

## **Strengthening Mobile Application Resources and Technician Training (SMARTT) Project Columbus State College**

### **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 pathway 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 Business and Industry Leadership Team (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 the existing Mobile Media Design Associate Degree in Interactive Media and the Mobile Application Software Development Associate Degree in Computer Science, including:
  - 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) to the new SMARTT pathway through partnerships with high school districts, special interest programs, and non-profit organizations.

### **Evaluation Questions**

#### 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 associate degree programs to create a state-of-the-art curriculum leading to an education program for Mobile Application Development Technicians? This will be assessed in terms of:
  - 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; and
  - e. Use of the SMARTT Project Device Lab.
3. How 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 (MADT) career education 2+2+2 pathway for a disadvantaged student population in terms of:
  - a. Established and executed model articulation agreements with high schools and university level

- baccalaureate programs;
- b. 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; and
  - c. The number of underserved and female students who:
    - i. Enrolled in the new Mobile certificate;
    - ii. Continued toward the Mobile AAS Degree;
    - iii. Were retained in the program;
    - iv. Completed capstone projects;
    - v. Completed the program;
    - vi. Entered the workforce after completing their certificate and capstone projects while taking their associate degrees;
    - vii. Began matriculation to a four-year institution; and
    - viii. Were satisfied with the Mobile Application Development Technology (MADT) 2+2+2 pathway.

### **Project and Evaluation Activities**

The table below has five major columns, which refer to project objectives (using the lettering and numbering scheme from above), corresponding project activities, evaluation activities (internal and external), evaluation questions (formative and summative), and data collection instruments.

The alignment of project activities with objectives and evaluation activities is shown in the table below. Project activities include the following:

- Complete industry and educational partner peer review of pathway and curriculum with the Business and Industry Leadership Team (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.
- High school promotion at large local school districts to encourage high achieving low-income, first generation graduates to matriculate into the SMARTT Pathway at Columbus State.
- Partnering with U.S. Department of Education TRIO Programs to identify and assist first-generation, low-income students into the SMARTT pathway.
- An expanded partnership with Per Scholas to provide seamless transfer of low-income adults from its CompTIA certifications into the SMARTT pathway.
- Facilitate updates re: Enrollment records.

- Follow up of records for capstone completers.
- Share and collect documents/records with four-year institutions for articulating students.
- Update student contact information for follow-up activities.

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

- Review and summarize all pertinent project documents [I].
- Check and analyze all project-related document summaries [E].
- Determine the BILT involvement in the development of the SMARTT curriculum and the CIMDD Certificate (via focused group discussion) with representatives of BILT [E].
- Determine teacher perspectives (via Teacher Survey) about the SMARTT Curriculum, the CIMDD Certificate, and the 2+2+2 MADT career pathway [E].
- Determine student satisfaction (via Student Survey) with the SMARTT Curriculum, the CIMDD Certificate, and the 2+2+2 MADT career pathway [E].
- Conduct analyses of all student documents [E].
- Provide all student contact information [I].
- Survey students and conduct focus group discussion (FGDs) of sampled students about their satisfaction with the MADT education program; conduct analyses of all student surveys [E].

### **Instrument Development**

UCESC will work collaboratively with the CCSC to develop relevant rubrics for all aspects of the evaluation that need rubrics (e.g., assessing students' projects, assessing quality of curricula, 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 but 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. 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 been shown to have high reliability and validity. Scales, subscales, and items from pre-existing instruments will be included, adapted to meet the needs of the project. Drafts of the surveys will be shared with the project team for suggested edits and feedback. Psychometric properties will be assessed to demonstrate reliability and validity. UCESC has employed these data collection methods (e.g., focus group discussions, document review, surveys) for numerous projects and is experienced in adapting instruments for project-specific needs to assess progress toward goals and objectives and to answer evaluation questions.

### **Data Collection**

- The project team will collect all relevant documents for review [I].
- UCESC will launch, field, and download [E] all surveys.
- UCESC will conduct all focus group discussions; discussions will be audiotaped [E].

