

RE-IMAGINING COMPETENCIES IN NORTH CAROLINA COMMUNITY COLLEGES:  
INTEGRATING CERTIFICATIONS INTO ACADEMIC PROGRAMS AT TWO  
COMMUNITY COLLEGES

A disquisition presented to the faculty of the Graduate School of  
Western Carolina University in partial fulfillment of the  
Requirements for the degree of Doctor of Education.

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February 2017

## ACKNOWLEDGEMENTS

### **From Jonathan Vester**

I would first like to thank my wife, Amy, for her unwavering support during my time at Western Carolina University. She has been with me throughout all of my experiences with the University, as a teenage dropout, and as a returning adult completing an undergraduate degree I never thought possible. Her commitment to my success and persistence in spite of all the world could throw at us continues to inspire me to be the best person, husband, father, and professional I can be.

I would like to thank Dr. William Carver II, President of Nash Community College for allowing me to conduct this research on our campus. By granting me the latitude to try new ways of approaching curriculum design, I know the College and our students will be better prepared for the world of work.

### **From Shelley White**

Thank you to my husband, Lee, for his steady encouragement throughout this journey and for being my constant in an ever-changing landscape. To my parents, Jesse and Belinda, for lighting the fire within me at a young age to continually seek opportunities to learn and grow.

Thank you to Dr. Dennis F. King, President of Asheville-Buncombe Technical Community College for his encouragement and support through this project. Thank you to the members of the A-B Tech implementation team for their vision and participation.

We, collectively, would like to thank the faculty and administration of Western Carolina University, specifically Drs. Kofi Lomotey and Brandi Hinnant-Crawford for the vision to challenge the traditional approach to doctoral scholarship. I acknowledge that the importance of

realistic, applied research is long overdue, and it is an honor to be a part of this emerging generation of scholar practitioners.

## DEDICATION

### **From Jonathan Vester**

To Amy, my wife and best friend.

To my children Baeden, Lachlan, August, and Phoebe.

I am equally proud and humbled to be a part of your lives.

### **From Shelley White**

To Lee, my husband and best friend. To my family: Amanda, Eddie, Jessie, Blace, Cameron, Jesse, Belinda, Jennifer, Evelyn, Jim, Amy, Ellis, Grace, Zeb, and Paul.

To my close friends.

To A-B Tech's Division of Economic & Workforce Development / Continuing Education.

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## ABSTRACT

RE-IMAGINING COMPETENCIES IN NORTH CAROLINA COMMUNITY COLLEGES:  
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Western Carolina University (February 2017)

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Once a community college graduate completes an associate's degree, the institution is committing to the public that the graduate possesses a prescriptive set of knowledge, skills, and abilities either gained through, or enhanced by, their college attendance. At most institutions, these skill sets are assessed almost exclusively through internal measures by the same faculty who delivered the course content. But what if the institution could also provide the student, and their future employer, another level of assurance regarding the quality and depth of instruction? In this disquisition, we present two different approaches to address increasing the integration of credentialing into the curriculum programs at a community college. One strategy examines intra-institutional articulation between continuing education and curriculum, while the other presents a method to integrate external certifications into curriculum programs as a validation of established learning outcomes.



## SECTION 1: INTRODUCTION

What you are about to read is not a disquisition, or even a dissertation, but a firestarter. In the pages to follow, we will tell you a story of two changed community colleges, and will look forward towards the next phase of our improvement cycles. We embraced the spirit of improvement science and proudly claimed the label of scholar practitioners. We have taken apart the Plan, Do, Study, Act cycle (Langley, Moen, Nolan, Nolan, Norman, & Provost, 2009) and made it our own, labored over the smallest details, and stood back in awe and wonder at what we accomplished in such a short amount of time.

We set out with the awesome endeavor to improve the imperfect. We work at imperfect colleges, run by imperfect people, with imperfect students, and subject to imperfect conditions. It is under these circumstances we dare to make the imperfect better. In the following pages, we will take you through the underlying framework, our individual experiences, and will describe for you what we learned- and what remains to discover.

Influenced by the Carnegie Foundation's Project on the Education Doctorate (CEPD), the disquisition is a culminating artifact developed by the Educational Leadership faculty of Western Carolina University (Crow, Lomotey, & Topolka-Jorissen, 2016). The disquisition is similar to the traditional doctoral dissertation in that the candidate must choose a topic worthy of research and then synthesize the available literature to support their discoveries. The disquisition differs from a dissertation because its focus is on the total process a scholar practitioner performs to identify, evaluate, and apply available and emerging research to create an improvement plan for their laboratory of practice, rather than

adding to, or as validation of, existing research (Bryk, Gomez, Grunow, LeMahieu, 2015; Crow, et al., 2016).

The American community college enjoys a very important place between the education and workforce ecosystems. Because both of these systems are touch points with students, the community college shapes, and is also shaped by, their unique needs and trends. With many community colleges struggling to adopt President Obama's completion agenda in a manner that is realistic and sustainable (O'Banion, 2010), administrators must look for ways to increase the value-added benefits of a community college education and graduate students with employable credentials. Community college academic programs such as nursing, which rely upon competency-based education to validate what students learn, demonstrate how to create close program alignment with the expectations of the workforce upon a student's completion (Klein, 2006; Darling-Hammond, Wilhoit, & Pittenger, 2014). As employers' expectations of specific proficiencies from a graduate increases, community colleges are considering expanding the credential offerings in other curriculums to include intra-institutional articulation policies and micro-credentialing in the form of industry certification as an external validation of program rigor, and to acknowledge the value of non-credit activities (Oliver, 2013; Flynn, 2004). Emphasized in a 2012 study of IT hiring practices, community college students must have a means to differentiate themselves from bachelor's degree credentialed job seekers to obtain jobs in their chosen field (Van Noy & Jacobs, 2012). The inclusion of trade certifications into community college program outcomes requires investigation and resolution of how they will influence program planning, curriculum mapping, recruitment, professional development, and retention (Uchiyama & Radin, 2009).

In this disquisition, we present two different approaches to address increasing the integration of credentialing into curriculum programs at community colleges. The first method takes advantage of the continuing education opportunities available to students before enrolling into curriculum courses. Research and discussion regarding improving intra-institutional understanding of the tangible learning outcomes from continuing education courses are presented by Shelley White to describe how Asheville-Buncombe Technical Community College (A-B Tech) can increase retention and completion in both continuing education and curriculum courses. The first strategy presents a creation of tight linkages between both operational units of the community college to create new career pipelines for students interested in transitioning from specific job training provided by continuing education courses to vocational and technical education curriculum programs.

Conversely, by using external, trade-specific certifications, colleges could validate instruction as state of the industry, and provide students with a marketable credential earned concurrently with their degree. In the second strategy of this disquisition, Jonathan Vester describes how Nash Community College used historical perspectives of competency-based education as an influencer on a proposed variant to the evidence-driven curriculum style. Contemporary perceptions of competency-based education in higher education are described in brief. We also describe research to develop an instrument to inform program planning using student and faculty perceptions as well as explicit employer needs.

## SECTION 2: IMPROVING NON-CREDIT TO CREDIT ARTICULATION AT A-B TECH

Completion rates among students enrolled at community colleges have room for improvement and expectations for increased accountability are high. Community colleges can do more to encourage students' completion of degree, diploma, and certificate programs. One approach awards credit for prior learning through completion of non-credit occupational skill based courses. Although policies exist at Asheville-Buncombe Technical Community College to support the practice of awarding credit for prior learning in non-credit workforce training, this beneficial service has been underutilized. No artifacts, workflow documentation, or practical application of procedures have been created, adopted, or accepted to facilitate the implementation of this policy. A lack of awareness exists on the part of staff, faculty, and students regarding opportunities to provide internal articulation of credit from non-credit coursework. Encouraging students to persist to higher levels of education is important because future wages, job prospects, and upward mobility are improved when individuals have attained any credential, be it a degree, diploma, or certificate (US Census Bureau, 2014). Students have an increased rate of completion when awarded credit for prior learning obtained through non-credit courses (Heyward & Williams, 2015).

### **Framing the Issue of Non-credit to Credit Articulation**

Nearly 90% of all education and training offered in the United States is non-credit, including professional development and training received on-the-job; yet colleges typically focus on credit-bearing programs as more significant (Flynn, 2001). Flynn (2004) asserts that college transcripts typically do not show all of the non-credit or workforce training

completed by an individual, giving an incomplete picture of the learning attained. Leading national education and training organizations, such as the American Association of Community Colleges (AACC) and the National Council of Continuing Education and Training (NCCET) outline goals for community colleges to prioritize non-credit credentialing; yet this credentialing often remains undervalued and overlooked (Van Noy, Jacobs, Korey, Bailey, & Hughes, 2008). Community college dean and popular higher education blogger, Matt Reid (2014), acknowledges articulating credit is a complex but important issue for community colleges to consider. Ganzglass, Bird & Prince (2011) express the need for colleges to allow the adults participating in necessary occupational education to receive credit for non-credit training.

Engaging students in learning pathways designed to progressively build job skills through stackable credentials is critical. The US Census Bureau (2014) reports lifetime earning potential is much higher for students earning a degree beyond high school. Job prospects and future upward mobility are also improved when individuals have attained any level of credential, be it a degree, diploma or certificate. As an individual earns progressively higher degrees, their potential median income also increases (US Census Bureau, 2014). By having more pathways to receiving credit for non-credit educational experiences, students have (1) more flexibility in their education, (2) higher earning potential, (3) a better outlook in the job market, and (4) the ability to return to the workforce faster.

Kentucky and New Jersey are leading the way in articulating non-credit to credit within community colleges, establishing criteria for supporting and conducting these transfers (Van Noy et al., 2008). One community college implemented processes where non-

credit courses were evaluated and translated into credit to address the needs of a specific company. Another community college took a credit-bearing course and segmented it into non-credit modules to give multiple entry points into the course to help students build credit in smaller steps. This strategy for building non-credit to credit pathways involves creating “stackable” modules or credentials (Reid, 2014). Another strategy for community colleges interested in increasing non-credit to credit articulation is to engage internal partnerships with stakeholders to build viable models and processes (Van Noy et al., 2008).

Engaging students in learning pathways designed to progressively build job skills through stackable credentials is critical. The North Carolina Community College System (NCCCS) is currently following cues from national priorities of higher education to explore methods of awarding credit for prior learning, including work and life experiences and continuing education training. The North Carolina General Assembly allocated funds during the 2014-2015 fiscal year for NCCCS to develop articulation criteria for prior military service and other previous learning experiences.

Kortesoja (2009) found adults view credentialed programming as more valuable than the material provided, meaning in their view, earning the credential itself was more important than the actual training material. She also found that adults are more likely to attend a training program offered by a college or university than one provided by a business or private organization due to the academic focus of educational institutions (Kortesoja, 2009). With such a high value placed on credential attainment in an academic setting, it is no surprise that students are more successful when they can transition seamlessly from a non-credit to a credit-bearing educational environment (Becker, 2011).

Short-term job skills training has been an integral part of workforce development since World War II, with the rise of women entering the labor market in record numbers during the 1930's and 40's, (Sullivan, 1992). Following the war and later through the 1950's, 60's, and 70's, the junior college movement spread across the United States (Stumpf, 2013). Many colleges emerged as technical training centers in rural areas bringing access to higher education to a new demographic, the average American worker (Stumpf, 2013). Apprenticeship programs focused on formal education paired with technical job skills training emerged during the 20<sup>th</sup> century as flexible options for building a highly skilled workforce, one employee at a time (Christman, 2012). Targeted workforce training continues to be driven by industry needs, as companies strive to impact their bottom line by investing in their workers through training (Latif, Jan & Shaheen, 2013).

Students receiving credit for prior learning will have more flexibility in their educational choices, a greater likelihood of completing their chosen degree, and a higher lifetime earning potential by having more options to receive credit for non-credit coursework. By aligning existing policy while implementing proven best practices, students at A-B Tech will have more opportunities to receive credit for their non-credit course work. As these processes are implemented and awareness is increased for students, faculty and staff, the number of students transitioning from non-credit to credit programs through internal articulation will increase. As a result, the students' likelihood of completing their certificate, degree, or diploma is expected to increase.

### **Intra-institutional Articulation at A-B Tech**

A-B Tech is a comprehensive two-year educational institution offering diplomas, degrees, certificates, workforce training, customized training for industry and community

enrichment courses. A-B Tech is one of 58 community colleges in the North Carolina Community College System (NCCCS) and is the eighth largest community college in the state, serving over 8,000 credit and over 15,000 non-credit students annually (A-B Tech, 2015). Although students enroll at A-B Tech from all of western North Carolina, A-B Tech is assigned as the community college serving Buncombe County, including the city of Asheville and Madison County.

Of the 15,000 non-credit students, nearly 10,000 per year complete non-credit, or continuing education, workforce focused training courses at A-B Tech (A-B Tech, 2015). Students completing these courses cannot readily or easily receive credit for prior learning when enrolling in similar credit-bearing programs at the College. As indicated by the few requests for awarding credit for non-credit workforce training, it could be inferred that few students, faculty and staff at A-B Tech are aware of the existing policy. Workforce courses are offered in all sectors important to our area's economy including healthcare, advanced manufacturing, business, hospitality and tourism, technology and computers. Courses are offered in a highly flexible format with as few as two to more than 300 contact hours. In 2013-2014, the non-credit student population was 50.5% female and 49.5% male, nearly 40% of students were over age 34 and 20% of students were non-white (A-B Tech, 2015). Students enroll in workforce courses for a variety of reasons including work requirements, building additional skills for work, personal interest, or training for a career change. Some students view non-credit workforce training as a cautious return to education, when they have not attended school in many years. Classes are offered at locations across A-B Tech's service area, including all five campus sites (Asheville, Enka, Madison/Marshall, South/Arden, and Woodfin) and off-campus partners such as Goodwill Industries of



Northwest North Carolina's Asheville Career Training Center and Asheville Buncombe Community Christian Ministries Veterans' Restoration Quarters (ABCCM-VRQ).

