional Bachelor of Science in information technology degree to develop the competency framework for the new program. The CBE team deconstructed learning outcomes already present in the non-CBE degree to build sets of competencies conveying information deemed necessary for success and job security in the workforce. Each competency was carefully designed to elicit work-relevant application of learning, without the verbs like “define” and “compare/contrast” found within the traditional learning outcomes. For example, competency requirements related to HTML5 and CSS3 ask that students “create a fixed website using established design principles” and “create a website usable across a variety of devices of varying screen sizes.”

The process of identifying competencies began with assigning specific courses from the traditional BS program to faculty course coordinators, who then sketched out draft competencies for iterative review and discussion. The development team drew on learning outcomes and rubric materials from

the Lumina Foundation Degree Qualification Profile (DQP), American Association of Colleges and University's (AAC&U's) Value Rubrics, Department of Labor Competency Clearinghouse's Industry Competency Model Initiative, and Association of Computing Machinery. It took 6 months to complete the framework. However, Brain Finnegan stressed that although Peirce has competencies ready for the commencement of the program in the Fall 2016 term, the development continues. He says, "I don't think it is a good idea to think of the process as ever complete exactly. Refinements are still ongoing as we work for better clarity, student-focused language, less jargon, and closer connections to the world of work."

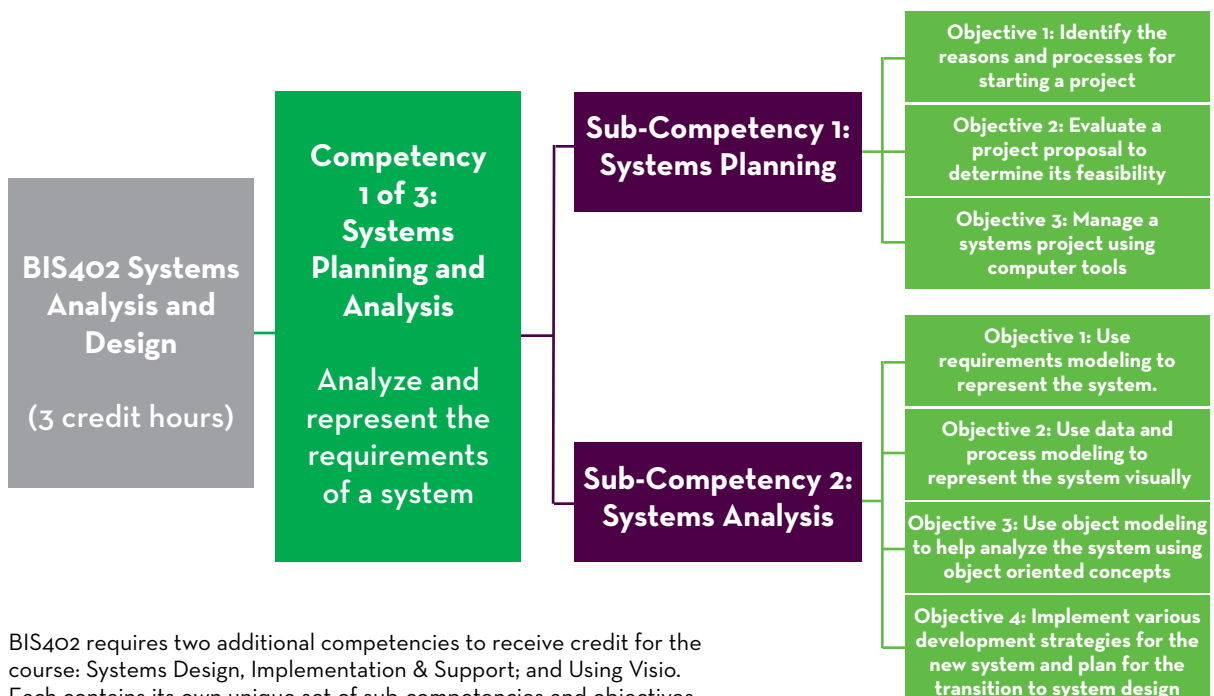
Peirce College has an active and sizeable program advisory board that includes representation from two-year colleges, articulating partners, educators, recruiters, and employers. This body acts as a maintaining mechanism for the learning outcomes and competencies at Peirce to ensure that they align with academic standards as well as employer needs.