### **Analysis**

- The project team will summarize [I] all documents based on the collaboratively established summary guide [I, E] for integration collaboration [E] with all other data.
- The evaluation team will thematically analyze focus group discussion data [E].
- Appropriate statistical analysis will be conducted and applied on survey data and all quantitative records [E].

### **References**

*Senior Interaction Capstone Project. School of Design, CMU.* Pittsburgh, PA: Eberly Center for Teaching Excellence, Carnegie Mellon University. Retrieved on June 12, 2017 from <https://www.cmu.edu/teaching/resources/Teaching/CourseDesign/Assessment-Grading/Rubrics/DesignCapstoneRubric.doc>

Lee, C-Y. & Cherner, T. S. (2015). A comprehensive evaluation rubric for assessing instructional apps. *Journal of Information Technology Education: Research*, 14, 21-53. Retrieved from <http://www.jite.org/documents/Vol14/JITEV14ResearchP021-053Yuan0700.pdf>

**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.

Obj.	Project Activities	Evaluative Activities/Processes [I=Internal; E=External]	Evaluation Questions [FQ = formative; SQ = summative]	Data Collection Instrument			
				Document Review	Student Performance Assessment	Focus Group Discussions and/or Interviews	Surveys
#1a, #1b, #1c	<ul style="list-style-type: none"> <li>Complete industry and educational partner peer review of pathway and curriculum with the Business and Industry Leadership Team (BILT) (1.1 and 1.4 from proposal activities list).</li> <li>Create a new collaborative Mobile Application Design and Development Certificate (1.2 and 1.3).</li> <li>Finalize transfer agreement with Franklin University to serve as a model articulation (1.5.1).</li> <li>Expand articulation with new high school and four-year partners (1.5.2).</li> </ul>	<ul style="list-style-type: none"> <li>Review of documents/evidence of completed curriculum peer review by BILT (Spring 2018).</li> <li>Review of meeting minutes indicating collaborative efforts Mobile Application Design and Development (MADD) Certificate (Spring 2018).</li> <li>Review of course curriculum leading to MADD Certificate (Spring 2018).</li> <li>Review articulation agreements with Franklin University and new high school and four-year partners (Year 2).</li> </ul>	FQ#1	X			
#1a, #1b, #1c	<ul style="list-style-type: none"> <li>Develop a collaborative, interdisciplinary capstone course focused on project-based experiential learning for students in the mobile application development technician pathway (2.1.1 and 2.2.1).</li> </ul>	<ul style="list-style-type: none"> <li>Review developed capstone course for PBL elements and provides review summary [I].</li> <li>Analyze capstone course review summary; check, via Teacher FGD and Teacher Survey, the collaborative and interdisciplinary process of capstone course development [E] (Spring 2018).</li> </ul>	FQ#2a	X		X	X

Obj.	Project Activities	Evaluative Activities/Processes [I=Internal; E=External]	Evaluation Questions [FQ = formative; SQ = summative]	Data Collection Instrument			
				Document Review	Student Performance Assessment	Focus Group Discussions and/or Interviews	Surveys
#2a, #2b	<ul style="list-style-type: none"> <li>Integrate two threads into all courses: project-based learning and soft skills development (2.2.2).</li> </ul>	<ul style="list-style-type: none"> <li>Review and summarize the process and final product of all courses with PBL and soft skills elements [I].</li> <li>Check document summaries for integration and triangulation with all other project data [E] (Summer 2018).</li> </ul>	FQ#2b	X			
#2a, #2b	<ul style="list-style-type: none"> <li>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 (2.1.2).</li> <li>Students will design and create mobile applications coordinated within a cloud-based project management platform for use by companies and non-profit organizations (2.1.2).</li> <li>Attend several Working Connections IT Faculty Development Institutes (2.4.1) to learn how to become a new hosting site (2.4.2).</li> </ul>	<ul style="list-style-type: none"> <li>Summarize all mobile curriculum highlighting the PBL thread [I].</li> <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> <li>Keep IT institutes attendance records, reviews documents related to IT institutes and describes lessons learned from the IT institutes [I].</li> <li>Conduct thematic analysis of project team-provided curriculum document and IT institute document summaries [E] (Summer 18, 19, 20).</li> <li>Conduct analysis of student performance assessments results [E] (End of Fall 2018 and each semester).</li> <li>Conduct pre-post surveys and FGD of sampled groups to determine teachers' and students' perspectives about the MADT education program and the new SMARTT pathway (Beginning of Fall 2018 and end of Spring 2019 is first to finish).</li> </ul>	FQ#2c	X	X	X	X
			FQ#2d	X	X	X	X

