

Understanding the Impact of the ATE Delta
Information Systems and Cyber (DISC) Initiative at
Phillips Community College
~Year 2 Evaluation Activities~

A Report To:



Phillips Community College

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June 2021

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Introduction

This report presents key findings from evaluation work supporting Year 2 activities conducted for Phillips Community College's ATE program, "Arkansas Delta Information Systems and Cyber (DISC) Initiative." Through this NSF-ATE project, Phillips Community College will work to (1) increase the quality and capacity of technicians in the Information Systems Program that graduate with certificates and degrees ready to enter the workforce, and (2) increase the quality and capacity of the faculty that teach in the Information Systems Program. As this is the second year of program implementation, results focus on the student outcomes that best fit anticipated formative achievements within the first and second year of programming:

- ✓ Industry relevant, "hands on" curriculum is created,
- ✓ Student enrollment increased by 20%/year,
- ✓ Student retention rate increased by 5% each year,
- ✓ 12 students enrolled in Information Technology degree program,
- ✓ 9 additional students graduate with Certificate of Proficiencies,
- ✓ 9 additional students graduate with Information Systems degree,
- ✓ 80% of graduates obtain industry certifications, and
- ✓ Faculty earn three high level certifications each.

To assess progress toward these outcomes, program evaluator Dr. Megan Mullins, in partnership with the Principal Investigators, conducted the following evaluation activities¹:

- ✓ Analysis of Secondary Institutional Data: Assessment of 2020-2021 academic enrollment and demographic data,
- ✓ Survey Research: Student Pre-test Survey & Annual Student Satisfaction Survey², and
- ✓ Focus Groups: Student Satisfaction Annual Focus Groups.

Year 2 Progress Toward Outcomes

The following performance measures are linked to the program's short-term outcomes. Evaluation results will be organized under each indicator subheading.

- The extent to which the project is implemented as intended (timeline, participants, activities, cost),
- Satisfaction with recruitment efforts,
- Increased student information technology knowledge and "hands on" skills,
- The extent to which stakeholders are satisfied with program components, and
- The extent to which investigators gain increased understanding of faculty and student needs and challenges as the DISC Initiative is implemented.

¹ The first scheduled site visit and in-person student focus groups were canceled due to COVID-19 and resulting campus closures in Spring 2020.

² The student satisfaction survey and post-program survey are currently in the field and preliminary results will be only briefly referenced in this report. Campus differences in satisfaction will be assessed and reported to the NSF in next year's report.

Extent to Which Project is Implemented as Intended

The program is being implemented as planned and the project is also operating within cost and inside its projected timeline, despite COVID-19 pandemic-related delays.

Table 1. Course Enrollment Demographics	Year 1 2019-2020 (n=18)		Year 2 2020-2021 (n=30)	
	#	%	#	%
Sex	18	100%	29	100%
Female	3	16.7%	8	26.7%
Male	15	83.3%	22	73.3%
Ethnicity				
White/unknown	9	50.0%	15	50.0%
Domestic students of color	9	50.0%	15	50.0%
First generation	6	33.3%	13	43.3%

The program is on target for its enrollment goals. Numbers below show total certifications and degrees to date, demonstrating a 70% increase (7 to 23) in certificate completion. Once Fall 2021 completion numbers are included, which add students delayed in completion due to the pandemic, rates will be compared to pre-pandemic expectations for enrollment and completion increases.

Table 2. Graduates in AAS degree and Certificates of Proficiency	Year 1 2019-2020 (n=9)	Year 2 2020-2021 (n=28)	Total (n=37)
	Year 1 #	Year 2 #	
IS.AAS	2	5	7
MANPC.CP	5	6	11
MSOPSYS.CP	1	6	7
CYS.CP	0	6	6
PROG.CP	1	5	6

IS.AAS (Information Systems Technology Degree)

MANPC.CP (Managing & Maintaining PC - Certificate of Proficiency)

MSOPSYS.CP (MS Operating Systems Desktop Support - Certificate of Proficiency)

CYS.CP (Cyber Security - Certificate of Proficiency)

PROG.CP (Programming/Coding - Certificate of Proficiency)

Extent to Which Curriculum is Implemented as Intended

Curriculum implementation did not come without challenges but is being implemented as planned. Faculty have continued to develop and implement NetLab+, a high-tech virtualization software, into the course curriculum. In Fall 2020, the college returned to on campus instruction with some classes still offered using alternative delivery formats. Utilizing NetLab+ as part of the curriculum allowed students to continue in the program which increased student retention rates while also providing quality instruction with hands-on simulations for students to apply classroom or textbook information in a real-world environment.

While NetLab+ has been beneficial to this transition, focus group results indicate that adoption of NetLab+ comes much more easily for some students than others. The absence of hands-on experiences is differentially felt. Additionally, some students continue to struggle with poor Internet connection in using the software to support their learning. Additionally, certification testing was put on hold as the testing center itself was closed to students and has only recently been re-opened this past Spring, 2021.

The program has also taken the important step in expanding their certification offerings by providing two "Boot Camps." In these camps, faculty prepared participating students for CompTIA A+ and Security+ industry certifications. The two-week intense boot camps were offered through Blackboard with curriculum that included instructional videos, NetLab+ review modules, and access to MeasureUp for online practice exams. Faculty also conducted two Zoom sessions for students to ask questions and discuss specific topics related to study materials, collaborate with other students, and receive tutoring from faculty as needed. Upon completion of the boot camp requirements, students were provided an industry certification testing voucher. A total of 13 students participated in one or both of these camps.