Taking non-credit courses is often viewed by students as less intimidating than enrolling in a curriculum program of study and can serve as a bridge for continuation into credit-bearing programs. However, at most community colleges, there is no formal institutional structure to support this transition (Van Noy et al., 2008). While non-credit workforce courses are positive training options, students completing these courses at A-B Tech cannot readily or easily receive credit for prior learning when transitioning into similar credit-bearing programs at the Community College. Current policies at A-B Tech allow the awarding of credit for non-credit or continuing education programming. A-B Tech Policy 802, Awarding of Curriculum Credit, states, "Curriculum credit may also be awarded based upon proficiency testing or other academic analyses of competencies" (2012). Continuing education classes leading to a credential or certification may be considered for course equivalency, with approval from the department chair (A-B Tech, 2014). Although a policy and a procedure have existed for many years at A-B Tech allowing the awarding of credit, no artifacts, workflow documentation, or practical application of procedures have been created, adopted, or accepted to facilitate the implementation of this policy. A lack of awareness regarding the policy exists on behalf of the students, staff, and faculty at A-B Tech.

Non-credit programming is sometimes viewed as academically less rigorous than credit-bearing curriculum programs (Becker, 2011). In reality, in many cases, the programming is very similar and is, in certain classes, provided by the same instructor. In recent years, the NCCCS has encouraged workforce continuing education to align

programming with third-party national, state, and local certifications in order to demonstrate learning outcomes and industry-level competency.

Persistence, the progression of students to the completion of a program, is a vital concern for community college retention. Students involved in non-credit training are engaged in continued learning by completing short-term workforce courses, but are inconsistently shown pathways to persist in further education. If these courses are redesigned to seamlessly transition students into credit-bearing programs with credit for the prior non-credit courses, students may be more likely to persist through the completion of the degree, diploma, or certificate. As an individual earns progressively higher credentials beyond high school, their median income increases (US Census Bureau, 2014). By encouraging students to persist into credit bearing programs from non-credit programs, we are potentially improving their future earning potential and quality of life. Job prospects and future upward mobility are also improved when individuals have attained any level of credential, be it a degree, diploma, or certificate.

Previously, no coordinated efforts existed to address the issue of improving non-credit to credit articulation at A-B Tech. Individual examples of students seeking credit for continuing education courses have been reported by the Student Services division; however, these instances are addressed on a case-by-case basis with no central coordination or documentation to capture the credit on the student's record at the time earned. Although policies are in place at the Community College to support the practice of awarding credit for prior learning, there appears to be lack of awareness toward pursuing more of these practices to benefit students. Businesses sponsoring students are frequently interested in whether the

non-credit workforce training completed by their employees could lead to community college credit as a step toward earning a degree, certificate or diploma.

### **Intervention Design**

The interventions employed in this disquisition were designed with the influence of improvement science. Langley et al. (2009) outline improvement science as a framework or model to achieve meaningful change within a system or organization. The framework is constructed to establish goals, monitor outcomes, and test changes within the environment using multiple Plan, Do, Study, Act (PDSA) cycles. Following the implementation of a change variable, the system is evaluated and adjustments are made for each subsequent cycle. The model ensures change processes are manageable, focused on limited variables, and able to be implemented and measured within a controlled timeframe (Langley et al., 2009). For these reasons, the tenants of improvement science support the work of scholar-practitioners and provide a model for engaging in purposeful change.

The first problem of practice addressed in this disquisition is the absence of a practical workflow to assist students with the awarding of credit for non-credit coursework, potentially due to a lack of awareness on the part of faculty and staff regarding the existing policy at A-B Tech. That is, staff and faculty in both divisions have not been encouraged to align program development between credit and non-credit courses to encourage utilization of the policy. An intervention is necessary to identify and address barriers, establish a practical workflow based on the existing policy, and increase awareness among faculty and staff, the primary stakeholders who will implement the policy on behalf of students.

A-B Tech should clearly articulate and better advertise the new procedure in order to establish a defined pathway for students interested in seeking credit for their completed non-

credit programming. A more detailed and structured workflow will be incorporated for targeted programming that meets the policy criteria. Benefits to this approach include increasing the number of students successfully transitioning from non-credit to credit programs, while intentionally developing the selected pathways offered to students. The intervention involves the review of a 330-contact hour continuing education course, Machining Fundamentals, and counterpart courses within the curriculum (credit) division of Engineering and Applied Technology. A delegation of stakeholders representing both credit and non-credit programming serve as the implementation team and reviewed the Machining Fundamentals course to determine appropriate courses and credit hours to be awarded in the curriculum program of study. This implementation team oversaw the development of a rubric to be used to evaluate students' skill levels at the end of the Machining Fundamentals course and helped create and review approval forms to allow formal documentation of the credit awarded to appear on the students' transcripts. A survey to gauge awareness of the existing policy and confidence administering the policy was administered during and after the intervention. The survey was administered to a broad group of non-credit and credit faculty and staff to assess changing awareness and confidence as a result of the increased activity surrounding non-credit to credit articulation at A-B Tech.

### SECTION 3: LITERATURE REVIEW

Research was shared with the implementation team on increased completion rates and best practices of other institutions implementing non-credit to credit articulation. Students interested in non-credit training complete short-term workforce courses, but are inconsistently shown pathways to persist to further education. If these courses are redesigned to seamlessly transition students into credit-bearing programs by awarding credit for the prior non-credit courses, students are more likely to persist through the completion of the degree, diploma or certificate (Heyward & Williams, 2015; Klein-Collins, 2011).

Heyward & Williams (2015) studied adult learner completion rates and examined the existence of a relationship between prior learning method and graduation. The researchers tested the statistical significance of differences in graduation rates between adults who received credit for prior learning and those who did not in four U.S. community colleges, tested the statistical significance of differences in graduation rates by method, and examined the relationship between adult graduation and method. The researchers focused on the dependent variable of graduation rates in relation to the independent variables of prior learning status and method. Two research questions required the examination of differences between proportions and a third tested the ability of the independent variable to predict the dependent variable, controlling for potentially confounding variables. Results for participant colleges (1) confirmed a remarkable difference in graduation rates between adult students who received credit for prior learning and those who did not, (2) uncovered striking differences in adult learner graduation rates by prior learning method, and (3) identified a clear relationship between method and graduation. Adult learners who received credit for

prior learning graduated at 2.4 times the rate of those who did not receive credit for prior learning (28.4% to 11.8%) overall (Heyward & Williams, 2015).

Klein-Collins (2011) used data from a 2010 Council for Adult and Experiential Learning (CAEL) report on a multi-institutional study of prior learning assessment and adult student outcomes. The author examined data from 62,475 adult students at 48 colleges and universities, following the students' academic progress over the course of seven years. The data from the 48 postsecondary institutions in this study show that students with prior learning credit had better academic outcomes, particularly in terms of graduation rates and persistence than other adult students. Many students who received credit for prior learning also shortened the time required to earn a degree, depending on the number of credits earned. The positive findings for low-income, black non-Hispanic and Hispanic students suggest that awarding college credit for significant life learning could be an effective way to accelerate degree completion, while lowering the cost, for underserved student populations (Klein-Collins, 2011).

According to research by Becker (2011), students in non-credit courses are more successful in later educational pursuits when they receive credit for those courses and transition seamlessly from a non-credit to a credit-bearing environment (Becker, 2011). Participants were enrolled in a two-semester program offered through the continuing education, or non-credit, division at the community college. They were all at an academic crossroad in terms of their next steps and future educational plans. Through semi-structured interviews, participants with varying social, economic, educational, and ethnic backgrounds shared their experiences and aspirations for social mobility. Narratives of the participants were coded and analyzed highlighting the common experiences. Themes emerged that were

aligned with level of educational background and socioeconomic status. Adult learners with higher perceived educational and socioeconomic backgrounds were more successful in transitioning from non-credit to credit environments. Students in non-credit courses are more successful in later educational pursuits when they receive credit for those courses and transition seamlessly from a non-credit to a credit-bearing environment (Becker, 2011).

The Four Frame Model of Bolman and Deal (2003) can aid in understanding and approaching issues about organizational diagnosis, development, and change. Bolman and Deal have synthesized management insight and wisdom along with years of social science research from the disciplines of sociology, psychology, political science, and anthropology into a model that views organizations in four images, i.e. frames captured by distinct metaphors: (1) structural [factories or machines], (2) human resource [families], (3) political [jungles], and (4) symbolic [temples or carnivals, theatres]. Each frame equates to a mental model. A frame, within this model, consists of ideas and assumptions that help the seeker of understanding register and assemble information into a coherent pattern. This enables one to decipher those clues by getting a more comprehensive picture of what is happening and what to do. It helps to think of a frame as having several potential functions: map, tool, lens, orientation, filter, prism, or perspective. Effective change leadership will engage Bolman and Deal's understanding of framing organizations.

The issue of awarding credit, or even recognizing non-credit training on a transcript, is national in scope and extends beyond the classroom. Awarding credit for other types of prior learning is also a national concern. Prior work experience (Hand & Winningham, 2009) and apprenticeships (McPhail, 2004) are being evaluated for their transferability to the college environment, extending the discussion to competency based education, where

mastery is demonstrated by skill attainment, not necessarily tied to seat time in the classroom (Johnstone & Soares, 2014). Colleges should seek to engage in internal partnerships that lead to increasing non-credit to credit articulation (Van Noy et al., 2008). Following the adoption of a new procedure, A-B Tech should continue to focus on program improvement to create more pathways in other career and technical education departments outside of machining. The implementation team at A-B Tech was exposed to the data and resources found in this literature review supporting the case for awarding credit for non-credit coursework.



#### SECTION 4: INTERVENTION RATIONALE AND IMPLEMENTATION TEAM

If successful, the Community College and the communities it serves will realize numerous benefits of having pathways between credit and non-credit courses. Students, who will be the primary beneficiaries of this intervention, will be aware of training pathways from non-credit to credit programs of study. More students will take advantage of these training pathways and more students will earn credits for these activities. Staff in both continuing education and curriculum will benefit by having an established and adopted process for transitioning credit. The Community College will benefit from increased enrollment due to more students persisting from non-credit to credit workforce training options. Finally, employers will benefit by having employees (students) engaged in progressive learning environments and earning credit toward a degree, addressing the mid-skills employment gap (Holzer & Lerman, 2009).

By focusing on the internal stakeholders (employees, staff, faculty) first, an agreed upon method, process, and workflow was established, reducing the stress on students to navigate through a maze of approvals, forms, and bureaucracy. By aligning existing policy while implementing proven best practices, students at A-B Tech have more opportunities to receive credit for their non-credit course work. As these processes are implemented, the number of students transitioning from non-credit to credit programs through internal articulation will increase.

To assure the success of this action research project, the implementation team consists of both curriculum and continuing education staff and faculty. The implementation team is comprised of the following members:

*Team members*

Vernon Daugherty, Dean – Engineering & Applied Technology

Kevin Kiser, Chair – Computer Integrated Machining & Mechanical Systems

Kevin Kimrey, Director – Economic & Workforce Development

David Rogers, Coordinator – Advanced Manufacturing

John Erwin, Coordinator – Advanced Manufacturing

Lee Fisher, Recruiter – Student Services

*Team facilitator*

Shelley White, Vice President – Economic & Workforce Development / CE

**Implementation Plan**

The implementation design is embedded mixed methods to explore (1) the level of awareness of internal stakeholders of non-credit articulation pathways, (2) the partnership activities of internal stakeholders, and (3) the number of students engaging in non-credit to credit articulation. This non-experimental exercise engaged in action research, as improvement cycles were implemented and reviewed with a pilot workflow to create non-credit to credit pathways. Target populations are internal and external stakeholders engaged in various activities surrounding the review of non-credit to credit articulation. Because this intervention involves very small populations (less than 10 in each stakeholder area), ethical considerations were made regarding the confidentiality of data collection. Due to the small numbers, developing a smaller subset is not suggested. The goal was to collect data from every stakeholder involved in the process.

### **Data Collection and Implementation Timeline**

Data were collected at various points during the intervention. A survey was administered to ascertain internal stakeholders' level of awareness with non-credit to credit articulation policies and procedures at A-B Tech. This survey utilized a nominal scale, collecting demographic data and prioritization of items related to the issue. The survey also engaged a self-efficacy scale to explore attitudes and understanding of policies and procedures related to the awarding of curriculum credit.

As the implementation team developed, reviewed and adjusted a new, shared workflow, the survey was re-administered to determine if the creation of a new workflow has increased awareness and confidence in the policy and procedure. Data were also collected on the number of students participating in training, receiving evaluation and credit, completing the curriculum application and choosing to transition from the non-credit Machining Fundamentals course to credit bearing courses in a curriculum program of study. I expected awareness and confidence in the existing policy and procedure to increase over the duration of the study among the faculty and staff in both curriculum and continuing education programs. The survey instrument, Internal Credit Articulation Survey, is included in Appendix A.

The intervention occurred over three, roughly 90-day cycles and involved the review of a 330-contact hour continuing education course, Machining Fundamentals, and counterpart courses within the curriculum (credit) division of Engineering and Applied Technology. The implementation team reviewed the Machining Fundamentals course and determined appropriate courses and credit hours to be awarded from the curriculum program of study. The curriculum members of the team supervised the development of a rubric to be

used to evaluate students' skill levels at the end of the Machining Fundamentals course and helped create and review approval forms to allow formal documentation of the credit awarded to appear on the students' transcripts. A survey to gauge awareness of the existing policy and confidence administering the policy was administered to a broad group of non-credit and credit faculty and staff to assess changing awareness and confidence as a result of the increased activity surrounding non-credit to credit articulation at A-B Tech. Planning occurred prior to the first 90-day cycle and included preliminary data collection from 30 staff and faculty in both credit and non-credit areas that established the topic of non-credit articulation as a viable concern.

