

# Columbus State Community College Strengthening Mobile Application Resources and Technical Training (SMARTT) Project: Year 1 Evaluation Report



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# Columbus State Community College Strengthening Mobile Application Resources and Technical Training (SMARTT) Project: Year 1 Evaluation Report

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**Columbus State Community College Strengthening Mobile Application  
Resources and Technical Training (SMARTT)**

**Year 1 Evaluation Report**

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# Columbus State Community College Strengthening Mobile Application Resources and Technical Training (SMARTT): Year 1 Evaluation Report

## Purpose of Evaluation

The University of Cincinnati Evaluation Services Center (UCESC) has been contracted by Columbus State Community College (CSCC) to conduct an evaluation of the three-year Strengthening Mobile Application Resources and Technical Training (SMARTT) Project, funded by National Science Foundation (NSF) Advanced Technological Education (ATE) award #1700519. The project's main goal of developing an education program for Mobile Application Development Technicians at Columbus State Community College is to meet the increased workforce demand by Ohio regional industry and to contribute to the diversity of this region's workforce. Companies are changing the way they think and altering hiring patterns from traditional four-year degrees to graduates with certificates and associate degrees for their open positions, valuing technical knowledge over a liberal arts degree. The SMARTT project intends to address the shortage of mobile developers through the creation of two associate degree programs, Mobile App Design in Interactive Media and Mobile App Development in Computer Science, and a collaborative certificate at Columbus State Community College.

The goal of the SMARTT project is to develop an education program for mobile application development technicians at Columbus State Community College to meet the increased demand by Ohio regional industry and to contribute to the diversity of the region's work force. The project objectives from the proposal include:

1. Establish a Mobile Application Development Technology 2+2+2 pathways featuring:
  - a. A model articulation agreement from high school to community college and then to university level baccalaureate programs.
  - b. The expansion of the existing Industry Advisory Committee into a true BILT under the guidance of Dr. Ann Beheler from the National Convergence Technology Center (CTC) so industry co-leads work and provide maximum benefit for students.
  - c. A collaborative Mobile Design and Development certificate curriculum led by the BILT.
2. Create a collaborative state-of-the-art curriculum leveraging existing coursework in Interactive Media and Computer Science:

- a. An online curriculum featuring digitized, adaptive learning object methodology.
  - b. A project-based learning capstone supported by a scalable, state-of-the-art device lab that that will provide the real-world work experience in designing and using mobile application development technology-related software and hardware.
3. Recruit underserved, disadvantaged populations (defined as low-income, first generation students) to the new SMARTT (Mobile Application Design and Mobile Application Development) pathways through partnerships with high school districts, special interest programs, and non-profit organizations.

The purpose of the three-year evaluation is to provide formative and summative evaluation data regarding the progress made toward these goals and outcomes of the project. For Year 1, the project team recruited a Business and Industry Leadership Team (BILT). Evaluation activities focused on updating the evaluation plan to reflect project activities and reviewing project documentation related to curriculum development and partner involvement in this process (e.g., BILT members). During Years 2 and 3, the evaluation will focus on curriculum design and planned curricular and course revisions using faculty and student input.

## Evaluation Questions

The evaluation team, in collaboration with the project team, revised the evaluation questions, along with the evaluation design and plan. The updated guiding questions are outlined below.

### Formative Questions (FQ)

1. What activities, processes, and practices contributed to the establishment of the College's Mobile Application Development Technology 2+2+2 pathway?
2. How did the project facilitate leveraging the existing coursework to create a state-of-the-art curriculum leading to an education program for mobile application development technicians?
  - a. Development of a collaborative, interdisciplinary capstone course focused on project-based experiential learning.
  - b. Integration of project-based learning and soft skills development in all courses.
  - c. Approaches to faculty development strategy.
  - d. Delivery of blended curriculum.
  - e. Development and use of the SMARTT project device lab.

3. To what extent did the project recruit disadvantaged populations to the new SMARTT pathway?

### Summative Questions (SQ)

1. To what extent has the project established a Mobile Application Development Technology career education 2+2+2 pathway for a disadvantaged/underserved student population?
  - a. Establishing and executing model articulation agreements with high schools and university level baccalaureate programs.
  - b. Developing and expanding curricula with industry input from the BILT, such as the development of a new Collaborative Interdisciplinary Mobile Design and Development (CIMDD) certificate.
  - c. The number of underserved and female students who:
    - i. Enroll in the new Mobile certificate
    - ii. Complete the new Mobile certificate
    - iii. Enroll in the Mobile AAS degree program
    - iv. Remain in Mobile AAS degree program
    - v. Complete capstone projects
    - vi. Enter the workforce after completing their certificate or capstone project
    - vii. Complete the Mobile AAS degree program
    - viii. Begin matriculation to a four-year institution.
2. To what extent are students in the Mobile Application Development Technology career education 2+2+2 pathways satisfied with the program?