Faculty have also been providing weekly tutoring sessions through Zoom and individual sessions when students request special appointments. Weekly on-campus tutoring sessions were offered to allow study groups as well as faculty interaction to answer questions and provide additional instruction when needed. These tutoring sessions also provide opportunities for students to receive support and study resources that promote student retention and success.

Satisfaction with Recruitment Efforts

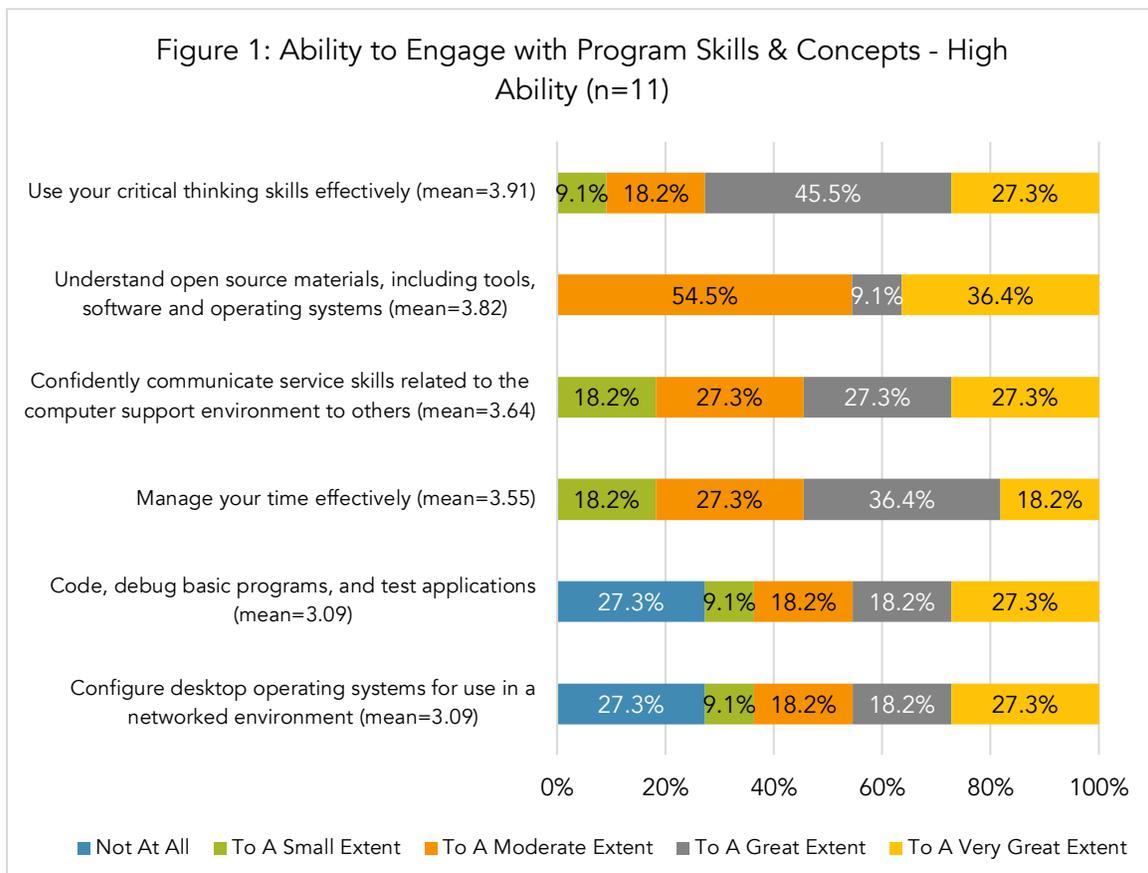
This section is informed by results from the student pre-test survey and Year 2 focus groups. Feedback from students on recruitment efforts for this first year indicate that students became aware of the program from a college advisor (75%, n=9), followed by a faculty recommendation (33.0%, n=4), and then word-of-mouth between students (25.0%, n=3), or by posted flyer or advertisement (25.0%, n=3).

Focus group results also reflect the effectiveness of direct one-on-one recruitment efforts made by college faculty and staff. Helena-West Helena Campus students were primarily recruited by a campus advisor (five students). One student was recruited by a faculty member, and two were encouraged by family members to pursue this type of learning, and one learned of the program from a friend. All students from the Stuttgart Campus were recruited into the program by Ms. Grove, a faculty member and also Co-PI of the DISC program.