## RELATIONSHIP TO THE CREDIT HOUR

Each competency within the CBE information technology degree is clearly mapped back to the credit hour, but some competencies are scoped differently than others. In some cases, the demonstration of a single competency is sufficient to receive credit for the traditional, three-credit-hour course. In other instances, a three-credit-hour course may equal up to four competencies. Each competency is then defined by one or more sub-competencies and one or more objectives.

Figure 1 shows the example of how one traditional course is mapped to individual competencies and its various sub-competencies and objectives. BIS402 Systems Analysis and Design is the name of the three-credit course in the traditional program. To earn credit for that course in the competency-based program, a student must complete three competencies: Systems Planning and Analysis; Systems Design, Implementation & Support; and Using Visio. Each of the competencies is then made up of various sub-competencies and objectives.

FIGURE 1: COURSE BIS402 AND COMPETENCY MAP WITH CORRESPONDING SUB-COMPETENCIES AND OBJECTIVES



BIS402 requires two additional competencies to receive credit for the course: Systems Design, Implementation & Support; and Using Visio. Each contains its own unique set of sub-competencies and objectives.

Depending on successful demonstration of all associated course competencies, the student is awarded the credit hours for the course on their transcript.

The structure of the CBE program parallels that of the traditional degree, with courses offered during the standard fall, spring, and summer 15-week terms. To graduate, students must complete 15 credit-based general education courses and 36 competencies, all of which total 120 credit hours (see Table 1). A portion of general education courses will be offered in the CBE format, while the remaining general education content is being developed for CBE. Students can complete the general education requirements through traditional credit-based courses, with prior learning assessment offered as an option for students with applicable prior learning.

Of the 26 IT program courses, 10 compose an associate degree in information technology. This is an important milestone for students as it ensures that if they are not able to complete the program past this point, they are still able to leave with a degree that has value in the labor market.

There are only four elective courses even offered within the CBE degree, leaving very little of the curriculum to student choice.

Policies and procedures for the transfer of credit into the CBE program are consistent with those of traditional degrees at Peirce. If the need arises for a student to transfer out of the CBE program into a non-CBE degree or to another institution, Peirce is able to provide them with a transcript of their completed courses and the credit hour equivalents to the competencies that the student has demonstrated.

**TABLE 1. CREDITS, COURSES, AND COMPETENCIES FOR THE PEIRCE CBE BS IN IT DEGREE**

| <b>Distribution of Credits for CBE Bachelor of Science in Information Technology Degree Requirements</b> |  |  |  |
|--|--|--|--|
|  | <b>General Education Requirements</b>  | <b>Associate Degree Core IT Courses</b>  | <b>Bachelor of Science IT Courses</b>  |
| <b>Credit Hour Equivalency</b>   | 43 Credit Hours  | 33 Credit Hours  | 9 IT Core Credit Hours<br>24 NAIS Concentration Credit Hours<br>12 Elective Credit Hours   |
| <b>Format</b>  | Non-CBE & Online Courses; Prior Learning Assessment Available                                | Online, CBE Format   | Online, CBE Format   |
| <b>Course Examples</b>   | Practical Reasoning, English Composition, College Algebra, Application Software Fundamentals | HTML and the World Wide Web, Database Management Fundamentals, PC Fundamentals | Network Routing and Switching, Information Systems Management, Systems Analysis and Design |

## CURRICULUM DEVELOPMENT AND THE STUDENT EXPERIENCE

Prior to enrollment in the program, prospective students are required to complete an initial assessment to determine if they have the skills and experience to be successful in the degree. The curriculum caters particularly to adults with no degrees but at least two years of professional experience in the IT field. This fact, along with the self-paced, online delivery, makes the degree best suited for independent adult professionals who are able to take advantage of the program's flexibility.