## Evaluation Procedures

Evaluation procedures for Year 1 of this project were primarily formative and reflected the fact that the project team was focused on creating the Business and Industry Leadership Team (BILT) to provide guidance for the planned curriculum development activities. The evaluation and project teams met in person in December 2017 and held virtual meetings on a regular basis to discuss progress made and specific project activities. Year 1 external evaluation activities are outlined below.

- Revised project evaluation plan.
- Obtained human subjects approval from UC Institutional Research Board (IRB).
- Reviewed BILT involvement in the development of the SMARTT curriculum.

## Participants

The SMARTT study will be recruiting participants in phases during the three-year grant period. In Phase 1, during the first year, the project team recruited BILT members who will provide advising and leadership into industry needs in relation to application design and development. The members of the BILT are listed in the SMARTT NSF Annual Report. At this time, these are the only participants included in this study.

In Fall 2018, BILT members participate in a focus group discussion conducted by the evaluation team. Future study phases will include faculty who helped re-design the curriculum and undergraduate college students who are currently enrolled in the existing curriculum and future students who enroll in the Mobile Application pathways courses. University of Cincinnati IRB protocols will be amended as the project progresses.

## Instruments

A BILT focus group protocol has been developed in Year 1. The protocol includes eight open-ended questions to gain feedback on the project's progress and their involvement in the curriculum development process. The protocol is shown in Appendix A of this report and has been approved by the University of Cincinnati's Institutional Review Board.

## Data Collection Procedures

The evaluation team obtained curriculum development materials from the project team. These documents were tracked and reviewed to identify evidence of collaboration with the BILT and completion of curricular materials.

## Data Analysis Strategies

The evaluation team reviewed project team documents during this Year 1 that included PowerPoint presentations presented at WebEx meetings among the project team and BILT members, voting documents from BILT meetings, curriculum development documents for various courses (IMM Design and CSCI), as well as the plan of studies, and the draft of the annual report for NSF.

# Results

At this time, the evaluation will address questions 1 and 2 (formative) since student recruitment for the pathways is scheduled to begin following approval of the developed curriculum by the state. The project team used Year 1 to gather details about knowledge, skills, and abilities needed by employers in the mobile application field with involvement from the BILT. They used this input to revise existing courses and to create new courses that are part of the CSCC Mobile Application Development Technology 2+2+2 pathways in mobile application development and in mobile application design. This curricular approval process has taken longer than initially expected; however, this increased time has allowed the evaluation team, in collaboration with the project team, to revise the evaluation plan to reflect these intended outcomes and add rigor, including follow-ups with students and a comparison group. The evaluation plan now includes data collection activities among a group of undergraduate students who will be taking the current CSCC foundational courses in academic year 2018-19 and will be a comparison group for SMARTT students who begin in Fall 2019 to take the revised CSCC courses (for the 2019-20 academic year).

## Revisions to Evaluation Design and Plan

Course approval timing (planned Fall 2019 implementation of SMARTT curriculum) has allowed the evaluation team, in collaboration with the project team, to change the evaluation design to establish a comparison student group for the 2018-2019 academic year, increasing the study's rigor. During the 2018-2019 academic year, Columbus State Community College students will be able to enroll in five identified courses, that are part of the current curriculum and are being revised for the SMARTT curriculum implementation in Fall 2019.

**Table 1. Courses to be Revised for SMARTT Curriculum Implementation**

| <b>Course Number</b> | <b>Course Title</b>                  |
|----------------------|--------------------------------------|
| CSCI 1650            | Programming Fundamentals for iOS     |
| CSCI 1660            | Programming Fundamentals for Android |
| CSCI 2650            | iOS Mobile Apps Development          |
| CSCI 2660            | Android Mobile Apps Development      |
| IMM 2372             | Adobe Phonegap                       |

Student course evaluations will be collected and analyzed for these courses in Years 2 and 3 in order to compare results between the courses before implementation and following implementation. Additional surveys to determine faculty members' and students' perspectives about the current mobile program are being developed and will be administered to students in



these courses as well as the faculty teaching these courses. The student survey will include questions assessing student self-efficacy and confidence to succeed in mobile applications careers, employability and employment options, and an evaluation of the program. A rubric to assess student performance in projects will be developed and piloted during the 2018-19 academic year. The project and evaluation teams have no control over when comparison students started in their program; thus, the evaluation team will administer a post-survey only when students graduate, either at the end of Fall 2018 or Spring 2019 semesters.