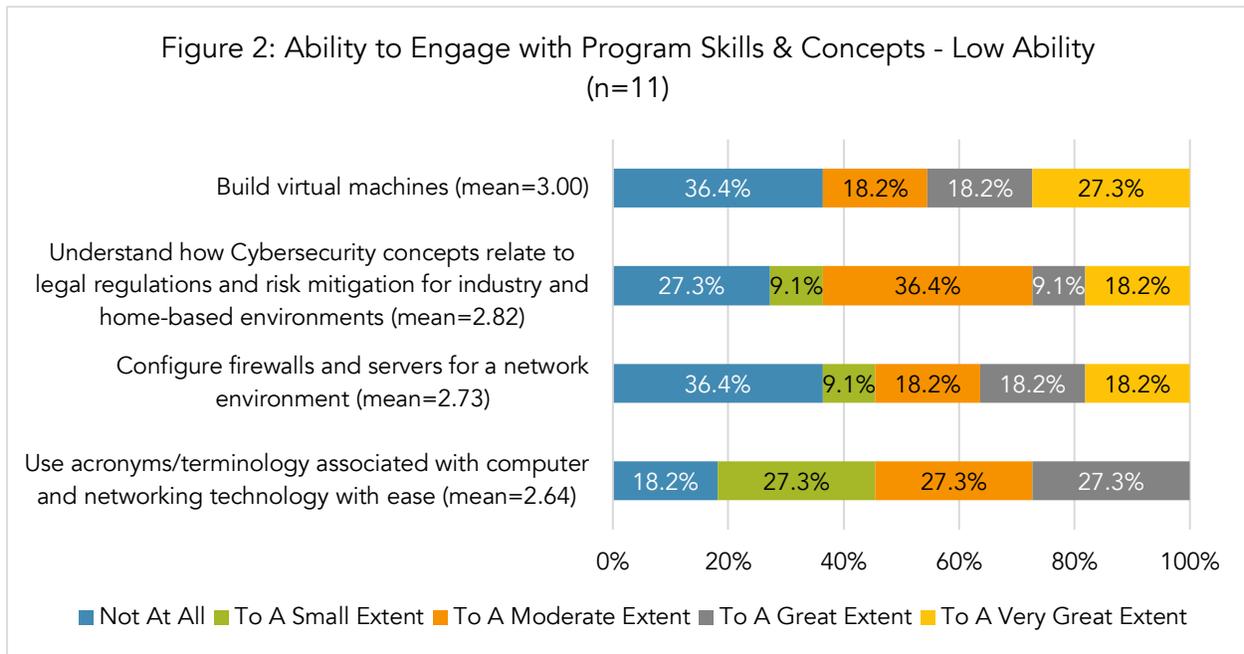
Increased Student Information Technology Knowledge and “Hands On” Skills

This section is informed from the student satisfaction survey and student focus groups.

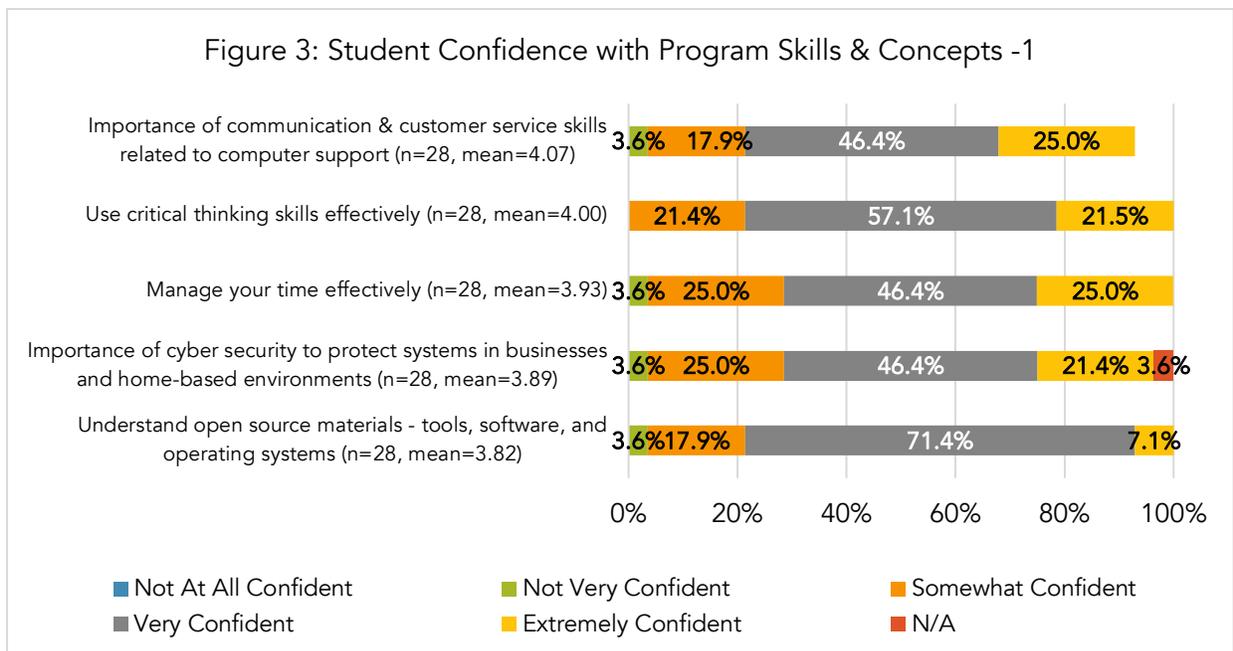
To allow for future assessment of the potential impact of the program curriculum and related activities, respondents of the pre-test survey were asked to indicate their ability to understand and utilize an assortment of skills, concepts, and resources upon entering the program. More specifically, students were asked to rate their baseline ability to understand and utilize ten skills and concepts that are introduced in the program on a scale from one (“Not At All”) to five (“To A Very Great Extent”). At program start, students note most skill in their ability to use critical thinking skills effectively (mean=3.91) and to understand open source materials (mean=3.82).