Curriculum development was undertaken by IT faculty members at Peirce in collaboration with representatives from the learning management software vendor, Flat World. Through an online format and open educational resources recommended by faculty, the team was able to construct the curriculum without the constraints of the credit hour, academic calendar, or required textbooks. Instead, they made a concerted effort to ensure that the courses conveyed realistic, work-relevant material to students through the use of projects, case studies, and industry-approved topics. Representatives from Flat World proved instrumental to the development of the curriculum as they trained faculty, through onsite retreats and weekly webinars, on the learning management platform and its instructional design capabilities.

After successful completion of the initial online assessment and admission to the program, students register for competencies with their CBE coach.

Students who work quickly through the competencies can complete multiple courses within one term, with no limit. Conversely, students who require more time to demonstrate competencies need only take the equivalent of 6 credit hours per term and can progress at their own pace without being penalized. Thus, time to degree is expected to vary depending on the student's experience, learning style, and transfer credits.

## ASSESSMENT APPROACH

One summative assessment is administered for each competency and is designed to test mastery of all the included sub-competencies and objectives.

For example, Table 2 shows how assessments address two different courses. For MIS110, there are four competencies, each of which have multiple objectives. To earn credit for MIS110, the student must successfully complete four summative assessments, one for each of the four competencies. Along the way, the student will take formative assessments for each of the objectives. In contrast, students in ITN130 will take four formative assessments, but only one summative assessment, since there is only one competency associated with that course.

There are formative assessments for each objective, but they are only offered as a way for students to monitor their progress and prepare for the final competency assessment. Because the CBE learning framework is constructed as a series of competencies rather than a traditional network of learning outcomes tied to courses, the design team made it a priority to develop assessments that could test the competencies in isolation to fairly capture a student's mastery of each skill.

The CBE program uses both subjective and objective assessments. The majority of the competencies are tied to subjective assessments, such as projects, presentations, and writing assessments developed by IT faculty. Faculty grade the materials according to a rubric that students are provided with prior to the beginning of each competency. They are categorized on a 4-point scale, with 2 or below failing to demonstrate competency and 3 or above being competent. Additionally, the degree program includes objective assessments either pulled directly from industry certification tests (Network Plus, Security Plus, etc.) or closely aligned to them. In cases where the assessment for a particular competency relies heavily on

TABLE 2. ASSESSMENT PROCESS FOR SAMPLE COURSES AND COMPETENCIES

| EQUIVALENT CREDIT-BASED COURSE                                | COMPETENCY STATEMENTS  | SUB-COMPETENCIES/OBJECTIVES  | ASSESSMENT PROCESS  |
|---|--|--|---|
| <p>MIS110 Usability Principles and Design, 3 credit hours</p> | <p>Frame interaction design, its processes, its consequences, and how human capabilities impact it in the larger system and software development lifecycle</p>   | <p>Objective 1: Explain what interaction design is, why it is valuable, what processes it involves, why it is important, and how human capabilities impact it</p> <p>Objective 2: Characterize the cognitive, social, and emotional aspects of human interaction and how they impact design considerations</p>   | <p>Student is given summative assessments for each of the four competencies that map to the three credit MIS 110 course.</p>  |
|   | <p>Analyze and represent usability requirements</p>  | <p>Objective 1: Gather sufficient, accurate, and relevant data to establish a set of user requirements</p> <p>Objective 2: Analyze, interpret, and present requirements data</p>   |   |
|   | <p>Design and prototype user interfaces using common design principles</p>   | <p>Objective 1: Explain the interaction design process, its underlying principles, and how it integrates into the larger development lifecycle</p> <p>Objective 2: Produce a conceptual model and a simple prototype design for a given requirements specification</p>   |   |
|   | <p>Conduct basic usability testing and evaluation</p>  | <p>Objective 1: Characterize the range of evaluation methods, their different purposes and contexts, and the practical challenges they present</p> <p>Objective 2: Conduct user-based evaluation studies</p> <p>Objective 3: Conduct expert-based evaluation studies</p>   |   |
| <p>ITN130 Networking Fundamentals, 3 credit hours</p>         | <p>Network Professional: Install, configure, manage, and troubleshoot wired and wireless networks, security standards and procedures and identify network limitations and weaknesses and emerging technologies</p> | <p>Objective 1: Plan and configure a basic LAN network</p> <p>Objective 2: Design and implement an IP network environment</p> <p>Objective 3: Install, configure, and troubleshoot common WAN, LAN, security, and network hardware issues in a business network</p> <p>Objective 4: Use appropriate policies and procedures to develop and maintain a computer network</p> | <p>Student completes a single assessment of the Network Professional competency in order to earn three credits for ITN130</p> |