## **Establishment of Columbus State Community College Mobile Application Pathways**

The project team sought feedback from the BILT regarding the knowledge and skills needed by employees in the field while developing the AAS degree programs in Mobile Development and Mobile Design as well as the related certificate. On December 14, 2017, the Columbus State faculty met with the BILT to discuss program and certificate development. Dr. Ann Beheler, Co-PI/Executive Director of Collin College, National Convergence Technology Center and the evaluation team (Jacinda Dariotis, Catherine Maltbie, and Edith Morris) from Evaluation Services Center at the University of Cincinnati were also in attendance. The drafted curriculums were shared with the BILT during a WebEx meeting on March 20, 2018. All project team and evaluation team members participated in WebEx meeting.

At the December 2017 in-person meeting, all project team members, Computer Science and Media Design faculty, and evaluation team members were introduced to the BILT members. Ann Beheler, Co-PI led a discussion where BILT members identified and rank ordered pertinent knowledge, skills, and abilities needed for new hires and current employees working in the mobile application development and design fields. Specifically, BILT members were asked to identify what makes employees in the mobile application field successful. An overview of the conclusions reached in this meeting included: 1) knowledge of more than one program/system was important, as was good communication skills and the ability to spring back from failure; 2) many positions are contract positions, and hence there was concern about getting and keeping qualified personnel; 3) demonstrating professional growth as a new hire was important, and an online portfolio can show both performance and growth and should be brought to job interviews.

At the March 20, 2018 WebEx meeting, the project team reviewed the program of study drafts created with the information gathered in the December 2017 meeting. Explicit connections between BILT comments and the plan of study were highlighted. As an overview, three changes were made to the proposed curriculum based on the input of the BILT members. Specific changes included: 1) removing system programming fundamentals and adding a course on prototyping to the mobile app design program; 2) a web-based development course was removed and replaced with Javascript, which is more useful in a hybrid world; and 3) Mobile Analytics became a required course rather than an elective.

Within the above curriculum, the project team revised current courses and developed seven new courses. These activities included the development of a collaborative, interdisciplinary capstone course focused on project-based experiential learning as well as the integration of project-based learning and soft skills development (such as collaborative, negotiating, planning, and organizational skills) into all courses. The proposed curriculum will be delivered in a blended manner, combining hands-on experiences in a newly developed device laboratory environment with online learning. The project team is currently developing an equipment list for the SMARTT project device lab. This new curriculum and courses are currently in final approval stages by the internal Columbus State Community College Curriculum Board, followed by the Ohio Department of Higher Education, and the Higher Learning Commission and students should begin enrollment Fall 2019.

Regarding progress made toward the faculty development strategy, four members of the project team registered to attend the Working Connections IT Faculty Development Institute in July 2018. The faculty attending these workshops hope to incorporate what they learn into the mobile courses and the project team hopes to learn how to host a mobile-focused track in the future.

A follow-up meeting with BILT members is planned for Fall 2018. The evaluation team plans to conduct a focus group with the BILT members to assess their level of satisfaction with the input process used during curriculum development and to gauge whether or not they felt that their input was considered when decisions were made. The project team will solicit recommendations for equipment to be included as part of the device laboratory.

## **Recruitment into SMARTT Pathways**

Student recruitment activities did not occur in Year 1. The project team will create materials that will be used to recruit students during outreach events in high schools and at recruitment events at Columbus State Community College after the curriculum is approved, hopefully in Winter 2019. The project team continues to work to guide the SMARTT project curriculum through the approval process at the college and state levels. The 2+2+2 pathways will be supported as the project team creates model articulation agreements with high school and four-year university partners to create pathways for students from high school to two-year colleges, and then to four-year colleges.

# Conclusions

The SMARTT project is well underway in terms of its main project goals: creating new pathways to provide options for high school students from high school through two-year colleges into four-year colleges, and to develop a regional workforce in mobile applications. Year 1 activities consisted principally of developing a business and industry leadership team to help guide the curriculum development process, and shepherding the revised curriculum through the approval process at college and state levels. These activities are summarized below.

- Since the revised curriculum is not being taught until Fall 2019, a comparison group, which contributes more rigor to the evaluation, is planned for the 2018-2019 academic year. This will allow the evaluation team to collect student data pertaining to course evaluations and student products generated in five courses that are currently being taught at Columbus State Community College that are being modified as part of the SMARTT Mobile Application curriculum.
- A curriculum was successfully developed. Curriculum outlines and course syllabi were submitted for approval and faculty are beginning to plan lessons and activities. The project team is planning to outfit the device lab and to attend the 2018 IT Institute for ideas that can be adapted or adopted into the SMARTT pathways.
- Documentation supports the conclusion that input from the business and industry leaders was considered and used to develop the curriculum. After the first meeting, the BILT team ranked knowledge, skills and abilities, and related these directly to the plan of study. The second round of feedback refined and revised the courses and the curriculum. The level of satisfaction from BILT members with the input process used during curriculum development and ideas for efficiently obtaining feedback in the future will be obtained during a Fall 2018 focus group.