Students are least skilled in their ability to configure firewalls/servers (mean=2.73) and to use acronyms/terminology associated with computer and networking technology (mean=2.64)

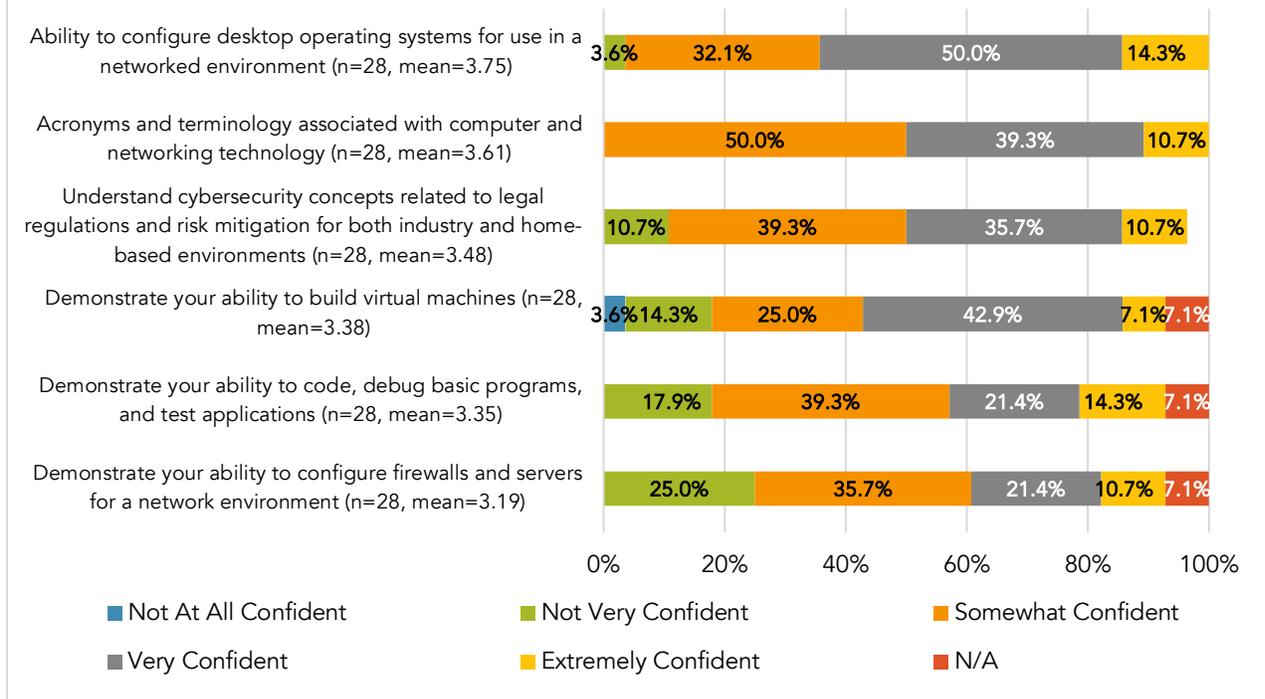


Satisfaction survey results indicate that students are most confident in their ability to use critical thinking skills, manage their time effectively, and use communication skills with customers.



Students are less confident in their ability to configure firewalls and servers, code/debug/test programs, and build virtual machines.

Figure 4: Student Confidence with Skills & Concepts - 2



When asked to identify something they have learned in the program that is helpful as they prepare for their career, students completing the student satisfaction survey identify:

- How a computer works/how to build a computer,
- Coding/programming skills/languages,
- Available career opportunities,
- Problem-solving, and
- Communication skills.

Verbatim Comments:

- *"I've learned ways to effectively deal with unsatisfied customers."*
- *"I learned a lot about working on and maintenance computers. Learned everything from hard drives to operating systems. we even built a computer to show what we learned through the course."*
- *"The better question is what I've learned that I don't feel will be useful, and the answer is 'nothing'. The knowledge presented is, obviously, useful in an age of ever-growing reliance upon technology."*
- *"I've learned how to efficiently deal with customers."*

Year 2 focus group results also demonstrate student acquisition of professionalization skills through program activities. Helena-West Helena Campus participants are more likely to note their acquiring of "soft skills" involving communication and professionalism, while those from the Stuttgart Campus center responses around the certifications and continued professional