an objective, external industry certification, Peirce also requires a subjective component in the form of a case study, opinion piece, or research paper. This addition was important to the design team in order to emphasize that the program is for a professional degree and not merely an assessment preparation program for industry certifications. Instead, the assessments within the program are designed to elevate graduates in their respective fields by requiring demonstration of soft skills like critical thinking and communication as well as industry-specific technological skills.

### **BUILDING SUPPORT FOR THE PROGRAM**

Peirce College was chosen to participate in the Council for Adult and Experiential Learning's CBE Jumpstart program, an initiative funded by the Lumina Foundation that offers technical training and assistance to institutions developing their competency-based education programs. Dr. Rita Toliver-Roberts noted that although Peirce already had a commitment to supporting its adult learner population through CBE, having that choice validated in the eyes of the institution's community was invaluable, as every one of Peirce's departments and offices were represented at the training. The CBE Jumpstart program provided faculty and staff with the assurance that they were on the right track, a sense of the innovative nature of CBE nationally, a wider discussion about CBE among the various departments, and a clear pathway to beginning their own program.

Within the College, internal communication about the CBE program began among faculty across the institution, stakeholders, and the greater Peirce community. Administrators are also currently discussing the program with Peirce's corporate partners in the hopes of establishing a pipeline between the degree and IT professionals in the workforce.

In marketing CBE to students, the college aimed to keep the message clear and simple. By stressing that the competency-based structure allows students to put what they already know to

work for them, Peirce conveyed the affordability and flexibility of the program for the adult learner. Prospective students are able to access additional information on Peirce's website along with the initial CBE assessment. An e-mail communication sent out to current students and alumni attracted a sizable group of prospective students interested in starting classes in the fall. Additionally, an animation video that informs prospective students about the advantages of CBE is available on Peirce's website.

### **FACULTY AND STUDENT SUPPORT STAFF**

The role of faculty began with curricular design and will continue with instruction and substantive student interaction upon commencement of the program. Initially, IT faculty members were assigned traditional courses according to their area of expertise. They were tasked with constructing competencies and corresponding assessments from those traditional courses, in conjunction with Flat World and the CBE coach. During the program's implementation, faculty will be responsible for instruction as well. Instructional responsibilities are likely to include holding office hours and tutoring sessions, providing timely feedback on assessments, participating in online discussions, and maintaining consistent, substantive communication with students.

A full-time CBE coach complements the academic assistance that faculty members provide by monitoring student progress within the competency-based structure and providing support for a caseload of 100 students. The coach meets once a week with the enrollment specialist to look over the assessment that prospective students complete prior to admission into the program. Once they are enrolled, responsibilities include hosting a student orientation two weeks prior to the beginning of the term, monitoring progress on Flat World, maintaining weekly contact with students, and engaging with the IT faculty on student-related concerns. The current CBE coach is in fact a member of the underlying IT faculty, with a master's degree in information technology as well as a master's in mental health

counseling. This overlap allows for continuity between advising and academics and will be pursued with future CBE coaches. However, although coaches may be members of the faculty, they are kept strictly distinct from assessment administrators to avoid any integrity issues.