## Recommendations

In Year 2, the SMARTT project will move into implementation, establishing a comparison group and finalizing curriculum revision and approvals.

- The project team and evaluation team will continue to work closely to ensure student assessment and evaluation measures are appropriate for learning objectives. The data collection process needs to be efficient for both students and faculty.
- The project team will continue regular meetings with the BILT to obtain feedback and recommendations as lessons and activities are finalized for the revised and added courses. The project team is focused on the device laboratory for immediate needs, but all courses' student learning objectives will need to be assessed for student achievement levels and for continuous improvement of the programs.
- The project team should monitor recruitment outcomes to determine if additional efforts need to be made to attract high school and other students into the SMARTT degree and certificate programs. Recruitment should begin with students currently at Columbus State Community College since the fundamental courses are currently taught and will not change as the new degrees are implemented.
- The relationship between the certificate and degree programs needs to be further delineated so that it is easily understood what is needed for each and a path to completion is outlined and understood. Plans of study for each pathway will help in this regard.

# Appendices

# Appendix A. Business and Industry Leadership Focus Group Protocol

## Open-Ended Discussion Guide SMARTT-Phase 1 BILT Focus Group

### Introduction

Hello, I am [XXXX] and this is [YYYY]. We are from the University of Cincinnati Evaluation Services Center. We would like to ask you about your experiences with the **SMARTT Project (Strengthening Mobile Application Resources and Technician Training)**.

The information you provide will help improve the program. This information sheet describes the purpose of this study and is for you to keep. [REVIEW THE INFORMATION SHEET. MAJOR POINTS TO HIGHLIGHT: Your participation is voluntary. Your name will not be included with any of the findings; please be as honest and candid as possible. To respect other participants, we ask that you do not share what is discussed in this group with anyone else. We will audio record the session to ensure we are accurately capturing the ideas. No one outside the evaluation team will hear these recordings.] Please remember to talk one at a time and speak up as much as possible so that we can hear what you have to say. Do you have any questions before we begin?

1. We would like to obtain some background information. What is your affiliation with the SMARTT project?
  - a. What is your position?
  - b. Please describe company or organization.
  - c. What expertise do you bring to the project?
  - d. How many SMARTT events have you participated in?
    - i. What were they?
  - e. How many CS or mobile design students have you hired in the last year? From CSCC?
2. If you attended SMARTT events, do you provide input?
  - a. Did you feel it was valued? Why or Why not?
  - b. How were your comments addressed?
3. How has your input been incorporated into the SMARTT curriculum?
  - a. Directly or indirectly?
  - b. What is your reaction to the current progress made for curricular development?
4. Do you plan to continue participating in SMARTT events?
  - a. In what capacity?
  - b. Why or why not?
5. In what ways does the SMARTT program support the educational development of new hires in your field?
  - a. In general terms, please describe what you expect from a graduate of the new mobile technology program at CSCC?
    - i. Were your expectations different, or the same, as others you have hired in the past?
      1. If yes, what was different?
6. In what ways has the SMARTT project developed a pathway for high school to AAS to BS for regional students (2+2+2)?
7. What is working well related to the SMARTT project? What needs improvement?
8. Is there anything we have not discussed about the program that you would like us to know?
9. Other comments?

# Appendix B. Updated Evaluation Design



**Strengthening Mobile Application Resources and Technician Training  
(SMARTT) Project  
Columbus State College  
Evaluation Design and Plan – Updated June 2018**

**Project Goals and Objectives**

The goal of this project is to develop an education program for mobile application development technicians at Columbus State Community College to meet the increased demand by Ohio regional industry and to contribute to the diversity of the region's work force. The **project objectives** include:

1. Establish a Mobile Application Development Technology 2+2+2 pathways featuring:
  - a. A model articulation agreement from high school to community college and then to university level baccalaureate programs.
  - b. The expansion of the existing Industry Advisory Committee into a true BILT under the guidance of Dr. Ann Beheler from the National Convergence Technology Center (CTC) so industry co-leads work and provide maximum benefit for students.
  - c. A collaborative Mobile Design and Development certificate curriculum led by the BILT.
2. Create a collaborative state-of-the-art curriculum leveraging existing coursework in Interactive Media and Computer Science:
  - a. An online curriculum featuring digitized, adaptive learning object methodology.
  - b. A project-based learning capstone supported by a scalable, state-of-the-art device lab that that will provide the real-world work experience in designing and using mobile application development technology-related software and hardware.
3. Recruit underserved, disadvantaged populations (defined as low-income, first generation students) to the new SMARTT (Mobile Application Design and Mobile Application Development) pathways through partnerships with high school districts, special interest programs, and non-profit organizations.