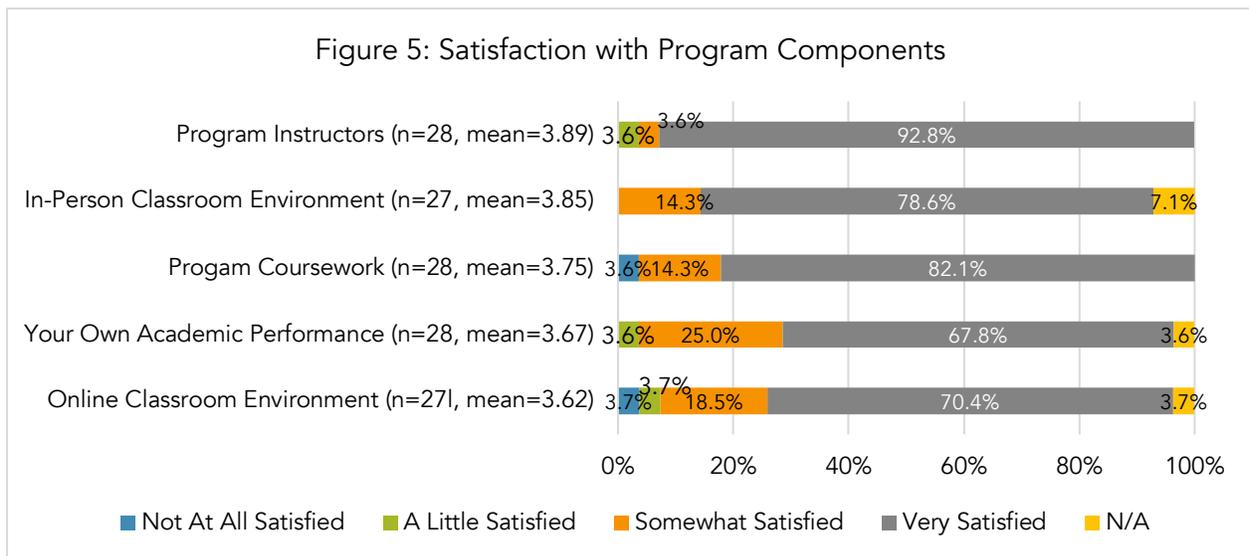
development opportunities available to program graduates – teaching students about first impressions and how to communicate with potential clients while performing IT services.

Verbatim Comments:

- “First impressions make the most important and lasting impression. You need to make a good first impression, otherwise every time you see them afterwards it might not be good.” (Helena-West Helena Campus)
- “It taught me how to be more patient with people who don’t understand technology, how to communicate with clients or the company, and give them a better understanding of their computers.” (Helena-West Helena Campus)
- “It is helpful learning how to explain things better to others and how to have the right attitude when you are explaining things.” (Helena-West Helena Campus)
- “Taking a professional approach to the employer, being optimistic about your knowledge, and being truthful. If they ask you, ‘What do you know,’ being truthful with them and explaining what you do know.” (Stuttgart Campus)
- “Having the ability to not just say I can do this, but to do what is asked of me without someone helping.” (Stuttgart Campus)

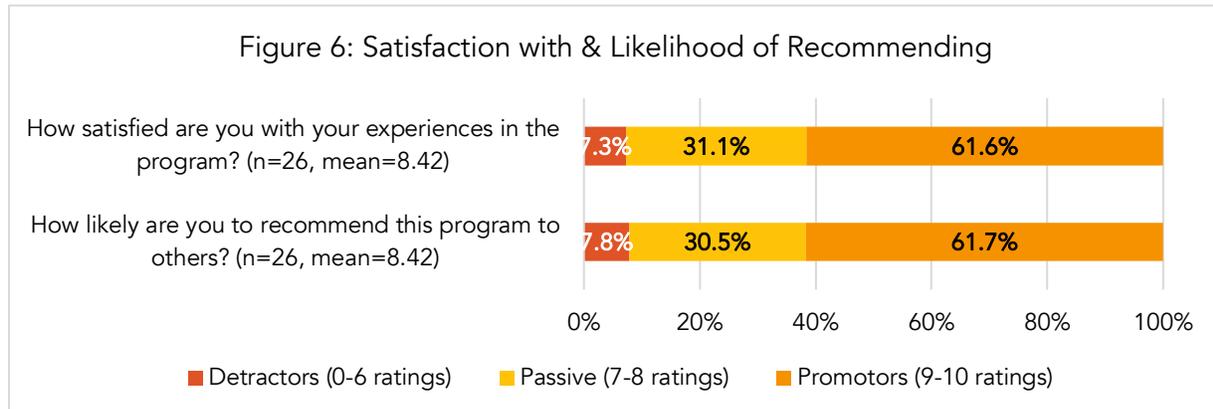
Satisfaction with Program

These results are informed by data collected from the student satisfaction survey, and Year 2 student focus groups. Students are, overall, very satisfied with their participation in the program. Survey results demonstrate that students provided the highest average satisfaction with program instructors. Notably, the indicator receiving the lowest average score is when students are asked to rate the online class environment and their own academic performance.



To measure overall satisfaction with the program, students completing the satisfaction survey were also asked to rate their satisfaction on a scale from 0 (“Extremely Dissatisfied”) to 10 (“Extremely Satisfied”). Students provided an average satisfaction of 8.42 (n=26). Using a similar scale, students were then asked to indicate how likely they are to recommend the

program to others. The response percentage distribution closely matches satisfaction ratings, indicating 6 in 10 are very likely to remain loyal and promote the program to others while about 3 in 10 can be viewed as relatively neutral (satisfied but unenthusiastic) about their program experiences. Approximately 2 in 10 can be viewed as detractors of the program – those individuals in the group who can put the program most at risk and impede growth through negative word-of-mouth. Closer analysis of these participant concerns can inform program improvement measures for these continuing students, especially if any campus-specific differences are found.



Focus group participants also report that the program is well done and that program instructors are effective, suggesting high satisfaction with their program experience. Helena-West Helena Campus participants shared this view as well and used this time to discuss how this program is the foundation of a good career path.

Verbatim Comments:

- *"I appreciate the respect for the individual that all of the faculty here have. As I said, they have work that they expect you to get done, and they will help you and give you the tools to do it. They respect your own autonomy and your time."* (Helena-West Helena Campus)
- *"For me it would probably be just how good the teachers are for me."* (Helena-West Helena Campus)
- *"Ms. Charlotte and Ms. Cindy have done an awesome job, they've supported us, they're always here. Ms. Grove has done a great job supporting me personally. If you tell them, 'I feel like I can't do it,' they will always say you can do it. And it really means a lot."* (Stuttgart Campus)

Enhanced Faculty Understanding of Student Needs and Experiences

This summary is informed by data collected in the student pre-test survey, student satisfaction survey, and student focus groups.