During the intervention, one continuing education course, Machining Fundamentals, was evaluated for credit in the spring of 2016. A form to document departmental approval and awarding of credit were tested during the course and reviewed for improvement following the completion of each course. The approval form is included in Appendix B. Students self-selected participation in the CE to CU transfer option; evaluation matrix and rubric were tested during the spring course, reviewed for improvement, and re-evaluated during the summer 2016 and fall 2016 courses. Deliverables of the intervention include a learning assessment rubric for the Machining Fundamentals course and the evaluation of up to three curriculum program options for students completing Machining Fundamentals with up to eight curriculum credits awarded. In addition, deliverables of the disquisition include the creation of a formalized approval and notification workflow for awarding credit for non-credit coursework, a procedure that can be applied to any program of study for evaluation of internal credit articulation, and a manuscript for a practitioner journal.

Staff in the non-credit and credit areas would like to engage in more cross-departmental partnerships leading to articulation of programming. Currently, survey data confirm a lack of awareness on behalf of both continuing education and curriculum staff and faculty. Based on the policy, curriculum department chairs are the primary stakeholders outside of continuing education and need to be fully engaged in order to implement the policy of awarding credit for non-credit coursework.

The awarding of credit for prior learning is an important research topic that warrants additional exploration and problem solving. A review of the literature explains the historical context and supports the need for further research and institutional improvement in this area. An environment exists at A-B Tech where the practice is allowed; however, lack of awareness and the absence of a process framework limit implementation. By raising awareness with stakeholders and creating a sound process based on best practices and continuous improvement, systematically awarding credit for non-credit workforce education at A-B Tech can become an integral part of program offerings. Non-credit to credit articulation can be improved at A-B Tech by an intentional evaluation of stakeholder understanding of the relevant policies and procedures, increasing awareness, and establishing collaborative work teams to create a new workflow to ease student access to these services.

Influenced by the Carnegie 90-day cycle framework, there were several phases of data collection. The following timeline lists the major events of the project.

*Fall 2015*

Pre-intervention survey to faculty and staff

Pre-intervention interview and focus group with selected staff

Pre-work with implementation team

Review of policy, discussion of pre-intervention survey results, selection of Machining Fundamentals as focus of intervention

*March 2016 – Cycle 1 Began*

Implementation team:

Reviews Machining Fundamentals course equivalents in curriculum programs

Develops shared rubric to assess student learning

Spring 2016 Machining Fundamentals course begins

*April-May 2016*

Implementation team developed draft approval form to formalize new workflow

Summer 2016 Machining Fundamentals course begins

*June 2016 – Cycle 1 Ends*

Machining Fundamentals students in Spring 2016 course evaluated using shared rubric

Spring 2016 Machining Fundamentals course ends

Data collected on student outcomes from Spring 2016 students

Discuss outcomes and strategies for improvement of new workflow

*July 2016 – Cycle 2 Begins*

Implement changes to new workflow for Summer 2016 students

Addition of Student Services representative visit to the course

Machining Fundamentals students in Summer 2016 course evaluated using shared rubric

*August 2016*

Fall 2016 Machining Fundamentals course begins

*September 2016 – Cycle 2 Ends*

Data collected on student outcomes from Summer 2016 students

Discuss outcomes and strategies for improvement of new workflow

*October 2016 – Cycle 3 Begins*

Survey distributed to faculty & staff

New strategies implemented for improvement of workflow with Fall 2016 students

*December 2016 – Cycle 3 Ends*

Fall 2016 Machining Fundamentals course ends

Distribute final survey to faculty & staff

Collect data on student outcomes & review survey data

During Cycle 1 the shared rubric was developed by the curriculum faculty and reviewed by the continuing education instructors. The rubric outlines class projects in Machining Fundamentals mapped to corresponding curriculum courses and the level to which those projects must be completed in order for credit to be awarded. The implementation team discussed the communication to be shared with the students enrolled in the first class regarding the option to have projects reviewed for possible credit should those projects meet the standards defined in the rubric. During Cycle 1, seven students were enrolled in Machining Fundamentals and only one student chose to have his project work evaluated for credit. This student did not complete the projects to the required standards in order to be awarded credit.

Following the completion of the first course, the implementation team met again to review the progress of the first class. The rubric was found to be an effective tool against which the continuing education instructors could pre-screen students prior to

recommendation for review of the curriculum faculty. Concern was expressed regarding the number of students interested in participating in the evaluation process. It was discussed that students enrolling in a short-term workforce training program, such as Machining Fundamentals, likely had an immediate job as a goal, rather than the completion of a degree or diploma. In order to increase the number of potential students participating in the evaluation process, a decision was made for the division Dean and a member of the Student Services recruitment team to visit the students of the second class. The Dean visited at approximately the 75% mark of the second cohort of students. He shared information regarding programs of study that would be good options for students wishing to continue their studies beyond the short-term training course and reiterated the option to seek credit for their time spent in the course. During the last week of class, a recruiter from the Student Services division visited the course to provide an in-class option for students to make application to the College. Three students took advantage of this opportunity and the same three had their projects evaluated by curriculum faculty prior to the end of class. All three students performed at the level to receive credit for MAC 141.

Following completion of the second course, the implementation team met again to review the process and progress since the first two cohorts of students. There appeared to be confusion among the team as to the documentation flow that would close the loop for the students to be awarded credit from the second cohort. Based on the current forms, the process needed to originate from the student following their project evaluation to the continuing education instructor before being submitted to the curriculum program for review. This process was reiterated with the team and extra steps were taken to ensure the three students from the second cohort had been awarded proper credit for MAC 141. A workflow



chart was developed by the department chair to document the communication, review, and approval flow to map out the entire process. This workflow chart is specific to Machining Fundamentals and is included in Appendix C. There was agreement that the addition of the Student Services recruiter helped to encourage and streamline the application process for the students and motivate them to push forward to have their projects reviewed for credit. It was also discussed that all students should have projects evaluated for credit, regardless of their current interest in pursuing additional education. One of the concerns expressed through this process is the nature of short-term workforce education. Because students are primarily interested in obtaining immediate employment following the completion of the course, the awarding of credit for future use should be built-in as a part of the course, rather than an option. Students then would have the credit available on their record at a time in the future where they may be interested in seeking a higher credential or further education for a promotion or raise.

For the third cohort of students, the Student Services recruiter visited at approximately the 75% mark in order for the students to have more time to prepare their final projects for review by the curriculum faculty. Rather than being heavily communicated as an option, students were told about internal articulation, and encouraged to participate in the final review by striving to complete projects at this level. Following the additional communication, one student pursued the awarding of credit and completion of the approval form.

Table 1 depicts student outcomes including the number of students enrolled in each cohort, students assessed, students awarded credit, college application status, and future enrollment status.

Table 1.

*Machining Fundamentals Student Outcomes from 2016*

Cohort	Enrolled	Assessed	Awarded Credit	CU Application	CU Enrollment
1	7	1	0	0	0
2	6	3	3	3	0
3	10	1	1	1	1
Total	23	5	4	4	1

## SECTION 5: RESULTS AND EVALUATION

### **Survey Results**

The faculty and staff survey prompted respondents to rate their understanding and confidence level with internal articulation at A-B Tech. The survey was sent to all faculty and staff in Continuing Education and to all faculty and staff in career and technical education divisions including Allied Health, Business & Hospitality, Emergency Services, and Engineering & Applied Technology. In all, there were 44 respondents in the initial survey representing faculty and staff from all areas. The median length of service at A-B Tech for respondents was 9.5 years. Initial survey results are included in Appendix D. Following an update on the activities of the Machining Fundamentals internal articulation project, policy review, and workflow documentation, the survey was sent a second time to determine if awareness and confidence levels had changed. Final survey results are included in Appendix E.

In the initial survey, respondents ranked student centered statements as the most important reasons for engaging in additional activities to increase internal articulation at A-B Tech. Statements such as “Students are more likely to persist in their education” and “Students are given a clear pathway for continuing with their career development” were ranked higher than statements that were employer or college centered, such as “Employers have more employees advancing their skills” and “The college retains students longer, increasing completion rates and ultimately increasing funding.”

Forty-four percent of initial respondents indicated they were not confident in their understanding of the policies and procedures that guide internal articulation at A-B Tech.

Similarly, over 61% were unfamiliar with the location of the policy, over 66% were unclear on what coursework qualifies for internal articulation, and over 55% were unsure of their ability to execute such a policy. Respondents indicated the top challenges of implementing internal articulation to be 1) general lack of awareness of the current policy and procedure, 2) aligning coursework takes time and effort, and 3) evaluating coursework takes time and effort. Concerns regarding interest levels of stakeholders and forming new internal partnerships were ranked lower.

Following an update to faculty and staff on the activities of the Machining Fundamentals internal articulation project, confidence levels improved. Twenty-nine percent of final respondents indicated they were not confident in their understanding of the policies and procedures that guide internal articulation at A-B Tech, an improvement from 44% initially. Similarly, only 43% were unfamiliar with the location of the policy, 33% were unclear on what coursework qualifies for internal articulation, and 48% were unsure of their ability to execute such a policy.

## **Limitations**

### **Small Student Cohorts**

One potential limitation of this intervention is small student cohorts within the machining courses included in the intervention. Low unemployment in our region has impacted class sizes in workforce continuing education programs such as machining over the past couple of years. One possible solution to this issue would be to have included more courses in the intervention; however, this would have introduced more complexity to the review of the courses for consideration and potentially reduced the time available to focus on the communication to students and between staff and faculty.

**Optional vs. Required**

A theme that emerged through all cohorts of students and many discussions of the implementation team was the nature of the internal articulation, should it be a requirement, a built-in expectation of the course outcomes or was this option something students could decide to pursue if they chose. After two cohorts where the communication to students was heavily crafted as an optional activity, the shift began toward making the evaluation for credit a built-in expectation of the course. Students enrolling in the short-term, workforce development course for strictly immediate employment may not value the credit at this time, but in the future, the credit becomes much more valuable when they are seeking additional training, perhaps due to a promotion or raise opportunity.

**Procedure Finalization**

The process of developing a formalized procedure and forms to aid the awarding of credit for non-credit coursework has undergone multiple iterations and continues to evolve. After two cycles of students, the department chair developed a workflow documenting the process developed through the pilot course offerings, focusing on portfolio or project review as the primary means of evaluation. As a result of a broader discussion on integrating internal articulation at the College, a cross-functional team involved in A-B Tech's Executive Leadership Institute also developed a draft workflow that incorporated options for evaluation in addition to portfolio or project review. This generalized pathway is included in Appendix F. The two versions are currently being reviewed for the possibility of combining them into one document that will be included as a reference attached to the official procedure for awarding credit.

### **Additional Instances of Internal Articulation**

During this process, I have learned that the Student Services division receives requests for internal articulation on an occasional basis. While requests do fall within the scope of the current policy, no documentation exists on the student's record until the time of the request and it is the responsibility of the student to ask. For example, with ServSafe Certification, a national standard for safe food handling, students who have completed the Continuing Education course and have successfully attained the national certification are eligible to receive one hour of curriculum credit for the Sanitation and Safety course within the culinary department. This type of articulation, awarding credit based on the attainment of a national credential, is different from the intervention examined by this project. In addition, students enrolling in the culinary program must prove that they have earned this credential before the credit is awarded. Second, credit is being awarded for the completion of a success and study skills course taught through the Department of Transitional Studies. This course mirrors the content taught in ACA 115, College Success Skills, and one hour of curriculum credit is awarded to students at the time they enroll in a curriculum program of study. One concern expressed regarding this process is that no formal documentation exists on the student's record until student enrolls in a curriculum program and makes the request for credit to be evaluated. This lack of documentation does not work in the student's favor because it potentially hinders them from receiving credit as it requires maintaining documentation in each department rather than having the credit appear on their permanent record with the Community College.

## **Recommendations**

During this process, additional areas for internal articulation review have been identified, both within and outside of the division involved in the intervention. These conversations have evolved naturally as a result of increased communication and awareness surrounding this topic. The first area of consideration is an internal articulation from the Industrial Maintenance Academy, a 330-hour course offered through Continuing Education, and Industrial Systems, a curriculum program of study within the division of Engineering and Applied Technology. Preliminary review by stakeholders estimates the potential of awarding up to eight hours of curriculum credit for the learning outcomes students achieve in this course. Additionally, the Associate Dean of Culinary and Hospitality has expressed interest in reviewing the content of two Continuing Education courses, Basic & Advanced Culinary Skills, for possible internal articulation to the Food Service Technology diploma program of study.

The process of integrating internal articulation at A-B Tech is moving forward following the work over the past year with the Machining Fundamentals course. An effort to broaden the courses participating in internal articulation is the next step. Work will continue on improving communication to students, streamlining the process of documentation, and increasing overall institutional awareness of this opportunity.

## SECTION 6: IDENTIFYING A NEED FOR CURRICULUM CHANGE AT NASH COMMUNITY COLLEGE

At Nash Community College, a semi-rural community college in eastern North Carolina, the majority of for-credit curriculums are general in their approach to preparing students for industry certifications. Most programs in the Community College's catalog do not explicitly prepare the student for external credentials such as trade or job-specific certifications (Nash Community College, 2015). Such broad application of the subject matter can lead to completing students being less marketable upon graduation. In this disquisition, we outline how to determine which specific programmatic changes within the Computer Information Technologies (CIT) degree program should be made to integrate external certifications into the curriculum.