## COST AND PRICING

Consistent with their mission to provide affordable and accessible academic options for adult learners, Peirce College made a strategic investment in the competency-based education program. The initiative currently does not have any external funders, meaning that the start-up and continuing costs will be absorbed by the institution. Revenue from the degree program is expected to cover its costs by 2019.

Students pay a flat rate of \$3000 per term under the all-you-can-learn model. This flat rate per term includes the cost of tuition, which is \$2700, and a student services fee of \$300. At minimum, the CBE student will enroll in 6 credits per term. Comparing traditional and CBE tuition pricing, the CBE price point is considerably lower in cost to a traditional student taking 6 credits per term (a charge of \$3,768, not including the cost of textbooks). In addition, the all-you-can-learn model aligns more closely with the needs and interests of Peirce's target population. Most of the students at the College attend part-time while maintaining full-time jobs and families, and many cannot afford to take more than two courses in any given semester. The CBE pricing structure allows motivated students to receive more instruction for their money without accruing additional costs. Peirce College is hopeful that this will allow students to complete their degrees more quickly by taking as many courses as they can manage for the same low cost as those students only taking a few.

## FINANCIAL AID AND ACCREDITATION

Because the competency-based IT degree maps directly back to traditional, credit-based courses held according to the standard Fall/Spring terms, students are eligible for financial

aid under Title IV of the Higher Education Act of 1965 as long as they earn a minimum of 6 credit hours per semester. Additionally, Title IV requires that programs provide substantive faculty/student interaction. Although the exact nature of this interaction has not been finalized, the CBE team and faculty have established policies and procedures that align with the substantive faculty-student interaction requirement to ensure that students will remain eligible for financial aid.

Because the CBE degree is designed to map back to the credit hour, and because students enroll in the competencies within the existing term structure, it was not necessary for Peirce to submit a substantive change application to its regional accreditor, the Middle States Commission on Higher Education.

## LESSONS LEARNED AND NEXT STEPS

In considering advice for other institutions wanting to develop their own CBE programs, Peirce leadership stressed that the learning management software vendor should be chosen early and wisely. The Flat World staff was able to provide general guidance not only on the platform's capabilities but also on using the system to enhance and enforce the strengths of the competencies themselves. In particular, Finnegan noted that their commitment to the articulation of the competencies, even to the point of challenging the college when necessary, made a qualitative difference in what students will experience in the program.

A second recommendation from the Peirce design team is to involve the coaches and advisors early in the design and development process. Peirce's CBE coach was hired early on, and the team believes that being involved from the beginning allowed her to lend her expertise to the expression of the competencies, processes, and procedures throughout, rather than becoming familiar with them post-launch.

The Peirce team also felt it necessary to acknowledge the immense time commitment



required to convert courses and corresponding learning outcomes to competencies. Initially, the assumption was that since the college had a pre-existing Bachelor of Science degree in information technology containing robust and work-relevant learning outcomes, the mapping of competencies from this traditional structure would be relatively simple. Although decidedly easier than developing a framework from the ground up, Peirce still spent significant time and resources on this stage of the program's design. Not only should the time commitment be seriously considered in any strategic plan, but it is also important to recognize the opportunity for reflection and quality improvement within the traditional program as learning outcomes are analyzed and restructured for CBE.

Peirce College has expressed a commitment to the reworking and reevaluation of the competencies developed thus far, with the expectation that after the launch of the degree program in September 2016, they may find the need to make the program more student centered or update the content to better meet industry demand. Peirce plans to first learn from the new degree program as much as possible and make improvements that will inform competency-based education programs at Peirce going forward. However, considering their dedication to the unique needs of the adult learner and enthusiasm for innovation, this is just the beginning for Peirce.

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- Dr. Brian Finnegan, Associate Professor and Assistant Dean, Information Technology and General Education
- Christa Donato, CBE Coach

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We advocate and innovate on behalf of adult learners to increase access to education and economic security. We provide adults with career guidance and help them earn college credit for what they already know. We equip colleges and universities to attract, retain, and graduate more adult students. We provide employers with smart strategies for employee development. We build workforce organizations' capacity to connect worker skills to employer demands.

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