**Evaluation Questions**

Formative Questions (FQ)

4. What activities, processes, and practices contributed to the establishment of the College's Mobile Application Development Technology 2+2+2 pathway?
5. How did the project facilitate leveraging the existing coursework to create a state-of-the-art curriculum leading to an education program for mobile application development technicians?
  - a. Development of a collaborative, interdisciplinary capstone course focused on project-based experiential learning.
  - b. Integration of project-based learning and soft skills development in all courses.
  - c. Approaches to faculty development strategy.
  - d. Delivery of blended curriculum.
  - e. Development and use of the SMARTT project device lab.
6. To what extent did the project recruit disadvantaged populations to the new SMARTT pathway?

Summative Questions (SQ)

1. To what extent has the project established a Mobile Application Development Technology career education 2+2+2 pathway for a disadvantaged/underserved student population?
  - a. Establishing and executing model articulation agreements with high schools and university level baccalaureate programs.
  - b. Developing and expanding curricula with industry input from the BILT, such as the development of a new Collaborative Interdisciplinary Mobile Design and Development (CIMDD) certificate.
  - c. The number of underserved and female students who:
    - i. Enroll in the new Mobile certificate

- ii. Complete the new Mobile certificate
  - iii. Enroll in the Mobile AAS degree program
  - iv. Remain in Mobile AAS degree program
  - v. Complete capstone projects
  - vi. Enter the workforce after completing their certificate or capstone project
  - vii. Complete the Mobile AAS degree program
  - viii. Begin matriculation to a four-year institution.
2. To what extent are students in the Mobile Application Development Technology career education 2+2+2 pathways satisfied with the program?

## Project Activities

These include:

- Complete industry and educational partner peer review of pathway and curriculum with the BILT.
- Create a new collaborative Mobile Application Design and Development certificate.
- Finalize transfer agreement with Franklin University to serve as a model articulation.
- Expand articulation with new high school and four-year partners.
- Develop a collaborative, interdisciplinary capstone course focused on project-based experiential learning for students in the mobile application development technician pathway.
- Integrate two threads into all courses: project-based learning and soft skills development.
- Integrate a project-based learning thread into the existing mobile curriculum, providing the opportunity to demonstrate application development and user interface design skills in a real-world environment; students will design and create mobile applications coordinated within a cloud-based project management platform for use by companies and non-profit organizations.
- Attend several Working Connections IT Faculty Development Institutes to learn how to become a new hosting site.
- Create a scalable and replicable flagship “SMARTT Device Lab” housed on campus that includes Android and iOS, phone and tablet devices for application testing.
- Promote program in large local school districts to encourage high-achieving low-income, first-generation graduates to enter the SMARTT Pathway.
- Partner with U.S. Department of Education TRIO programs to identify and assist first-generation, low-income students in the SMARTT pathway.
- Expand partnership with Per Scholas to provide seamless transfer of low-income adults from CompTIA certifications into the SMARTT pathways.
- Gather follow-up records for capstone completers.
- Share and collect documents/records with four-year institutions for articulating students.
- Update student contact information for follow-up activities.

## Project Benchmarks

Project managers will track program progress based on benchmarks outlined in Table B1. While the new degrees and the certificate curriculum are designed during the project, many of the foundational courses already exist, allowing enrollment of students in Year 2 as the second year classes are finalized.

Table B1. Project Outputs, Outcomes and Benchmarks

| Project Component  | Year 1 | Year 2 | Year 3 | Total |
|--|--------|--------|--------|-------|
| Number of <i>new</i> companies engaged in BILT   | 16     | 2      | 2      | 20    |
| Number of <i>new</i> students enrolled in new Mobile certificate   | 0      | 24     | 30     | 54    |
| Number of <i>new</i> students continuing toward Mobile AAS degree  | 0      | 24     | 30     | 54    |
| Semester-to-semester retention percent for students in program.  | 60%    | 65%    | 70%    | 70%   |
| Number of students completing new Mobile certificate (launch Y2)   | -      | 10     | 15     | 25    |
| Number of students completing Mobile AAS degree (launch Y2, first graduates Y3; others will graduate in sustainability period beyond project)    | -      | -      | 8      | 10    |
| Number of students articulating to 4-year institutions (starts Y3)   | -      | -      | 4      | 4     |
| Number of faculty participating in Working Connections Institute   | 5      | 5      | 20     | 30    |
| Number of capstone projects completed by students ( <i>one project per year per student; Y3 includes Y2 students (24) and Y3 students (30)</i> ) | 0      | 24     | 54     | 78    |
| Benchmark: at least 90% of graduates express satisfaction with SMARTT program  | -      | 90%    | 90%    | 90%   |
| Benchmark: at least 30% of students obtain employment after completing certificate while finishing their associate's degree                      | -      | -      | 30%    | 30%   |

### Project Impacts (beyond grant period)

- Increase in retention and completion rates of students in SMARTT pathways
- Increase in number of disadvantaged and underserved students enrolled in SMARTT pathways
- Increase in number of technicians are educated and prepared to meet industry demand
- Faculty expertise is expanded in mobile technology
- BILT members hire and express satisfaction with SMARTT graduates

### Evaluation Activities

As shown in the evaluation design table, numerous internal [I] and external [E] evaluation activities are proposed.