### **Framing of the Problem**

Community college vocational and technical degree programs rarely address the competitive advantage graduates might have if their college degree was supplemented by external certifications. Historically, Nash Community College has abstained from addressing this issue within the programs of study because faculty perceive obtaining external certifications as the responsibility of the student, and therefore direct alignments of courses or programs to certifications has not been a priority. If programs or courses were better aligned for certification obtainment, students would be more marketable, the program could validate its content as being relevant and current, and faculty could benefit from extra professional development as the program bridged the skills gap to meet this challenge. In 2015, Joel Lee, Field Operations Manager of Edward's Incorporated, addressed local high



school and Nash Community College counselors stating, “We need graduates that have skills not currently taught in the classroom. Our industry [general industrial construction] has specific certifications that make a candidate more desirable than someone with just a degree” (Lee, 2015). Mr. Lee’s views mirror those held by many local employers. To meet this challenge, the Community College will have to assess how it can make its graduates more attractive to prospective employers and better prepared for the workforce.

### **Is Lack of Expanded Credentials a Problem?**

As the sixth-ranked state in economic growth and with over 254,000 employees in technology occupations (Abernathy, 2015) there is great potential for North Carolina’s technology students who possess degrees coupled with industry credentials. Nash’s misalignment of program-level outcomes with the expressed need of the local workforce (Lee, 2015), absence of any substantial data collection regarding certification of graduates, and the various trends in the recent higher education ecosystem creates a problem of practice for the Community College.

### **Historical Evidence of Misalignment**

Building competencies into a program of study has been a challenge for community college administrators because of the breadth of knowledge students possess before coming to the classroom. There is a challenge in determining what the student already knows, and what the community college experience imbued upon them. For example, many think of the modern community college student, and in particular the traditional-aged student, as inherently possessing technical competencies, or being digitally native.

Several recent studies challenge this perception of the digital native student. One study of faculty reported students directly out of high school lack the ability to navigate a

menu-driven website that contained their course content for hybrid or completely online courses, which is counter-intuitive to many commonly held conceptions of the digitally native student (Smith, 2012). Another contributor to this belief is that for several decades, college students have been overestimating their ability to use the personal computer (Grant, Malloy, & Murphy, 2009), and this opinion has sustained the notion of preparedness in technology-dependent courses. With courses directly addressing the competencies students need for success, as well as providing external validation of this learning, colleges can bridge the digital native skill set with the digital workplace.

A long-standing practice in higher education is the use of prerequisite courses to introduce or reinforce knowledge or skills needed in subsequent courses. Although there have been some studies finding little evidence prerequisites lead to improved performance in targeted courses (Abou-Sayf, 2008; Marcal & Roberts, 2000), prerequisite courses can allow for measured introduction of material that can gradually be mastered. Acknowledging the spectrum of students attending a community college, any prerequisite course would need to be (1) well structured, (2) focused on delivering instruction in a non-threatening manner, and (3) taught by faculty who understand the social implications of CIT students not possessing basic digital literacy skills. In their study of suburban university students, Lin, Shih, and Lu (2013) found little gender differences in digital literacy skills, but males were more likely to use technology outside of the classroom. Lee and Huang (2014) discovered among their Taiwanese subjects a tendency for females to display anxiety at levels significantly higher than that of their male counterparts when they possessed lower computer literacy. Studies such as these highlight the need for colleges to be aware of the multiple influences on student performance in courses addressing computer competencies.

## **Perspectives on the Problem**

To create explicit connections between workplace skills and the classroom, many colleges and universities have implemented competency-based education (CBE) academic programs with varied levels of success (Gruppen, Mangrulkar, & Kolars, 2012; Hill, 2012; Wesselink, de Jong, & Biemans, 2010). For example, Schneider and Yin (2012) found successful CBE programs cut dropout rates by half, and have helped Florida's Valencia College achieve a 40% graduation rate. Historically, one of the major benefits of CBE is the student's ability to convert experiential learning events to course credits that count toward graduation-- tightening the link between mastery of a skill and completion of a degree (Leggett, 2015). However, for Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) colleges like Nash Community College, there is an administrative barrier to the institution offering CBE as a strategic solution to the skills gap in the form of accreditation procedures. SACSCOC requires a college to submit a prospectus for every program offering the institution considers competency-based (SACSCOC, 2013). This prospectus process also requires the college to pay \$500 per program reviewed. The reason for this level of scrutiny by the accreditors is as a result of how a full competency-based education program fundamentally changes how an institution awards and processes course credits.

## **Causes and Costs of the Problem**

Curriculum planning that acknowledges the importance of trade and industry certification demonstrates the institutional commitment to local stakeholders and student success after graduation, while simultaneously supporting faculty control over academic rigor. When programs of study can demonstrate relevance to the working world, students

have a greater tendency to persist to graduation (Woods, 2015). With competition for high paying entry-level jobs in the wide-ranging industries such as the technology or electrical engineering sectors, Nash Community College has an obligation to prepare program completers for success before they enter the workforce.

Changing an entire curriculum to align with external evaluations will take a substantial commitment from the institution. A significant hurdle to overcome will be developing program competencies due to the difficulty in conceptualizing and executing the changes. Course content and overall learning outcomes have many influencers with varied expectations of the program graduates (Epstein & Hundert, 2002). Program planning and course redesign may come at a financial cost and/or in the form of faculty release time. With so many local employers acting as benefactors of the institution's curriculum and non-credit programs, Nash Community College will have to engage them methodically to determine how best to meet the greatest need without compromising the Community College's authority to establish the curriculum. Successful program redesigns rely on active collaboration with community stakeholders including the employers who will eventually receive the community college graduates as employees (Woods, 2015). Among the requirements of any change effort to an academic program, considerations must be made for the faculty who will directly interact with the content and students. In their study, Rosser and Townsend (2006) found ignoring the faculty perspective can lead to disenfranchisement, and ultimately cost the institution talented instructors.

Like many change efforts, transitioning an institution from a traditional, passive learning model to a fully engaged design, such as one that employs competency-based education (CBE), is extremely challenging and complex (Alonso, Manrique, Martinez, &

Viñes, 2011; Hensel & Stanley, 2014; Uchiyama & Radin, 2009). College leaders responsible for change, faced with balancing all of the current burdens of the institution with the unknown impact of CBE, must be considerate of all stakeholder needs and expectations ranging from the student to the employer (Weick, 1976; Sharma, 2009). At the core of a competency-centric change effort is the task of defining what the institution perceives as the final goal. For example, if online education is or will be a key component of the curriculum, as is the case at most higher education institutions, faculty must understand the benefits, restrictions, and pedagogical shifts that come with this mode of instructional delivery. In their study comparing students exposed to traditional classroom structures to those who participated in a blended in-person lecture and online model, Alonso, Manrique, Martínez, and Viñes found the latter group to have higher final grades (2011). The authors attributed this difference to the embedding of constructivism-based blended learning. The students were given material online to read, review, and create informed judgements about. The students were then challenged during face-to-face class time to apply those concepts. This new method of instruction is a departure from the classroom comfortable to many college faculty. To comply with this model, courses must be redesigned with the complete student experience in clear focus, encouraging faculty to consider all material as an essential piece of an inter-woven learning matrix.

Having clear learning expectations benefits the faculty in many ways. With adequate articulation, the course outcomes make the transitions between courses easier to conceptualize and communicate to others. When faculty are able to express student learning expectations in a collegial environment, research has found unexpected levels of comradery (Uchiyama & Radin, 2009). With expanded trust and relationships, honest discussion and

debate regarding the merits of various outcomes and competencies are possible among faculty. These discussions can then be the foundation of creating curriculum maps that describe the courses, skills, and competencies students obtain as they progress through the program of study (Uchiyama & Radin, 2009). Faculty also need to feel appreciated as employees and as professionals in their field (Rosser & Townsend, 2006). By being able to take ownership of a curriculum design project, faculty are contributing their expert knowledge to assure the quality of the overall learning. A secondary benefit to this arrangement is the faculty are now vested in the success of the implementation and sustainability of the changes. By promoting engagement at the institutional level, college leaders can see higher job satisfaction from faculty, leading to improved retention of faculty who are not change adverse (Rosser & Townsend, 2006).

Not only do faculty benefit from acknowledgment of their efforts, so do students (Wallar & Papadopoulos, 2015). In their study of a group of health sciences students who were partnered with professionals with similar disciplinary interests, the researchers found students had a deeper understanding of the material and the overall connections between the course learning outcomes when those outcomes were explicitly defined. The authors suggested the applied competencies taught in the courses gave the students a foundation to communicate with their in-field professional. With clear learning objectives, the students were also more engaged in the experience because they knew what they should be learning (Wallar & Papadopoulos, 2015). The need for clear learning outcomes and objectives is echoed in David and Lewis's (2014) study of embedded competencies. The researchers concluded that unless explicitly directed, students are likely to omit content from artifacts demonstrating competencies that are latticed within the curriculum.

Locally, Nash Community College operates as a mix of a smart network (Goldstein, Hazy, & Lichtenstein, 2010) and a traditional tiered hierarchy (Bolman & Deal, 2003). The Community College is a smart network in regard to the conception and execution of many grassroots projects. Community college administration promotes working in task-oriented, cross-departmental groups as a standard method of problem solving. Departments are expected to form around tasks, and reach out to the best-qualified employees in support of solving a problem (Goldstein et al., 2010).

The institution strives to embrace the ideas around innovation and cross-departmental collaboration. However, where high-risk or mandated projects are concerned, community college leadership prefer a top-down approach to decision making, solution design, and execution (Bolman & Deal, 2003). The “machine bureaucracy” (Bolman & Deal, 2003, p. 80) serves as an efficient model to distribute new policies or legislated directives without regard for employees or students who might be adversely influenced post-implementation. It is in this closed bureaucratic system that administrators can distance themselves from humanistic implications and focus primarily on the task completion (Bolman & Deal, 2003).

Because of its dual structure, change, or information that could inform change, travels through the organization slowly and diminishes the Community College’s overall agility. When innovation channels are blocked by the organizational structure, individuals furthest from the decision making process have little time to react before improvement is expected by those enacting the change (Goldstein et al., 2010). The Community College’s dual structure allows miscommunication to occur when employees hesitate to act while processing the directive. The employees must also decide whether or not this particular initiative is expecting change and action to come from the bottom, or if a prescriptive plan of action is

forthcoming from upper administrative levels. This type of organizational dynamic can lead to either initiative cohesiveness or initiative entropy, wherein the complexity of the system can contribute to it being sustained or its degradation (Zuchowski, 2012).

Structurally, the information and change channels of many organizations, including those of Nash Community College, resemble the shape of a tension spring, commonly referred to as a Slinky. Using high speed photography, Cross & Wheatland (2012) recorded the delay in movement of the different parts of the Slinky upon the release of the top-most section. It would appear to the observer of this phenomenon that the bottom of the Slinky hovers in mid-air far after the moment the top is released. To describe the physical change, “the collapse of tension in the slinky occurs from the top down, and a finite time is required for a wave front to propagate down the Slinky communicating the release of the top” (Cross & Wheatland, 2012, p. 2).

Parallels can be observed in the manner information about the drop state of a Slinky is transmitted down the coil (Cross & Wheatland, 2012) and information is transferred from the top to the bottom of the institution, and vice versa. The capacity to react, appropriate organizational structure, and time needed to communicate change operate as factors influencing the institutional wave front, just as the coils of the spring influence the Slinky. The Slinky analogy is key to understanding the institution as a dynamically coupled knowledge network. The dynamically coupled knowledge network is a new organizational theory informed by Goldstein, Hazy, and Lichtenstein’s (2010) work on complexity theory, and developed through this disquisition. Organization structure, culture, and capacity also share similarities with other physical properties important to the wave front in that the length of time information takes to travel down the coil is directly related to the size of the coil, the



tightness of the turns, and the elasticity of the material (Cross & Wheatland, 2012; Holmes, Borum, Moore, Plaut, & Dillard, 2014). Authentic and sustainable change will not happen instantly, just as the whole of the Slinky does not fall through space as one cohesive, rigid object. The desired state and acknowledgement of successes must be malleable and accept adjustments as various parts of the institution undergo the iterative Plan, Do, Study, Act (PDSA) cycles (Langley et al., 2009).

### **Credentialing Options**

With so many relevant external assessments of skills covered in a Computer Information Technology program, the institution must establish the skills stratification that best demonstrates the student's progression, but also holds the most value in the workplace. Tests such as the Educational Testing Service (ETS) iSkills test have shown increases in student preparedness in later classes (Egan & Katz, 2007). As ETS was developing their standardized assessment, participating pilot colleges, who used the results to improve existing instructional strategies, reported an increase in student computer abilities. The rebranding of the ETS iSkills test to the iCritical Thinking Certification was a response to changing needs in information literacy assessment. The new assessment focuses on information literacy skills such as information seeking, data organization, and data presentation (Teske & Etheridge, 2010). The iCritical Thinking Certification, according to Teske & Etheridge, does provide insight into areas where students have weaknesses (2010), provides institutions national comparisons for all of the skills areas, and is useful for baseline collection for improvement projects. Standardized tests could limit the use of the results if the overall program goal is to provide a validation recognized by the workplace. Before an institution commits to this type of skills assessment method, the college should perform a

critical evaluation of exactly which skills and abilities are tested. The institution would also need to determine if the data are applicable outside of the academic setting. Because many colleges use this test as a placement tool, the instrument could be measuring achievement too soon in the academic process to be meaningful after graduation.