To better document both resources used and resources needed by students, students were asked to provide the extent to which they utilize resources for their program assignments. Satisfaction survey results indicate that students rely heavily on email communication with faculty (92.6%), followed by computer labs for program support (85.2%), and to a lesser extent

on Zoom open tutoring sessions (44.4%) and phone/text communication with faculty (40.7%). A majority of those that utilize these resources rate them as at least “Somewhat” helpful, with 81.5% agreeing that email/text communication with faculty is viewed as “Very Much” helpful.

When asked in the satisfaction survey what additional resources they need to be successful in the program, a few students asked for more hands-on labs and more in-classroom interaction or discussion on curriculum components, while others note they don’t need more resources.

Verbatim Comments:

- *“Need more actual instruction on the topics instead of reading from PowerPoints on a screen. The PowerPoints refer to the chapter that I just read. They can be put online for me to review while in a study session.”*
- *“Visual examples.”*
- *“More hands-on labs.”*

Focus group participants suggest program improvements to better support current as well as future students and, in doing so, highlight general needs and challenges. Notably, a few students from the Stuttgart Campus indicate they have all the resources they need to be successful in the programs current form. The Helena-West Helena Campus participants need more, highlighting how the program can better help them to prepare for the hiring process via: mock interviews, resumé development, and practice certification tests. One Helena-West Helena Campus participant, with agreement from their peers, suggests the program bring in guest speakers who work in the field to present their job experience to students. Students at this campus are less sure of their career path and the types of jobs out there for people with their degrees. They want more examples coming from the community.

Verbatim Comments:

- *“Internships, that help us with getting a feeling about what we are going to do with our career. We would get some job experience in an internship and that would help us with what we are doing now.” (Helena-West Helena Campus)*
- *“Mock interviewing.” (Helena-West Helena Campus)*
- *“Resume development.” (Helena-West Helena Campus)*
- *“There is not a whole lot of information on practice tests for certifications.” (Stuttgart Campus)*
- *“A speaker who can present their job experience and what they do. I think that would help us make a better decision about what we may want to be doing in our future.” (Helena-West Helena Campus)*

[NetLab+ User Experiences](#)

The satisfaction survey and focus groups also allowed space for students to provide specific feedback on their NetLab user experience. In the survey, students were asked to respond to four items about NetLab using a scale from 1 (“Not At All”) to 4 (“Very Much”). As with the program’s Year 1 findings, Year 2 are suggestive of NetLabs being functionally usable for students and the value students place on it providing needed “hands on” learning and practical opportunities to learn new skill sets. Further analysis by campus will determine if

survey results deliver the same pattern of inequity in perceived ease of Netlab use by campus location.

	Not At All	A Little	Somewhat	Very Much
Easy to learn how to use (n=25, mean=3.36)	--	12.0% (n=3)	40.0% (n=10)	48.0% (n=12)
Easy to navigate (n=25, mean=3.36)	--	12.0% (n=3)	40.0% (n=10)	48.0% (n=12)
Providing a "hands on" learning experience (n=26, mean=3.50)	--	11.5% (n=3)	26.9% (n=7)	61.5% (n=16)
Providing practical opportunities to learn new skill sets (n=25, mean=3.40)	--	12.0% (n=3)	36.0% (n=9)	52.0% (n=13)

Students recommend improving the Netlab user experience by providing students with more understanding of how to troubleshoot areas hard for them to understand. This year's focus group discussion of extra resources prompted Helena-West Helena Campus participants to express their lack of satisfaction with NetLab while the Stuttgart participants praised NetLab.

Verbatim Comments:

- *"NetLab is so straight forward but broken at the same time. I don't need help working on it, NetLab itself is broken. Every time I am working on it, I get errors, and nothing works... I still want to use it because it helps, but it only helps when it isn't breaking itself."* (Helena-West Helena Campus)
- *"My favorite thing I'd have to say is NetLab. I really love the NetLabs that we do. I like going in there and experimenting with all the stuff that they have and getting the hands-on experience with that. Just seeing all the different things that you can do with all the different operating systems. I really like seeing how they work."* (Stuttgart Campus)
- *"NetLab is very useful in some respects, but I also think that two things aren't so useful. One is the fact that it can break in ways that wouldn't be expected from the input that you gave. Recently I was doing a NetLab that required me to basically spoof a mac address, but the end result was that it disconnected me from the NetLab for doing so. It's not only super finicky, but some interactions may not be expected or easily derived using logic. Some things just happen for no reason, but they do happen consistently at least."* (Helena-West Helena Campus)
- *"The NetLabs are easy to navigate. They work very well for us here at Phillips."* (Stuttgart Campus)
- *"Another thing about NetLab, the additional eBook that instructs you, they sometimes don't include the reason you are doing what you are doing. For me, the reason is important. I think that is how it could be improved."* (Helena-West Helena Campus)

- *"NetLab. When you read the book, it wants you to have two different virtual machine setups. Most people don't have a computer that has the capability of using maybe one or two virtual machines let alone the four or five or eight that might be required for certain NetLab activities. Not only can you use the NetLab to set those up, it allows me to just get in and it's already set up. I don't have to worry about installing the operating system or whatever application it might want. The NetLabs all run on virtual machines and a lot of people don't have the ability to run those."* (Stuttgart Campus)
- *"I don't feel like NetLab is a waste of time, but I feel like giving more context for why we're doing things would be better."* (Helena-West Helena Campus)

COVID-19 Challenges

COVID-19 caused both PCCUA campuses to close early Spring 2020 and greatly impacted program functioning. While Year 2 students were eventually able to move to a hybrid model of instruction, students still struggled to adapt. Results summarized here are pulled from the focus group and student pre-test results.