Obj.	Project Activities	Evaluative Activities/Processes [I=Internal; E=External]	Evaluation Questions [FQ = formative; SQ = summative]	Data Collection Instrument			
				Document Review	Student Performance Assessment	Focus Group Discussions and/or Interviews	Surveys
#2b	<ul style="list-style-type: none"> <li>Create a scalable and replicable flagship “SMARTT Device Lab” housed on campus that includes Android and iOS, phone and tablet devices for application testing (2.3).</li> </ul>	<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] (finalized Summer 2018).</li> <li>Conduct evaluation of the “SMARTT Device Lab” using the developed rubric [I].</li> <li>Review the internal evaluation result of the “SMARTT Device Lab” [E] (Beginning of Fall 2018 and end of Spring 2019 is first to finish).</li> <li>Check (via Student and Teacher Surveys) about the applicability, scalability, and replicability of the “SMARTT Device Lab”; analyzes survey data [E] (Beginning of Fall 2018 and end of Spring 2019 is first to finish).</li> </ul>	FQ#2e	X		X	X
#3	<ul style="list-style-type: none"> <li>Promote program in large local school districts to encourage high-achieving low-income, first-generation graduates to enter the SMARTT Pathway (3.1 and 3.2).</li> <li>Partner with U.S. Department of Education TRIO programs to identify and assist first-generation, low-income students in the SMARTT pathway (3.1 and 3.2).</li> </ul>	<ul style="list-style-type: none"> <li>Document and summarize all promotions materials used in recruitment [I].</li> <li>Document and summarize the project collaboration and partnership with USDOE Trio Program and Per Scholas [I].</li> <li>Review project team summaries about promotions materials used in recruitment [E] (Spring 2018 and ongoing).</li> <li>Review the summary documents about project collaboration and partnership with USDOE Trio Program and Per Scholas to check for project expected</li> </ul>	FQ#3	X			

Obj.	Project Activities	Evaluative Activities/Processes [I=Internal; E=External]	Evaluation Questions [FQ = formative; SQ = summative]	Data Collection Instrument			
				Document Review	Student Performance Assessment	Focus Group Discussions and/or Interviews	Surveys
	<ul style="list-style-type: none"> <li>An expanded partnership with Per Scholas to provide seamless transfer of low-income adults from CompTIA certifications into the SMARTT pathway (3.1 and 3.2).</li> </ul>	<ul style="list-style-type: none"> <li>results re: identification of first-generation, low-income students in the program and the transfer of low-income adults into the SMARTT pathway [E] (Spring 2018 and ongoing).</li> </ul>					
#1a, #2a, #2b	<ul style="list-style-type: none"> <li>All aligned project activities with FQ#1</li> </ul>	<ul style="list-style-type: none"> <li>Review and summarize all pertinent project documents [I]. Check and analyze all project-related document summaries [E].</li> </ul>	SQ#1a	X			
#1b, #1c	<ul style="list-style-type: none"> <li>All aligned project activities with FQ#2</li> </ul>	<ul style="list-style-type: none"> <li>Determine the BILT involvement in the development of the SMARTT curriculum and the CIMDD Certificate (via focused group discussion) with representatives of BILT [E].</li> <li>Determine teacher perspectives (via Teacher Survey) about the SMARTT Curriculum, the CIMDD Certificate, and the 2+2+2 MADT career pathway [E].</li> <li>Determine student satisfaction (via Student Survey) with the SMARTT Curriculum, the CIMDD Certificate, and the 2+2+2 MADT career pathway [E].</li> </ul>	SQ#1b	X		X	X
#3	<ul style="list-style-type: none"> <li>Facilitate updates re: Enrollment records</li> </ul>	<ul style="list-style-type: none"> <li>Provide all student documents with corresponding demographic characteristics [I]. Conduct analyses of all student documents [E].</li> </ul>	SQ#1ci-v	X			
#1a	<ul style="list-style-type: none"> <li>Follow up of records for capstone completers</li> </ul>		SQ#1c-vi	X			