At the opposite end of the certification spectrum, Al-Rawi, Lansari, and Bouslama (2005) recommend that computer information systems degree programs tightly integrate higher-level industry certifications into their curriculum structure to benefit the student after completion. The authors propose courses designed where the final grade is dependent, in part, upon the completion of a prescribed certification. The conversion of the external assessment into a high stakes evaluation could pose an issue for those students suffering from test anxiety (Eum & Rice, 2011), but it would motivate students to learn the content as well as demand high expectations from the faculty to prepare students for fee-based assessments.

### **Desired State**

To meet the expressed need of local employers and advisory groups, as well as student expectations to be prepared for gainful employment upon graduation (Nielsen, 2015), it is imperative that the institution take advantage of every opportunity to improve its curriculums (Albashiry, Voogt, & Pieters, 2015; Nielsen, 2015). While unforeseen at the outset of this study or the conceptualization of competency-validated education, there is now specific external pressure to reevaluate how the Community College acknowledges the importance of third-party credentials to students and employers. To be in compliance with the mandate given by the North Carolina Community College System, NCC must make explicit integrations of external certifications into the Information Technology Curriculum Standard by the fall semester of 2017 (NCCCS, n.d.).

NCC's desired state is an institution-wide culture that welcomes the critical appraisal of how well existing academic programs align with externally recognized competencies and certifications. Additionally, the critical appraisal will serve as a catalyst to the inclusion of external validations as a means to continuously improve (Austin & Claassen, 2008). This cultural shift will require the Community College to make accommodations for change and accept the fundamental principles of change theory that establish it as iterative, reflective, and inevitable (Johnson & Kruse, 2009).

## SECTION 7: INTRODUCTION AND INTEGRATION OF COMPETENCY-VALIDATED EDUCATION

Using a non-experimental design, I implemented an evidence-based, action research plan to change a curriculum program of Nash Community College. Evaluation of best practices and emerging trends regarding the integration of external credentials in program outcomes informed the change plan. Specifically, the following problem of practice was addressed: Nash Community College needed to strengthen the curriculum, focus on employer concerns regarding workforce preparedness, and improve retention and graduation rates of the Computer Information Technology degree program. My intervention consisted of the incorporating of industry or third-party certifications as an embedded evaluation of program efficacy and micro-credentialing of student achievement. The intervention was implemented using the varying perceptions of value given to third-party credentialing among employers, community college students, and faculty. While competency-based education programs are well established in higher education, and there are many best practice models to choose from, this intervention presented an opportunity to develop a new method of program design that fits Nash Community College's specific needs: competency-validated education.

Competency-validated education (CVE) is an academic planning model that acknowledges the importance of workplace competencies in academic planning, the benefits of applied constructivist theory, and the best classroom practices of CBE (Al-Huneidi & Schreurs, 2012). Similarly titled, competency-validated education is significantly different from competency-based education. SACSCOC defines competency-based education as “outcome-

based and assesses a student's attainment of competencies as the sole means of determining whether the student earns a degree or a credential" (SACSCOC, 2013, p. 1).

Competency-validated education uses specific, measurable achievements such as third-party certifications, standardized tests, or any other assessment method that accurately blends institutional requirements and workforce standards to assure alignment or "validation" of the program learning outcomes and course progression with employment preparedness after graduation. CVE is a new educational planning model created through this disquisition. Because of its newness, there may be some challenges from accrediting agencies confusing CVE with competency-*based* education (CBE). By choosing CVE as the method of program improvement, it will be imperative that Nash demonstrate its legitimacy using artifacts such as clear documentation of the program-level learning outcomes, program validation criteria, assessment data, and evidence of program and student success.

### **Intervention Design**

In its mission statement, Nash Community College states that it creates an "educational environment which prepares students for successful college transfer and rewarding careers" (Nash Community College, 2015). However, the Community College is currently without any policy describing how it performs this task or attempts to collect data to support the claim. This omission signaled the need for further research and a course of action that would establish explicit links between instruction and employment preparedness. The only significant data on external certification obtainment by North Carolina Community Colleges come from the annual Performance Measures of Student Success report published by the North Carolina Community College System Office (NCCCS). The Performance Measures for Student Success report limits the data on certification achievement to first time

test takers in primarily health science and public safety fields, which are only a fraction of the program offerings at Nash Community College (North Carolina Community College System, 2014).

Along with the institutional need to continually evaluate and improve the academic offerings, the College has a responsibility to the community to prepare graduates to be successful. To ignore, or to at least not investigate for action, a possible gap in what the Community College perceives are the proper knowledge, skills, or abilities one needs to have sustained employment is socially unjust and irresponsible to both the student and the communities that we service. The core of Nash's problem of practice was a misalignment of program-level outcomes with the expressed need of the local workforce, and a lack of data regarding certification of graduates. Without an understanding of how well graduates are prepared for the workforce, the Community College is unable to effect appropriate changes to academic programs.

Nash had not addressed a curriculum design using mapping or tightly integrating external competencies until 2015 when this topic was presented to the President. Since May of 2015, informal discussions with department chairs have taken place, opening the way for formal meetings and planning to take place as this disquisition developed. It was not until the 2015 annual program review of the CIT curriculum that the inclusion of external credentials occurred. During this meeting, attended by the program faculty and several local industry leaders, committee members stated a rising need for graduates to have skills beyond the degree to not only make them more attractive in a shrinking job market, but also to better prepare them for a wider range of job duties (N. Floyd, personal communication, October 19, 2016).

## **Design and Implementation Team**

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*Team Members:*

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*Expert Groups:*

CIT Advisory council

HR Directors of local businesses employing CIT graduates

## **Implementation Plan**

To determine if the institution successfully addressed the problem of practice and the essential research questions, data were gathered in three phases. This implementation plan section will include a narrative schedule of events, followed by a short narrative describing each phase, and a plan for obtaining data that informed the research process. The survey data generated in this intervention are based on an embedded mixed methods approach (Creswell, 2011), and establishment of a grounded theory for data comparison (Corbin & Strauss, 1990) was formed through descriptive statistical analysis (Creswell, 2011). The theoretical

framework guiding this disquisition considers the incoming curriculum student as having the potential to achieve external credentials while still enrolled at NCC. Through the student's completion of courses containing the certification validation points, the overall curriculum is strengthened, and the student is better prepared for gainful employment (see Appendix G).

### **Data Collection Timeline Narrative**

There were several phases of data collection that were influenced by the Carnegie 90-day cycle framework (Langley et al., 2009). The first data collection phase took place in October of 2015 when I met with the Computer Information Technology (CIT) Advisory Committee, a committee I serve on as an employer representative. Along with the usual agenda items, this meeting provided me with informal, candid impressions held by other local employers and CIT faculty regarding certifications. These themes would serve as a starting point for future conversations and the later development of survey instruments. I was situated at an optimal position both organizationally and professionally to address my disquisition. The departments of Institutional Technology, Institutional Effectiveness, and eLearning report directly to me, the Vice President of Technology and Chief Information Officer. Using established data request procedures and my positional authority (Bolman & Deal, 2003) over the Institutional Effectiveness department assured the fulfillment of student data requests. Having insight into how to work within an organizational structure is one of the benefits of insider research (Bonner & Tolhurst, 2002). During the process of implementation, any substantive changes made to the program would require an update to the curriculum scope and sequence documents to reflect integration of certifications. These changes would also be published to the Community College's website and distributed to CIT students via their College email account.



At the end of the fall 2016 semester, I concluded all modification actions in preparation for completing this disquisition. Program improvement efforts continued at the College level as the changes transitioned into the curriculum, and a second 90-day PDSA cycle began with the spring 2017 term. In the event improvements in curriculum design and competency validation are not evident after the second cycle, the Implementation Team will meet with other Community College leaders to determine a change of approach. Integration of certification milestones into 2017-2018 CIT curriculum will be reflected in the College catalog, which will be finalized in January 2018.

### **Pre-Program Modification Data Gathering Process**

Data were collected from several sources during the planning of the study. The groups chosen for data collection were (1) currently enrolled Computer Information Technology Associate in Applied Science (CIT-AAS) students, (2) recent CIT-AAS graduates, (3) current full and part-time faculty in the NCC CIT department, and (4) local employers identified through their association with the Carolinas Gateway Partnership, a regional workforce and economic development board. The operational definition of recent graduates used in this disquisition is any Nash Community College Computer Information Technology Associate of Applied Science alumni who graduated during or after May of 2016. Based upon their relevance to the overall implementation and improvement process, the groups were surveyed at various points during the semester.

To establish pre-intervention similarities and differences in external certificate opinions, data collection was performed at the beginning of the fall 2016 semester for all of the participant groups. The surveys (see Appendices H - K) were administered electronically to all participants via an email invitation. The surveys posed questions essential to making

informed decisions about possible programmatic changes. These potential changes, as identified by the Implementation Team during the initial planning, could be actions such as needing better communication to the community about curriculum outcomes, or to aid in setting realistic expectations of graduates or other stakeholders. A group of trained evaluators validated all of the survey instruments.

The results of the surveys were used to foster discussion amongst the Implementation Team during the planning phase, and would later be used with the summative evaluations to check for any improvements in the respondents' ability to identify relevant certifications. Further review of the survey instruments and participant selection process will take place as the College expands the integration of CVE into other programs. By continuously refining the instrument, these same surveys can be used as data sources for future program reviews and as a means to gauge improvements resulting from the use of CVE.

The participant groups listed, in order of ranked importance, up to 10 third-party certifications they thought were most important for CIT majors to obtain before, directly after, and before the end of their third year of employment. Ranking certifications aided in the prioritization of certification training within the program of study and established if there were misgivings in any respondent group regarding realistic goals for certifications resulting from participation in the CIT-AAS curriculum. The certification ranking was also useful in determining the feasibility and scope of the embedded validations for program planning.

### **Formative data collection**

**Current students.** The Current Student Perceptions Survey, a convenience survey of current CIT students was administered through an online instrument with the invitation delivered via email (see Appendix H for more information on the survey) at the beginning of

the fall 2016 semester. The email addresses of the students were collected through a data request to the NCC Office of Institutional Effectiveness. Because the current program enrollment was 39 (Vester, 2016), the target response rate was 100%. The small sample size required a clear explanation of the study's purpose, brevity and succinctness of the instrument, and persistence to collect responses without accumulating erroneous data (Barge & Gehlbach, 2012). The survey of these students was designed to determine their perceptions of industry credentials to provide a comparison with other response groups.

**Recent graduates.** The Current Graduates Perceptions Survey, a convenience survey of the graduates from the current academic year was administered through an online instrument with the invitation delivered via email (see Appendix I for more information on the survey) at the conclusion of the spring 2016 semester. The email addresses of the students were collected through a data request to the NCC Office of Institutional Effectiveness. The Associate of Applied Science Computer Information Technology degree has very few graduates each year; therefore, the target response rate was 100% of the three recent completers. The survey of these students was designed to determine their perceptions of industry credentials as they enter the workforce to provide a comparison with other response groups.

**Program faculty.** The Faculty Perceptions Survey, a convenience survey of current CIT program faculty, was administered through an online instrument with the invitation delivered via email (see Appendix J for more information on the survey) at the beginning of the fall 2016 semester. The email addresses of the faculty were collected through a data request to the NCC Office of Institutional Effectiveness. The target response rate was 100% of the 10 full-time and four part-time faculty teaching courses in the Computer Information

Technology Associate of Applied Science degree during the fall of 2016. The faculty survey was designed to determine their perceptions of industry credentials, to provide a comparison with other response groups, and to inform possible program changes due to misalignment of desired outcomes.

**Employers.** The Human Resources Perceptions Survey, a convenience survey of local Human Resource Directors (or a functional equivalent) at businesses that employ technology workers, was administered through an online instrument with the invitation delivered via email (see Appendix K for more information on the survey) at the beginning of the fall 2016 semester. The target response rate was 43 of the 48 major employers in the NCC service area (Carolinas Gateway Partnership, 2012) for a 95% confidence level with a confidence interval of 4. The email addresses of the employers and Human Resource Directors were collected through a data request to the Carolinas Gateway Partnership. The survey of employers was designed to determine their perceptions of industry credentials for incoming and recently hired employees. These data will be used in comparisons with other response groups.

### **Summative data collection**

**Current students.** The Current Student Perceptions Survey, a convenience survey of current CIT major students was redistributed through an online instrument with the invitation delivered via email (see Appendix H for more information on the survey) at the end of the fall 2016 semester. The email addresses of the students were collected through a data request to the NCC Office of Institutional Effectiveness for the formative survey earlier in the semester. The target response rate to this survey was 100%. The survey of these students was designed to determine any change in their perceptions of industry credentials resulting

from the changes to the curriculum, and to provide comparison data with the responses given by the formative survey groups.

**Program faculty.** The Faculty Perception Survey was redistributed through an online instrument with the invitation delivered via email (see Appendix J for more information on the survey) at the end of the fall 2016 semester to current full and part-time CIT faculty. The email addresses of the faculty were collected through a data request to the NCC Office of Institutional Effectiveness for the formative survey earlier in the semester. The target response rate was 100%. The purpose of this survey was to determine any changes in the opinions held by the CIT faculty regarding third-party certifications as a result of this intervention, and to compare responses from other respondent groups.

## SECTION 8: RESULTS AND EVALUATION

The results of this intervention are separated into three distinct parts, formative, intervention strategy, and summative. The results from the formative survey were used to construct the intervention strategy that was later evaluated with the summative survey. This methodology was chosen as an application of a PDSA cycle wherein understanding of the environment needing change is established, an intervention occurs and is then evaluated, and finally corrections are made to the intervention based on observations of the data (Langley et al., 2009).