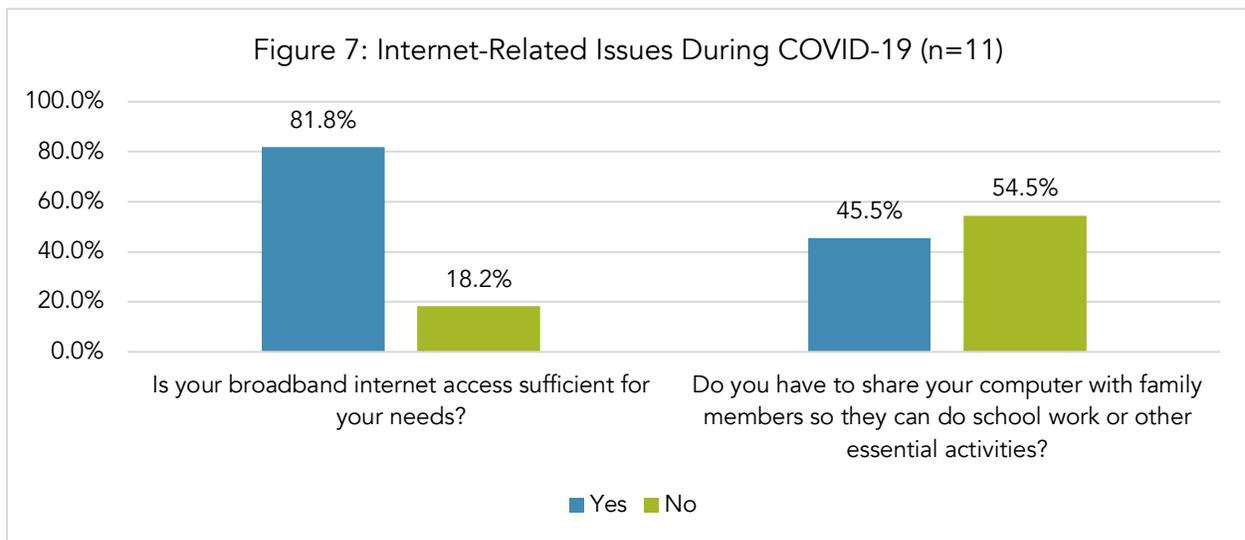
DISC program focus group participants from the Stuttgart and Helena-West Helena campuses are proud of how they persevered during the challenges presented by this global pandemic, but there is a clear distinction between the experiences among those at each campus. Those from the Stuttgart Campus specifically mention feelings of accomplishment related to their continuing education, nearing graduation, and maintaining their employment despite poor Internet infrastructure and COVID-19 restrictions. A couple of the Helena-West Helena Campus participants identify improved time management skills as an achievement. However, more identify time management as an exacerbated problem as a result of the pandemic, subsequently increasing the stress load of these students. In short, Helena-West Helena Campus students struggled more and found less to report out on as being proud of accomplishing than their Stuttgart Campus counterparts.

Verbatim Comments:

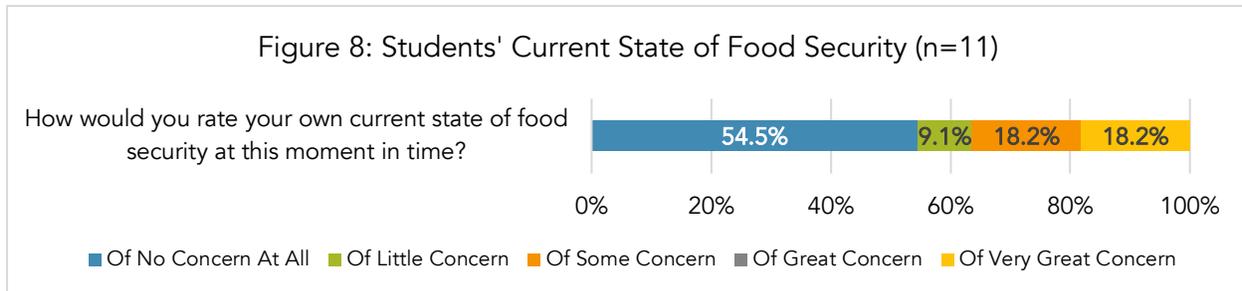
- *"Getting done with my work in a timely manner even though I work every day."* (Helena-West Helena Campus)
- *"Most of my achievements during the pandemic have been purely personal. When it comes to school, I have a work study job and that gives me a sense of happiness, compared to doing nothing at home and attending classes. It's good because outside of that, there's not really much that I do. So I'm happy to have school classes and the work study to keep me busy because if I wasn't busy, I'd probably be very depressed."* (Stuttgart Campus)
- *"I would say for me, I'm getting close to graduation. I would say being able to complete the courses necessary to get to the finish line, to graduate during this whole COVID pandemic."* (Stuttgart Campus)
- *"That I still go to work every day."* (Stuttgart Campus)
- *"Going virtual has put a big impact on Southern Arkansas with Internet connection. Last semester, when we went virtual, many times the Internet was down. For one of my classes I would get 20 to 30 questions into a test and the Internet will go down and be gone for four or five days because the infrastructure of the Internet is so poor."* (Stuttgart Campus)