Obj.	Project Activities	Evaluative Activities/Processes [I=Internal; E=External]	Evaluation Questions [FQ = formative; SQ = summative]	Data Collection Instrument			
				Document Review	Student Performance Assessment	Focus Group Discussions and/ or Interviews	Surveys
#2b	<ul style="list-style-type: none"> <li>Share and collect documents/records with four-year institutions for articulating students</li> </ul>		SQ#1c-vii	X			
#3	<ul style="list-style-type: none"> <li>Update student contact information for follow-up activities</li> </ul>	<ul style="list-style-type: none"> <li>Provide all student contact information [I].</li> <li>Survey students and conduct FGD of sampled students about their satisfaction with the MADT education program; conduct analyses of all student surveys [E].</li> </ul>	SQ#1c-viii	X		X	X

**From SMARTT Proposal Narrative to NSF**

Project managers will track program progress based on these benchmarks. While the new degrees and certificate curriculum will be designed during the project, many of the foundational courses already exist, allowing us to enroll students in year two as the second year classes are finalized.

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, other will graduate in sustainability period beyond project)	-	-	8	10
Number of students articulating to 4-year institution. (starts Y3)	-	-	4	4
Number of faculty participating in Working Connections Institute	5	5	20	30
At least 90% of all graduates express satisfaction with SMARTT Program	-	90%	90%	90%
At least 30% of students obtain employment after completing certificate while finishing their associate's degree	-	-	30%	30%
Number of capstone projects completed by students ( <i>one project per year per student; year 3 includes first 24 students and second 30</i> )	0	24	54	78

**Figure 5: Project Output and Outcomes**

***Impacts (beyond grant period)***

- Increased retention and completion rates of students in SMARTT pathway
- Increased number of disadvantaged and underserved students enrolled in SMARTT pathways
- Increased 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

Project Timeline	Year 1				Year 2				Year 3			
	Fall 17	Winter 18	Spring 18	Summer 18	Fall 18	Winter 19	Spring 19	Summer 19	Fall 19	Winter 20	Spring 20	Summer 20
1.1 – Finalize and convene BILT												
1.2 – Align Mobile Application AAS curriculum between CSCI and IMM												

Project Timeline	Year 1				Year 2				Year 3			
	Fall 17	Winter 18	Spring 18	Summer 18	Fall 18	Winter 19	Spring 19	Summer 19	Fall 19	Winter 20	Spring 20	Summer 20
1.3 – Adapt courses for new certificate for Mobile Application												
1.4 – BILT Meetings												
1.5.1 – Create model university articulation agreement												
1.5.2 – Replicate model articulation to additional institutions												
2.1.1 – Develop adaptive learning objects for course modules												
2.1.2 – Deliver curriculum using hybrid/blended model												
2.2.1 – Develop project-based capstone												
2.2.2 – Integrate project-based learning strategy into existing courses												
2.3 – Create SMARTT Device Lab												
2.4.1 – Attend Working Connections IT Faculty Development Institute												

Project Timeline	Year 1				Year 2				Year 3			
	Fall 17	Winter 18	Spring 18	Summer 18	Fall 18	Winter 19	Spring 19	Summer 19	Fall 19	Winter 20	Spring 20	Summer 20
2.4.2 – Plan and host Working Connections IT Faculty Institute												
3.1 – Create outreach materials												
3.2 – Perform recruiting/outreach												
Project dissemination												
Formative evaluation												
Summative evaluation												