### **Formative evaluation results**

The formative surveys allowed the participants to provide their opinions on how important third-party certifications are to both themselves and to the career field of information technology. Respondents were also prompted to provide a rated list of the most relevant technology certifications for students prior to graduation, and then during the first three years of employment. The results of these formative surveys, located in Appendix L, indicate current students, recent graduates, and faculty have some general agreement that certifications are important for successful employment, but hold different views on what are the most important certifications to obtain during, and after, they complete their degree. The exception to this inference is the CompTIA A+ certification, a widely recognized certification required for most entry-level computer support positions. When questioned about what certifications were important for a student to obtain prior to employment in the technology field, the CompTIA A+ certification was listed as the most important by 42% of the 47 student and faculty respondents.

The formative data collected from the CIT alumni and employer groups did not yield as much substantive data as anticipated. Only two of the three (66%) CIT graduates and two of the 18 (11%) employers responded to the survey request. The original employer pool of 48 was unobtainable through the Carolina's Gateway Partnership due to missing or outdated email addresses and contact information. I worked with the Partnership's administrative representative to collect 18 names and email addresses, but ultimately was unable to achieve my target.

### **Intervention strategy and results**

During the fall 2016 semester, development and implementation of modifications to the course content took place to change the misaligned perceptions at the academic program and student level. The Implementation Team met several times to review the survey data and come to a consensus on how the topic of certifications should be introduced to their classes in both seated and online sections, specifically to courses being taught in the fall 2016 and the spring 2017 terms. The team (1) held ongoing conversations around the preliminary survey data, (2) presented ideas on possible classroom discussions or events focused on certifications, (3) continued the deliberation on what courses constitute exam readiness, (4) explored funding options, and (5) looked at opportunities in the upcoming spring semester for ways to increase awareness to have students sit for certifications.

Once the Implementation Team created a plan for fall 2016 and spring 2017, the first two semesters impacted by the study, they then assumed the task of mapping the curriculum to the most realistically obtainable certifications. Because of the unique structure of the community college, students who attend these institutions need flexible, and sometimes disjointed, paths to completion (Laanan, 2003). As opposed to their peers in traditional

university programs, community college students rarely have an opportunity or desire to take courses in a lock-step cohort (Maher, 2005). The nontraditional course completion behavior observed in both the literature and through local experience led the Implementation Team to the conclusion that the creation of a linear certification pathway would not be a viable solution. In team discussions it was determined that providing the students with a preparation checklist, or Program Certification Milestones document (see Appendix M), would be a more appropriate tool for communicating the efforts toward certificate attainment. A certification obtainment document was also created that aligned with the standardized curriculum sequence document (see Appendix N); however, this document was primarily used for informational purposes within the Implementation Team meetings.

A major discussion point among the members of the Implementation Team was the ways that the curriculum had been modified to address the integration of CVE. The CIT-AAS program courses taught in the fall of 2016 contained elements of CVE in several ways. The courses directly related to third-party certifications used textbooks explicitly designed to prepare the student for specific exams, often published by the test vendor. The majority of textbooks for CIT courses come bundled with access to online materials, including certification test preparation. Many CIT courses require the use of the online labs for simulation and assessment of the knowledge, skills, and abilities contained in the course learning outcomes. By using the online tools, the students are provided with professionally produced supplemental materials for their graded coursework while concurrently exposing them to a close facsimile of the actual exam. Nash proactively addressed the exam access barriers to certifications by becoming a Certiport testing center in 2013 (N. Floyd, personal



communication, November 21, 2016). Students interested in taking any of the Microsoft, Certiport, or ACT tests can do so without leaving the campus.

Increasing the use of online content and textbooks by the exam publisher was not the only strategy devised to increase student preparedness and eventual certification obtainment. Upon reviewing the survey data and taking into consideration the comments of the CIT Advisory Committee, the Implementation Team successfully petitioned the CIT department chair for the addition of a reflection assignment to each course containing certification outcomes beginning in the spring of 2017. During the 2017-2018 academic planning cycle, the CVE-influenced course learning outcomes and information regarding exams relevant to the course will appear on the syllabus.

Resulting from the planning and preliminary environmental scanning needed for this intervention, Nash also took action at an institutional level to demonstrate its commitment to CVE. At the direction of the President, all academic transcripts printed after the spring of 2016 contain a section for certifications and other institutional awards. By providing the student a single, official document to communicate their academic and external competencies, the Community College aims to improve the students' employability and bolster the institution's standing with the community as a value-added partner.

### **Summative Evaluation**

The summative evaluation took place at the conclusion of the fall 2016 semester. A survey was issued to the current students and CIT faculty to determine if the embedded course content regarding external certifications and competencies improved their knowledge of certifications. While there were multiple attempts to promote participation by both groups, there was limited response to the survey requests. The faculty response rate was

54% (n=7) and only a six percent response rate for currently enrolled students (n=3). The only data of note was that the faculty responding to the summative survey showed continued high regard for the CompTIA A+ certification as being important to the CIT program graduate. Results of the summative faculty surveys are included in Appendix O. None of the student participants listed any certifications in their responses.

Without substantial data to perform a full statistical analysis, a mathematical comparison of the formative and summative survey results of the students was not possible. However, 100% of the responding students still indicated an opinion that certifications are important to the technology industry. Of those responding, 67% of the students also maintained their opinion of how important certifications are to the technology career field. Results of the summative student surveys are included in Appendix P.

### **Limitations**

A limitation to demonstrate the success of this intervention was the time needed for students to benefit from the changes to the program, and then attempt certification. Changes to the program will be observed outside of the initial 90-day PDSA cycle (Langley et al., 2009) due to student attendance behaviors, required course progressions, and other factors outside of the control or influence of the Community College. With many community college students taking courses beyond the traditional two-year period, gathering conclusive evidence of the benefits of CVE will extend several years (Hodara & Jaggars, 2014; Laanan, 2003).

Additionally, one of the first observations made by the Implementation Team regarding the survey data was the lack of responses from the students, employers, and even some CIT faculty. The group eventually agreed that the most likely reason for the

suboptimal participation was survey apathy common to the use of email-delivered instruments (Leeuw, 2012; Porter, Whitcomb, & Weitzer, 2004; Rush, Adamack, Gordon, Lilly, & Janke, 2013). Questionnaires inundate students from various campus groups, faculty planners, and college-wide initiatives. Due to the volume of competing requests for the students' time outside of class and homework, the electronic invitation may have been ignored. According to Farley Phillips, the Associate Dean of Institutional Effectiveness, the normal response rate for NCC's students is 35%, regardless of the survey type (F. Phillips, personal communication, December 15, 2016). Employers, while expressing interest in the quality of prospective employees in program advisory meetings (S. Yates, personal communication, October 26, 2016), have similar demands of their time that contributed to the limited response to survey requests. Abraham, Helms, and Presser (2009) provided an interesting perspective on survey taking as a form of volunteerism with reduced social pressure to respond due to the anonymity of the online survey. The authors additionally echoed Knack's (1992) notion that potential respondents will opt out of altruistically giving their time to a cause that offers no personal benefit. While CVE offers a benefit to all surveyed groups, there was insufficient incentive to participate or ask clarifying questions. Despite the fact that the response rate for the students was inadequate to make any comparison with the formative group, lower response rates did provide useful information to the future recommendations of the intervention.

### **Recommendations**

In an effort to foster more understanding about the importance of certifications, the CIT Department Chair has asked the CIT faculty to engage their students at least once a semester in a discussion or class event focused on external certifications and the application

of CVE. This interaction, aided through the Program Certification Milestones document, will be to highlight how the program of study prepares students for credentials beyond their community college degree.

To counter the influence survey apathy may have had on early data collection, students should be given a direct notice of the survey being conducted, or the survey should be given at a time in the semester with the least likely chance to be disregarded due to other surveys or college-wide assessments. To gain more employer participation, a wider group should be used through organizations such as the Chamber of Commerce, Rotary, and other economic development boards. While most if not all of the businesses associated with the Carolinas Gateway Partnership are also associated with these groups, having multiple paths to their inbox may increase the likelihood of their participation.

To prepare for the time when CVE is embedded in all curriculums, the Community College must address the concerns expressed by the student and faculty groups. According to the formative and summative surveys of faculty and students, the top most barriers to certification obtainment are the cost and preparation for the exams. As shown in Table 2, with a total cost of \$1,046.25, there is a significant financial risk to CIT students if they are underprepared for the exams. The Community College has addressed preparation through the aforementioned curriculum changes, and the Implementation Team recommended two viable solutions to the cost problem.

Table 2.

*Pricing Guide for Third-Party Certification Exams*

Exam or Certification	Test Publisher	Cost
Career Readiness Certificate	ACT	Free to Nash Students
Certiport Internet and Computing Core Certification (IC3)	Certiport	\$35.50
CompTIA A+ (Part 1 and 2)	CompTIA	\$400.00
Exam 70-410: Installing and Configuring Windows Server 2012 R2	Microsoft via Certiport	\$165.00
Exam 70-687: Configuring Windows 8.1	Microsoft via Certiport	\$165.00
Exam 98-364: Database Administration Fundamentals	Microsoft via Certiport	\$50.75
Microsoft Office Specialist – Access	Microsoft via Certiport	\$115.00
Microsoft Office Specialist – Excel	Microsoft via Certiport	\$115.00

*Note.* Exam costs as of November 2016.

The Carl D. Perkins Career and Technical Education Improvement Act of 2006, or Perkins Act, which is the contemporary name given to the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, sets specific guidelines for the use of federal funds to promote vocational and technical education in community colleges across the country (Carl D. Perkins Career & Technical Education Act, 2006). The Perkins Act serves as a financial resource for community colleges to establish, enhance, or sustain curriculum programs that directly lead to gainful employment. Perkins Act funds are limited to vocational and technical programs, effectively excluding their use for college transfer or continuing education operations (Lakes, 2007). The majority of programs impacted by the integration of CVE are vocational and technical associate in applied science degrees, allowing these students access to Perkins Act funds to cover some or all of the cost to test.

Another local option for supplementing or otherwise offsetting the costs associated with external certifications is through the establishment of a student fee in accordance with the North Carolina Community College code 1E SBCCC 700.6 (North Carolina Community College System, 2014). The establishment of a student fee would create a dedicated financial resource for payment of exams. Curriculum students would pay into the fund regardless of completion or intent to take the certification tests. The Implementation Team agreed that the financial investment of a fee by the student might create motivation to take the exams.

A final implementation issue to overcome will be the lack of patience on the part of the Community College. The administrators of NCC were very excited when the idea of a new CBE influenced method of program planning to aid in student success after graduation was first proposed. In the time leading up to the implementation of this intervention, there has been much discussion about the topic and some work on mapping courses to external competencies has already begun in other programs of study. To apply the Slinky theory, there can be a significant delay between the activation of the initiative and observation of results.

While this improvement initiative has been aided on the periphery by other College improvement initiatives, the chosen methodologies do not coincide with those recommended within this disquisition. It is conceivable that there will be some resistance from faculty who want to continue with their own methods rather than be a part of this effort. Demonstrating the research behind the proposed changes and predictions on the benefits should alleviate most faculty resistance. In their 2009 study of employers, students, and faculty, Wesselink, de Jong, and Biemans (2010) found competency-based education to be a vital part of a successful and meaningful vocational-technical education. However, the authors did find

inconsistencies in the employers' expectations of the college to prepare students for specific job tasks. Establishing an understanding of how to create feasible outcomes and timelines will better prepare program faculty and administrators during the redesign of the curriculums.

## SECTION 9: CONCLUSION

At many institutions, workforce development and curriculum initiatives are considered mutually exclusive. As described above and demonstrated using our theoretical framework, these two functions of the community college are not only similar, but can operate symbiotically to substantially increase the likelihood of student success. Serving as an entryway into the community college, workforce development programs give students familiarity with the overall operations of higher education while providing a tangible credential instantly applicable to their career. Through intra-institutional articulation, that credential becomes a head start to completing a curriculum degree, acknowledging the students' prior achievements and shortening their time returning to the workforce. For those students taking the traditional curriculum degree route, certifications like those earned externally or in workforce development courses serve as incremental learning validation events on the path to completion.

By directly applying student, faculty, and employer feedback into the curriculums of both Asheville-Buncombe Technical College and Nash Community College, the institutions affirm the importance of all local stakeholders. The use of multi-phase research plans allows both community colleges a means to verify any changes to the programs that had a positive impact and to adjust where needed. While these action research activities were for the scale of just two programs at each location, the structures are replicable with the potential to change how both institutions gauge student success before and after degree completion. Improving credentialing options for students in both credit and non-credit programs addresses issues across the continuum of higher education, and allows for multiple



opportunities to demonstrate workforce preparedness regardless of which program the student completes.

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## APPENDICES

**Appendix A: Internal Credit Articulation Survey**

1. Select the job title that best fits your role at the college: (Check one)
  - a. \_\_\_\_\_ Faculty, Full-time or Adjunct – Credit/Curriculum
  - b. \_\_\_\_\_ Faculty, Full-time or Adjunct – Non-credit/Continuing Education
  - c. \_\_\_\_\_ Dean or Department Chair – Credit/Curriculum
  - d. \_\_\_\_\_ Director or Senior Administrator – Non-credit/Continuing Education
  - e. \_\_\_\_\_ Coordinator – Non-credit/Continuing Education
  - f. \_\_\_\_\_ Administrative Support – Non-credit/Continuing Education
  - g. \_\_\_\_\_ Administrative Support – Curriculum
  - h. \_\_\_\_\_ Director or Coordinator – Student Services
  - i. \_\_\_\_\_ Administrative Support – Student Services
  - j. \_\_\_\_\_ Other, please specify \_\_\_\_\_
  
2. How long have you worked at A-B Tech?
  - \_\_\_\_\_ 0-1 years
  - \_\_\_\_\_ 2-5 years
  - \_\_\_\_\_ 6-10 years
  - \_\_\_\_\_ 11-20 years
  - \_\_\_\_\_ 21+ years
  
3. How confident are you in your understanding of non-credit articulation?
  - \_\_\_\_\_ Confident
  - \_\_\_\_\_ Somewhat Confident

\_\_\_\_\_ Not Confident

4. How confident are you in the location and policy number of the current non-credit to credit articulation policy and procedure at A-B Tech?