- *“There have been times where our Internet has gone out for a week, and it is a problem. It sets us back, but that’s not the school’s fault. That is something with the place that we live.”* (Stuttgart Campus)
- *“To me personally, time management is a lasting challenge. Working 40 hours a week at my job and trying to still do homework is difficult.”* (Helena-West Helena Campus)
- *“It can be personally stressful to [be employed full time and a student]. I like to get done with my homework, but I am too tired after work and then it is past the due date for some things.”* (Helena-West Helena Campus)
- *“I personally struggle with mental health during COVID. Things like depression and anxiety, mental health in general has been a lot harder to manage. I have heard a good number of stories telling me it is not just me feeling this way.”* (Helena-West Helena Campus)

Students taking the pre-test survey were asked a series of questions gauging their ability to adapt to education during the pandemic. More specifically, they were asked about Internet accessibility and food access challenges. While all students indicate that they have access to broadband Internet (n=11) and mainly access the Internet at home through a paid provider (n=11), 18.2% indicate that their home Internet access is insufficient for their needs and 45.5% report having to share their computer with family members for schoolwork or other essential activities (see Figure 7, next page).



Additionally, students were asked about their housing stability and food security during the COVID-19 pandemic. While no students report that they have had to move to a new place of residence within the last eight months (n=11), 36.4% indicate that their current state of food security is of “Some Concern” or greater (see Figure 8, next page).



Notably, on average, students whose primary campus is located in Helena-West Helena express significantly *greater concern* regarding food security (mean=3.40) compared to students situated in Stuttgart (mean=1.17, $p < .05$).³ The figure below displays concerns for food security among students primarily attending the Helena-West Helena and Stuttgart campuses, respectively.

Toward the Future

In this second year of ATE programming, the team collected important process data from its students, even while COVID-19 disruptions continued to challenge program implementation. Students have highlighted what they most value about the program and offered recommendations for program improvement. Continued student, faculty, and stakeholder feedback, as well as continued assessment of secondary institutional data on enrollment, retention, and number of certifications produced will determine how these, and other indicators of student success, shift over the duration of the program.

Overall, this program is on track in achieving its short-term outcomes. Despite challenges to enrollment and certification processes, the new curriculum is being implemented, the program has hired new faculty to teach the curriculum, the classrooms are now in hybrid format, and the program has begun to offer certification “boot camps” to students in order to continue to grow their technical skills and professional certifications.

That being said, evaluation results note differing student experiences between the two campuses regarding skills highlighted as gains, resources used, and career plans. Students at the Helena-West Helena campus appear to rely more heavily on support from faculty while Stuttgart students mention the support they receive from each other. Students at the Helena-West Helena campus are much more reliant on faculty to support them through their coursework and to teach them soft skill development. These students consider faculty support critical to their current and future success in the program. While there should be caution in how this distinction is interpreted, *it is important to consider why these two distinct experiences are*

³ These results should be interpreted with caution due to the low sample sizes for the Helena-West Helena (n=5) and Stuttgart (n=6) groups, respectively. No other significant differences based on students' primary campus were observed for other items presented in this report.

present, what mechanisms are driving the different experiences, the overall impact of differences in experiences on student retention, certification, graduation, and post-graduation success, and what can be done internally to bring both campuses into a uniformity of experience and satisfaction across different students' lived experiences.

Additional recommendations for DISC program leadership to consider from Year 2 evaluation activities, as previously reported and reiterated in this formative report are to:

- Look into institutional and student composition differences between the Stuttgart and Helena-West Helena campuses that may be driving the unique experiences between the two. A better understanding of these two different stories told by the focus groups can inform future development and growth for PCCUA's DISC program. It may be the case the unique cultural elements among those on each campus call for a tailored program to be implemented on each campus.
 - Results from the satisfaction survey will be assessed to see how this trend manifests itself in this specific evaluation assessment.
- Find ways to provide assistance for adequate technology and Internet access for students, especially when the program is in the online format. Regardless of format, Internet access is critical to an information technology and cyber security program. Bolstering student access to this resource will help limit student setback and improve access a valuable resource.
- COVID-19 challenges reveal a series of student lifestyle needs - food security, time management, and the struggles of finding the time and energy to complete schoolwork while employed full-time. Continued faculty and staff acknowledgement of these student contexts and continued adaptability around them to support students (e.g., communication via email/text/telephone can help students access needed community resources while also helping them feel like they belong in the program and have the confidence to succeed.
- Continue to provide students with relevant, local examples of people successful in their career fields, using skills taught within the program. Amplify these examples as well as professionalism skills for the Helena-West Helena students, who are vocal in their desire for more of these examples and skill sets.

Next steps in the Year 3 evaluation are to gather data on student retention, program completion, and career success, and faculty satisfaction – especially as the program begins with to move into post-COVID-19 pandemic conditions.