### Instrument Development

UCESC will work collaboratively with CCSC to develop relevant rubrics for all aspects of the evaluation that need rubrics (e.g., assessing student projects, assessing quality of curricula, and assessing quality of instructional apps). Some examples that may be used and/or modified by the team (with permission) are the Course Evaluation Rubric for a Capstone Project in Design (Evenson, 2016) or the Evaluation Rubric for Instructional Apps (Lee & Cherner, 2015). The final development will depend on the priorities and decisions of the team; the process of rubric development detailed by Lee & Cherner (2015) is a best-practice model.

UCESC has extensive experience developing protocols for focus group discussions and interviews as well as surveys. As specified in the proposal, these instruments will be developed in collaboration with the project team to ensure content and topics meet the needs of the project team and align with project objectives and evaluation questions.

Course approval timing has allowed the evaluation team to establish a comparison student group for the 2018-2019 academic year with SMARTT curriculum changes being implemented beginning in fall 2019 to assess student reactions to curriculum changes. The project and evaluation teams have no control over when comparison students started in their program; thus, the evaluation team will administer a post-

survey only when students graduate, either at the end of fall 2018 or spring 2019 semesters. Instruments to evaluate student experiences include:

1. Student self-efficacy survey
2. Student confidence survey
3. Employability and employment student survey
4. Program evaluation survey (administered at the end of capstone course)

In keeping with best practices in survey development, UCESC will conduct a literature review of existing, standard measures used to assess similar topics using pre-established, existing surveys that have high reliability and validity. Scales, subscales, and items from such pre-existing instruments will be adapted to meet the needs of the project. Drafts of surveys will be shared with the project team for suggested edits and feedback. Psychometric properties will be assessed for reliability and face validity. Faculty surveys and protocols for student focus groups will be developed as the project progresses.

### Data Collection

- The project team [I] will collect all relevant data for curriculum mapping and BILT feedback for knowledge and skills assessment.
- The project team [I] will collect all relevant data for course evaluations and rubric scores.
- UCESC [E] will launch, field, and download student and faculty surveys.
- UCESC [E] will conduct all focus group discussions with students and BILT members; discussions will be audiotaped.

### Analysis

- UCESC [E] will check fidelity of curriculum mapping against BILT-defined knowledge and skills.
- UCESC [E] will thematically analyze focus group discussion data.
- UCESC [E] will conduct appropriate statistical analysis on survey and quantitative data.

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**Project Goal:** To develop an education program for mobile application development technicians at Columbus State Community College to meet the increased demand by Ohio regional industry and contribute to the diversity of the region’s work force.

| Evaluation Questions<br>[FQ = Formative; SQ = Summative]  | Evaluative Activities<br>[I=Internal; E=External]   | Timing                                 |
|---|---|--|
| FQ1. What activities, processes, and practices contributed to the establishment of the College’s Mobile Application Development Technology 2+2+2 pathway?   | <ul style="list-style-type: none"> <li>Review completed curriculum peer review by BILT [E]</li> </ul>   | Spring-Summer 2018                     |
|   | <ul style="list-style-type: none"> <li>Collaboratively develop a rubric to evaluate the Mobile Application Development pathways [I,E]</li> </ul>  | Fall 2018                              |
|   | <ul style="list-style-type: none"> <li>Check mapping of course curriculum [E]</li> </ul>  | Fall 2018                              |
|   | <ul style="list-style-type: none"> <li>Review articulation agreements with Franklin University and other high school and four-year partners [E]</li> </ul>  | Spring 2019 and 2020                   |
| FQ2a. How did the project facilitate leveraging the existing associate degree programs to create a state-of-the-art curriculum leading to an education program for mobile application development technicians?<br><i>This will be assessed in terms of development of a collaborative, interdisciplinary capstone course focused on project-based experiential learning</i> | <ul style="list-style-type: none"> <li>Collaboratively develop a rubric to evaluate the capstone course [I,E]</li> </ul>  | Winter 2018                            |
|   | <ul style="list-style-type: none"> <li>Review CSCC course evaluations for all courses in programs [I] and provide results to evaluation team for analysis [E]               <ul style="list-style-type: none"> <li>Courses currently taught and significantly changed: Programming Fundamentals for iOS (CSCI 1650), Programming Fundamentals for Android (CSCI 1660), iOS Mobile Apps Development (CSCI 2650), Android Mobile Apps Development (CSCI 2660), and IMM 2372 course in Adobe Phonegap</li> </ul> </li> </ul> | Comparison 2018-19<br>Modified 2019-20 |
|   | <ul style="list-style-type: none"> <li>Review developed capstone course for PBL elements [I]</li> </ul>   | Fall 2019                              |
|   | <ul style="list-style-type: none"> <li>Faculty survey: the collaborative and interdisciplinary process of capstone course development [E]</li> </ul>  | Spring 2019 and 2020                   |