\_\_\_\_\_ Confident

\_\_\_\_\_ Somewhat Confident

\_\_\_\_\_ Not Confident

5. How confident are you in your understanding of which Continuing Education coursework is eligible for credit based on A-B Tech policy and procedure?

\_\_\_\_\_ Confident

\_\_\_\_\_ Somewhat Confident

\_\_\_\_\_ Not Confident

6. How confident are you in your understanding of the internal stakeholders (Faculty/Staff) involved in awarding credit for non-credit coursework at A-B Tech?

\_\_\_\_\_ Confident

\_\_\_\_\_ Somewhat Confident

\_\_\_\_\_ Not Confident

7. How confident are you in your ability to execute current policies and procedures related to awarding credit for non-credit coursework at A-B Tech?

\_\_\_\_\_ Confident

\_\_\_\_\_ Somewhat Confident

\_\_\_\_\_ Not Confident

8. Awarding students credit for their Continuing Education course work is important because: (Rank in order of importance from 1-7 with 1 being the most important and 7 being the least important)

\_\_\_\_\_ Students are more likely to persist in or complete their education.

\_\_\_\_\_ Students are given a clear pathway for continuing with their career development.

\_\_\_\_\_ Students receive something of value beyond the skills taught in the course.

\_\_\_\_\_ Employers have more employees advancing their skills.

\_\_\_\_\_ Employers have more employees eligible for advancement/promotions.

\_\_\_\_\_ The College has more students enrolling in curriculum programs after completing continuing education courses.

\_\_\_\_\_ The College retains students longer, increasing completion rates and ultimately increased funding.

9. What challenges might impact A-B Tech from increasing options for students to earn credit through selected Continuing Education courses? (multiple selections allowed)

\_\_\_\_\_ General lack of awareness of current policy and procedure

\_\_\_\_\_ Absence of a formalized work flow

\_\_\_\_\_ Collaborating with new or unknown internal partners

\_\_\_\_\_ Aligning coursework takes time and effort

\_\_\_\_\_ Evaluating coursework takes time and effort

\_\_\_\_\_ Low interest on behalf of internal stakeholders

\_\_\_\_\_ No challenges are anticipated

## Appendix B: Continuing Education to Curriculum Credit Form

### Asheville-Buncombe Technical Community College Articulation of Non-Credit Course to Credit Course (Only Applies to Non-Credit Courses taken at A-B Tech)

I, \_\_\_\_\_ request articulated credit for the following course(s):  
PRINT FULL NAME

Course \_\_\_\_\_  
Prefix Number Course Title

Course \_\_\_\_\_  
Prefix Number Course Title

Course \_\_\_\_\_  
Prefix Number Course Title

In order for your request to be considered, you must respond YES to all of the following:

\_\_\_\_\_ I have completed (or nearing completion) non-credit course(s) at the college approved for possible articulation.

\_\_\_\_\_ I have completed all required projects or assessments needed for evaluation for articulation.

\_\_\_\_\_ I do not have any recorded grade from previous enrollment in requested course(s) to be articulated.

\_\_\_\_\_ I am now enrolled in a program for which the articulated credit will be applicable.

\_\_\_\_\_ I understand that by receiving articulated credit, my course loads may be reduced now and in the future, which may affect my eligibility for financial assistance through the College, VA, Financial Aid, and other programs.

Student Signature \_\_\_\_\_ Date | | | | | ID # \_\_\_\_\_ Major Curriculum \_\_\_\_\_

#### INSTITUTIONAL USE ONLY

#### Continuing Education Instructor Recommending Consideration for Articulated Credit

Instructor \_\_\_\_\_ Date \_\_\_\_\_

#### Curriculum Instructor(s)

I/We have evaluated the student work and/or assessments according to criteria established for articulated credit for this/these course(s) and:

\_\_\_\_\_ Approve this request for articulation of credit.

\_\_\_\_\_ Disapprove this request for articulation of credit.

Rationale for decision (attach relevant artifacts):

Instructor(s) \_\_\_\_\_ Date \_\_\_\_\_

#### Chairperson

\_\_\_\_\_ I approve this request for articulation of credit.

\_\_\_\_\_ I disapprove this request for articulation of credit.

Department Chairperson \_\_\_\_\_ Date \_\_\_\_\_

#### Dean

\_\_\_\_\_ I approve this request for articulation of credit.

\_\_\_\_\_ I disapprove this request for articulation of credit.

Division Dean \_\_\_\_\_ Date \_\_\_\_\_

#### Vice President, Instructional Services

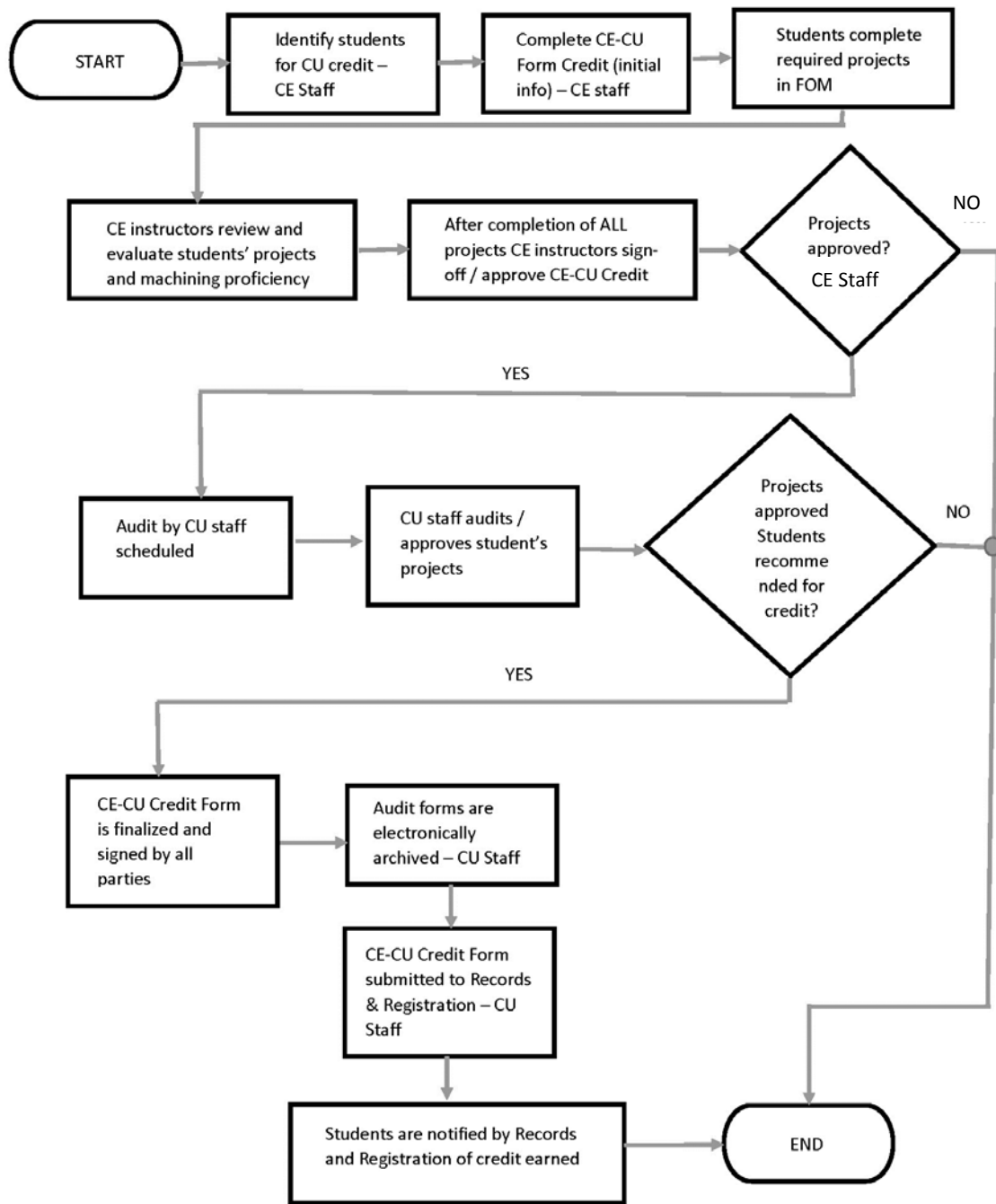
\_\_\_\_\_ I approve this request for articulation of credit.

\_\_\_\_\_ I disapprove this request for articulation of credit.

Vice President, Instructional Services \_\_\_\_\_ Date \_\_\_\_\_



### Appendix C: CE-CU Credit Process Flow Chart



### Appendix D: Responses to Internal Credit Articulation Survey - Initial

Please select the job title that best fits your role at the college.

Answer	%	Count
Faculty Full-time or Adjunct, Curriculum	19.44%	7
Faculty Full-time or Adjunct, Continuing Education	2.78%	1
Dean or Department Chair, Curriculum	19.44%	7
Director/Senior Administrator, Continuing Education	8.33%	3
Coordinator, Continuing Education	19.44%	7
Administrative Support, Continuing Education	13.89%	5
Administrative Support, Curriculum	0.00%	0
Director/Coordinator, Student Services	0.00%	0
Administrative Support, Student Services	0.00%	0
Other, please specify	16.67%	6
Total	100%	36

How long have you worked at this college? (in years)

Analysis	
Minimum	1.0
Maximum	30.0
Mean	9.53
Count	36

## Responses to Internal Credit Articulation Survey (continued)

Awarding students credit for their Continuing Education coursework is important because: (place items in order of importance)

Item	Ranking of Importance							Total
	1	2	3	4	5	6	7	
Students are more likely to persist in or complete their education	11	7	7	2	1	3	0	31
Students are given a clear pathway for continuing with their career development	9	10	5	5	2	0	0	31
Students receive something of value beyond the skills taught in the course	7	6	10	1	4	1	2	31
Employers have more employees advancing their skills	1	1	1	11	8	8	1	31
Employers have more employees eligible for advancement/ promotions	0	2	2	3	7	5	12	31
The college has more students enrolling in curriculum programs after completing continuing education courses	0	5	4	5	3	8	6	31
The college retains students longer, increasing completion rates and ultimately increasing funding	3	0	2	4	6	6	1	31

Awarding students credit for their Continuing Education coursework is important because: (place items in order of importance)

Item	Mean
Students are more likely to persist in or complete their education	2.48
Students are given a clear pathway for continuing with their career development	2.39
Students receive something of value beyond the skills taught in the course	3.00
Employers have more employees advancing their skills	4.68
Employers have more employees eligible for advancement/ promotions	5.52
The college has more students enrolling in curriculum programs after completing continuing education courses	4.74
The college retains students longer, increasing completion rates and ultimately increasing funding	5.19

## Responses to Internal Credit Articulation Survey (continued)

How confident are you in your ability to execute current policies and procedures related to awarding credit for non-credit coursework at A-B Tech?

Answer	%	Count
Confident	22.22%	8
Somewhat confident	22.22%	8
Not confident	55.56%	20
Total	100%	36

How confident are you in your understanding of which continuing courses are eligible for credit based on A-B Tech policy and procedure?

Answer	%	Count
Confident	13.89%	5
Somewhat confident	19.44%	7
Not confident	66.67%	24
Total	100%	36

How confident are you in your understanding of current policies related to non-credit to credit articulation or awarding curriculum credit for continuing education coursework at A-B Tech?

Answer	%	Count
Confident	22.22%	8
Somewhat confident	33.33%	12
Not confident	44.44%	16
Total	100%	36

How confident are you in your understanding of the internal stakeholders (faculty/staff) involved in awarding credit for non-credit coursework at A-B Tech?

Answer	%	Count
Confident	22.22%	8
Somewhat confident	30.56%	11
Not confident	47.22%	17
Total	100%	36

## Responses to Internal Credit Articulation Survey (continued)

How confident are you in your ability to execute current policies and procedures related to awarding credit for non-credit coursework at A-B Tech?

Answer	%	Count
Confident	22.22%	8
Somewhat confident	22.22%	8
Not confident	55.56%	20
Total	100%	36

What challenges might impact A-B Tech from increasing options for students to earn credit for selected Continuing Education courses? (multiple selections)

Answer	%	Count
General lack of awareness of current policy and procedure	76.47%	26
Aligning coursework takes time and effort	73.53%	25
Evaluating coursework takes time and effort	70.59%	24
Collaborating with new or unknown internal partners	32.35%	11
Absence of a formalized workflow	29.41%	10
Low interest on behalf of internal stakeholders	23.53%	8
No challenges anticipated	5.88%	2
Total	100%	34

How confident are you in the location of policies related to non-credit to credit articulation or awarding curriculum credit for continuing education coursework at A-B Tech?

Answer	%	Count
Confident	30.56%	11
Somewhat confident	61.11%	22
Not confident	8.33%	3
Total	100%	36

### Appendix E: Responses to Internal Credit Articulation Survey – Final

Please select the job title that best fits your role at the college.