| <p style="text-align: center;"><b>Evaluation Questions</b><br/>[FQ = Formative; SQ = Summative]</p>   | <p style="text-align: center;"><b>Evaluative Activities</b><br/>[I=Internal; E=External]</p>   | <p style="text-align: center;"><b>Timing</b></p>                           |
|---|--|--|
| <p>FQ2b. How did the project facilitate leveraging the existing associate degree programs to create a state-of-the-art curriculum leading to an education program for mobile application development technicians?<br/><i>This will be assessed in terms of integration of project-based learning and soft skills development in all courses within a blended curriculum</i></p> | <ul style="list-style-type: none"> <li>• Summarize the process and final products of courses with PBL and soft skills elements [I]               <ul style="list-style-type: none"> <li>○ Conduct performance assessments of student-created and designed mobile applications [I]</li> <li>○ Review and describe the coordination of student projects with cloud-based project management [I].</li> </ul> </li> </ul>  | <p style="text-align: center;">Comparison 2018-19<br/>Modified 2019-20</p> |
|   | <ul style="list-style-type: none"> <li>• Review curriculum mapping to track integrations between courses for both Mobile App Development and Mobile App Design curriculum [E]</li> <li>• Looking at               <ul style="list-style-type: none"> <li>○ Pre-requisites</li> <li>○ Knowledge and skills building on each other (PBL, Soft skills, Application development, User interface design development, Cloud-based project management)</li> <li>○ Ties to real-world environment</li> </ul> </li> </ul> | <p style="text-align: center;">Fall 2018 (when curriculum approved)</p>    |
|   | <ul style="list-style-type: none"> <li>• Comparison of student performance assessments results [E]</li> </ul>  | <p style="text-align: center;">Comparison 2018-19<br/>Modified 2019-20</p> |
|   | <ul style="list-style-type: none"> <li>• Conduct surveys to determine faculty members' and students' perspectives about the MADT education program and the new SMARTT pathway after changes, using 1) post student survey for the comparison group and 2) pre-post student surveys for the CSCC students [E]</li> </ul>  | <p style="text-align: center;">Comparison 2018-19<br/>Modified 2019-20</p> |
|   | <ul style="list-style-type: none"> <li>• Conduct pre-post surveys to determine CSCC students' perspectives about the MADT education program and the new SMARTT pathway [E]; conduct focus groups discussions (FGD) with selected graduates</li> </ul>  | <p style="text-align: center;">Modified 2019-20<br/>FGD with graduates</p> |
| <p>FQ2c. How did the project facilitate leveraging the existing associate degree programs to create a state-of-the-art curriculum leading to an education program for mobile application development technicians?</p> <ul style="list-style-type: none"> <li>• This will be assessed in terms of approaches to faculty development strategy</li> </ul>                          | <ul style="list-style-type: none"> <li>• Keep IT Institutes' attendance records, review documents related to IT Institutes and describes lessons learned from IT Institutes [I].</li> </ul>  | <p style="text-align: center;">Summer 2018, 2019,<br/>2020</p>             |
|   | <ul style="list-style-type: none"> <li>• Conduct faculty surveys to determine effects of faculty members' experience at the IT Institutes on the MADT education program and the new SMARTT pathways</li> </ul>   | <p style="text-align: center;">Fall 2018, 2019, 2020</p>                   |

| <p style="text-align: center;"><b>Evaluation Questions</b><br/>[FQ = Formative; SQ = Summative]</p>  | <p style="text-align: center;"><b>Evaluative Activities</b><br/>[I=Internal; E=External]</p>  | <p style="text-align: center;"><b>Timing</b></p>                            |
|--|---|---|
| <p>FQ2d. How did the project facilitate leveraging the existing associate degree programs to create a state-of-the-art curriculum leading to an education program for mobile application development technicians?<br/><i>This will be assessed by use of the SMARTT Project Device Lab</i></p>   | <ul style="list-style-type: none"> <li>Collaboratively develop a rubric to evaluate the applicability, scalability, and replicability of the “SMARTT Device Lab” [I,E]</li> </ul>   | <p style="text-align: center;">Fall 2018</p>                                |
|  | <ul style="list-style-type: none"> <li>Conduct evaluation of the “SMARTT Device Lab” using the developed rubric [I]</li> </ul>  | <p style="text-align: center;">Beginning Winter 2019; assessed annually</p> |
|  | <ul style="list-style-type: none"> <li>Assess (via student and faculty surveys and student focus group discussion) the applicability, scalability, and replicability of the “SMARTT Device Lab” [E]</li> </ul>  | <p style="text-align: center;">Modified 2019-20 FGD with graduates</p>      |
| <p>FQ3. To what extent did the project recruit disadvantaged populations to the new SMARTT pathway?</p>  | <ul style="list-style-type: none"> <li>Document and summarize all promotional materials used in recruitment [I].</li> </ul>   | <p style="text-align: center;">Winter 2019 and ongoing</p>                  |
|  | <ul style="list-style-type: none"> <li>Document and summarize the project collaboration and partnership with USDOE Trio program and Per Scholas [I].</li> </ul>   | <p style="text-align: center;">Winter 2018 and ongoing</p>                  |
|  | <ul style="list-style-type: none"> <li>Check for project expected results regarding identification of first-generation, low-income students in the program and the transfer of low-income adults into the SMARTT pathways [E]</li> </ul>  | <p style="text-align: center;">Spring 2019 and ongoing</p>                  |
| <p>SQ1a. To what extent has the project established a Mobile Application Development Technology (MADT) career education 2+2+2 pathway for a disadvantaged student population in terms of: <i>Established and executed model articulation agreements with high schools and baccalaureate university level programs</i></p>  | <ul style="list-style-type: none"> <li>Review curriculum mapping and alignment with CSCC official articulation documents provided by project team with other educational institutions pertaining to course credits allowed and instructor requirements of dual-level courses, etc. [E]</li> </ul> | <p style="text-align: center;">Spring 2020</p>                              |
| <p>SQ1b. To what extent has the project established a Mobile Application Development Technology (MADT) career education 2+2+2 pathway for a disadvantaged student population in terms of: <i>The expanded Building and Industry Leadership Team (BILT) leading curricular development such as the development of a new Collaborative Interdisciplinary Mobile Design and Development (CIMDD) certificate</i></p> | <ul style="list-style-type: none"> <li>Determine BILT involvement in the development of the SMARTT curriculum and the CIMDD certificate (via focus group discussion) with representatives of BILT [E].</li> </ul>   | <p style="text-align: center;">Fall 2018</p>                                |
|  | <ul style="list-style-type: none"> <li>Determine faculty perspectives (via faculty survey) regarding the SMARTT curriculum, the CIMDD certificate, and the 2+2+2 MADT career pathways [E].</li> </ul>   | <p style="text-align: center;">Fall 2019 and 2020</p>                       |

| <p style="text-align: center;"><b>Evaluation Questions</b><br/>[FQ = Formative; SQ = Summative]</p>  | <p style="text-align: center;"><b>Evaluative Activities</b><br/>[I=Internal; E=External]</p>  | <p style="text-align: center;"><b>Timing</b></p> |
|--|---|--|
| <p>SQ1c. To what extent has the project established a Mobile Application Development Technology (MADT) career education 2+2+2 pathway for a disadvantaged student population in terms of: <i>The number of underserved and female students who ...</i></p> <ul style="list-style-type: none"> <li><i>i. Enrolled in the new Mobile certificate;</i></li> <li><i>ii. Completing the new Mobile certificate;</i></li> <li><i>iii. Enrolled in the Mobile AAS degree program;</i></li> <li><i>iv. Retained in Mobile AAS degree program;</i></li> <li><i>v. Completed capstone projects;</i></li> <li><i>vi. Entered the workforce after completing their certificate or capstone project</i></li> <li><i>vii. Completed the Mobile AAS degree program;</i></li> <li><i>viii. Began matriculation to a four-year institution</i></li> </ul> | <ul style="list-style-type: none"> <li>• Track student numbers in each program from entering pathways through CSCC graduation <ul style="list-style-type: none"> <li>○ Entering to completion of certificate</li> <li>○ Entering to completion of Mobile AAS degree, including new capstone course</li> <li>○ Workforce participation during or after degree completion</li> <li>○ Matriculation into four-year institutions</li> </ul> </li> </ul> | <p style="text-align: center;">Ongoing</p>       |
| <p>SQ2. To what extent are students in the Mobile Application Development Technology (MADT) career education 2+2+2 pathways satisfied with the program?</p>  | <ul style="list-style-type: none"> <li>• Conduct pre-post surveys to determine CSCC students' perspectives about the MADT education program and the new SMARTT pathways [E]</li> </ul>  | <p style="text-align: center;">Spring 2020</p>   |
|  | <ul style="list-style-type: none"> <li>• Conduct focus group discussion of selected students who graduated about their satisfaction with the MADT education program [E].</li> </ul>   | <p style="text-align: center;">Spring 2020</p>   |