Answer	%	Count
Faculty Full-time or Adjunct, Curriculum	0.00%	0
Faculty Full-time or Adjunct, Continuing Education	4.76%	1
Dean or Department Chair, Curriculum	0.00%	0
Director/Senior Administrator, Continuing Education	19.05%	4
Coordinator, Continuing Education	33.33%	7
Administrative Support, Continuing Education	23.81%	5
Administrative Support, Curriculum	0.00%	0
Director/Coordinator, Student Services	0.00%	0
Administrative Support, Student Services	0.00%	0
Other, please specify	19.05%	4
Total	100%	21

How long have you worked at this college? (in years)

Analysis	
Minimum	2.0
Maximum	30.0
Mean	10.3
Count	20

Awarding students credit for their Continuing Education coursework is important because:  
(place items in order of importance)

Item	Ranking of Importance							Total
	1	2	3	4	5	6	7	
Students are more likely to persist in or complete their education	4	12	3	1	0	1	0	21
Students are given a clear pathway for continuing with their career development	12	2	4	3	0	0	0	21
Students receive something of value beyond the skills taught in the course	5	2	4	4	3	0	3	21
Employers have more employees advancing their skills	0	3	4	5	5	3	1	21
Employers have more employees eligible for advancement/ promotions	0	0	3	2	7	6	3	21
The college has more students enrolling in curriculum programs after completing continuing education courses	0	1	1	3	3	8	5	21
The college retains students longer, increasing completion rates and ultimately increasing funding	0	1	2	3	3	3	9	21

## Responses to Final Credit Articulation Survey (continued)

Awarding students credit for their Continuing Education coursework is important because: (place items in order of importance)

Item	Mean
Students are more likely to persist in or complete their education	2.24
Students are given a clear pathway for continuing with their career development	1.90
Students receive something of value beyond the skills taught in the course	3.48
Employers have more employees advancing their skills	4.19
Employers have more employees eligible for advancement promotions	5.19
The college has more students enrolling in curriculum programs after completing continuing education courses	5.48
The college retains students longer, increasing completion rates and ultimately increasing funding	5.52

How confident are you in your understanding of which continuing courses are eligible for credit based on A-B Tech policy and procedure?

Answer	%	Count
Confident	9.52%	2
Somewhat confident	33.33%	7
Not confident	57.14%	12
Total	100%	21

How confident are you in your understanding of the internal stakeholders (faculty/staff) involved in awarding credit for non-credit coursework at A-B Tech?

Answer	%	Count
Confident	14.29%	3
Somewhat confident	61.90%	13
Not confident	23.81%	5
Total	100%	21

## Responses to Final Credit Articulation Survey (continued)

How confident are you in your understanding of current policies related to non-credit to credit articulation or awarding curriculum credit for continuing education coursework at A-B Tech?

Answer	%	Count
Confident	9.52%	2
Somewhat confident	61.90%	13
Not confident	28.57%	6
Total	100%	21

How confident are you in your ability to execute current policies and procedures related to awarding credit for non-credit coursework at A-B Tech?

Answer	%	Count
Confident	19.05%	4
Somewhat confident	33.33%	7
Not confident	47.62%	10
Total	100%	21

What challenges might impact A-B Tech from increasing options for students to earn credit for selected Continuing Education courses? (multiple selections)

Answer	%	Count
General lack of awareness of current policy and procedure	76.47%	26
Aligning coursework takes time and effort	73.53%	25
Evaluating coursework takes time and effort	70.59%	24
Collaborating with new or unknown internal partners	32.35%	11
Absence of a formalized workflow	29.41%	10
Low interest on behalf of internal stakeholders	23.53%	8
No challenges anticipated	5.88%	2
Total	100%	34

How confident are you in the location and policy number of policies related to non-credit to credit articulation or awarding curriculum credit for continuing education coursework at A-B Tech?

Answer	%	Count
Confident	9.52%	2
Somewhat confident	47.62%	10
Not confident	42.86%	9
Total	100%	21



## Appendix F: Continuing Education to Curriculum Credit Pathway Guide

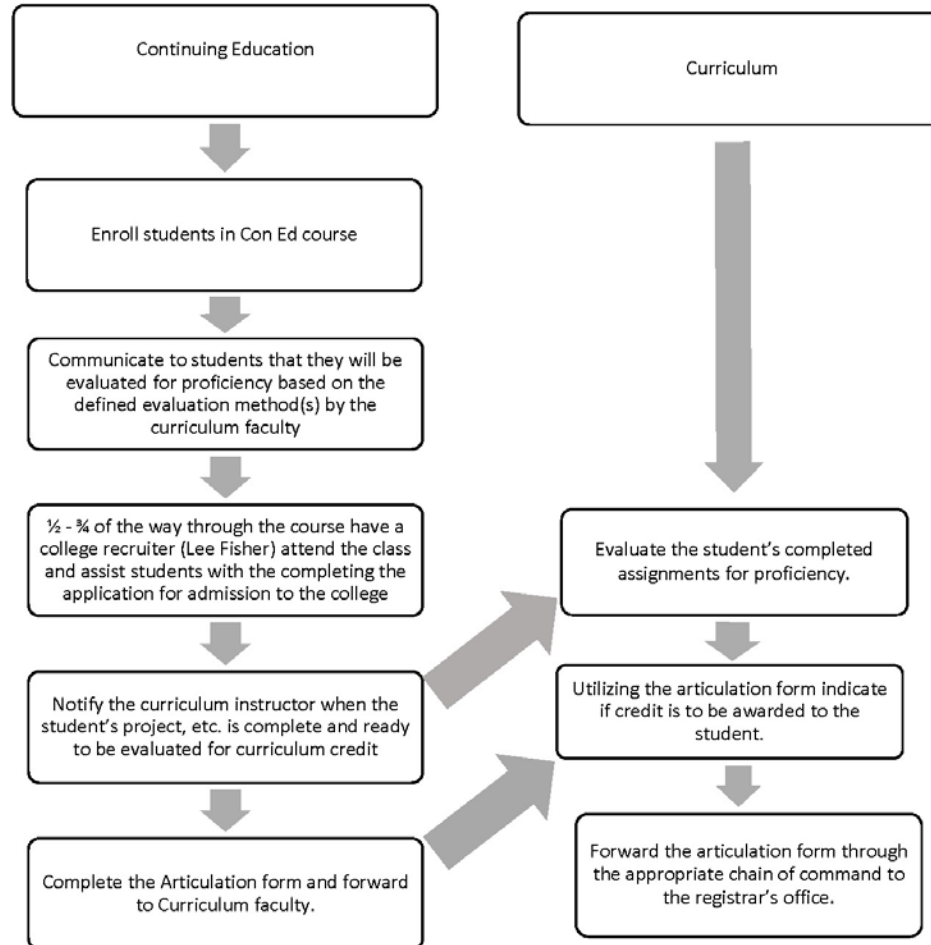
### Continuing Education to Curriculum Credit Pathway

This document is intended to be used as a guide for faculty in both continuing education and curriculum in the awarding of curriculum credit for course work completed through continuing education. This document is a supplement to college policy 802 Awarding of Curriculum Credit.

Step 1: Identification of appropriate continuing education course for which curriculum credit could potentially be awarded by either continuing education or curriculum faculty.

Step2: Determine the amount of curriculum credit to be awarded and the curriculum course for which the credit may be granted.

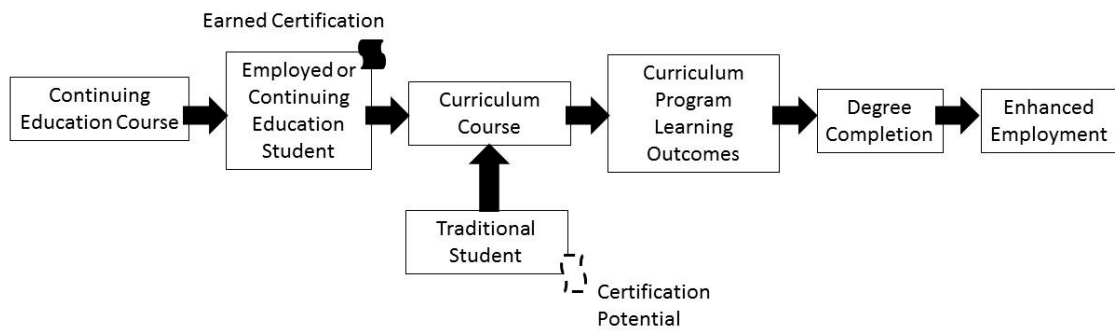
Step 3: Initiate communication between the curriculum faculty, along with their department chairperson, and the continuing education faculty regarding the requirements for awarding credit. Establish student outcomes and evaluation methods for proficiency. Proficiency may be determined through a project grading rubric, portfolio review, final exam, certification testing, or other appropriate evaluation methods.



## Appendix G: Theoretical Framework

### Re-imagining Competencies in the Community College

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*A Theoretical Framework for the Integration of External Certifications into  
Community College Academic Programs*



## **Appendix H: Current Student Perceptions Survey**

The purpose of this anonymous survey is to determine the opinions of current Computer Information Technology students towards competency focused education and industry certifications. The results of this survey will be used to establish a baseline for future surveys regarding student opinions and competency education.

---

1. Listed in the order of importance (#1 being the most important), what certifications should be obtained prior to employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
2. Listed in the order of importance (#1 being the most important), what certifications should be obtained by the end of the first year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
3. Listed in the order of importance (#1 being the most important), what certifications should be obtained by the end of the second year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
4. Listed in the order of importance (#1 being the most important), what certifications should be obtained by the end of the third year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

5. How important are certifications in the technology industry? (Very Important, Somewhat Important, Somewhat Not Important, Very Unimportant, Does not apply, I do not know)
6. As a student, how important are industry certifications to you? (Very Important, Somewhat Important, Somewhat Not Important, Very Unimportant, Does not apply, I do not know)
7. What is your gender? (Female, Male, Other, Choose not to answer)

### **Appendix I: Current Graduate Perceptions Survey**

The purpose of this anonymous survey is to determine the opinions of recent Computer Information Technology graduates towards competency focused education and industry certifications. The results of this survey will be used to establish a baseline for future surveys regarding the opinions of graduates towards competency education.

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1. Listed in the order of importance (#1 being the most important), what certifications should be obtained prior to employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
2. Listed in the order of importance (#1 being the most important), what certifications should be obtained by the end of the first year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
3. Listed in the order of importance (#1 being the most important), what certifications should be obtained by the end of the second year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
4. Listed in the order of importance (#1 being the most important), what certifications should be obtained by the end of the third year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

5. How important are certifications in the technology industry? (Very Important, Somewhat Important, Somewhat Not Important, Very Unimportant, Does not apply, I do not know)
6. As a student, how important are industry certifications to you? (Very Important, Somewhat Important, Somewhat Not Important, Very Unimportant, Does not apply, I do not know)
7. What is your gender? (Female, Male, Other, Choose not to answer)

## **Appendix J: Faculty Perceptions Survey**

The purpose of this anonymous survey is to determine the opinions of community college faculty towards competency focused education and industry certifications. The results of this survey will be used to establish a baseline for future surveys regarding faculty opinions and competency education.

---

### **Across all of your career:**

1. How many years have you worked as an instructor?
2. How many years have you worked as an instructor in higher education?
3. How many years have you worked as an instructor in a community college?
4. How many years have you worked at Nash Community College?
5. How many industry certifications have you earned in your primary subject matter?
6. If you answered more than 0 to the above question, how many of those industry certifications were earned in the past five (5) years?

**Please read the following statements carefully and indicate the answer that best applies to you. (Strongly Agree, Agree, Disagree, Strongly Disagree, Does Not Apply)**

7. Courses should become progressively more difficult as the student progresses towards program completion.
8. I design my upper level courses relying on the student possessing retained knowledge from previous courses.
9. Courses that I do not create rely on the student possessing retained knowledge from previous courses.

**Please read the following statements carefully and indicate the answer that best applies to you. (Always, Often, Seldom, Never, Does Not Apply)**

10. I refer to the learning outcomes of lower level courses when creating upper level courses.
11. When teaching an upper level course, I refer to the learning outcomes of lower level courses to understand what knowledge, skills, or abilities the student should possess.
12. When teaching a lower level course, I refer to the learning outcomes of upper level courses to understand what knowledge, skills, or abilities the student should possess.
13. How important are industry certifications to employers in field in which you primarily teach? (Very Important, Somewhat Important, Somewhat Not Important, Very Unimportant, Does not apply, I do not know)
14. How many of the courses in your primary program of instruction directly address preparation necessary to obtain industry credentials? (1-3, 4-6, 7-10, 11 or more, None, I do not know)
15. What is your gender? (Female, Male, Other, Choose not to answer)
16. What is your primary employee classification? (Full-time Faculty, Part-time Faculty, Full-time Staff, Part-time Staff, Other (Please describe))



### **Appendix K: Human Resources Perceptions Survey**

The purpose of this anonymous survey is to determine the opinions of local employers towards competency focused education and industry certifications. The results of this survey will be used to establish a baseline for future surveys regarding employer opinions and competency education.

---

1. What industry classification would best describe your company?

**Across all of your career:**

2. How many years have you worked in this industry?

3. How many years have you worked at your current company?

4. How many industry certifications have you earned in your primary subject matter?

5. If you answered more than 0 to the above question, how many of those industry certifications were earned in the past five (5) years?

6. Listed in the order of importance (#1 being the most important), what certifications should be obtained prior to employment in this field? (Limit of 10)

7. Listed in the order of importance (#1 being the most important), what certifications should be obtained by the end of the first year of employment in this field? (Limit of 10)

8. Listed in the order of importance (#1 being the most important), what certifications should be obtained by the end of the second year of employment in this field? (Limit of 10)

9. Listed in the order of importance (#1 being the most important), what certifications should be obtained by the end of the third year of employment in this field? (Limit of 10)

10. How important are certifications in your industry? (Very Important, Somewhat Important, Somewhat Not Important, Very Unimportant, Does not apply, I do not know)
11. As an employer, how important are industry certifications to you? (Very Important, Somewhat Important, Somewhat Not Important, Very Unimportant, Does not apply, I do not know)
12. What is your gender? (Female, Male, Other, Choose not to answer)

## Appendix L: Formative Perception Survey Descriptive Analysis

### Responses to Faculty Perceptions Survey

#### Formative Evaluation

How important are industry certifications to employers in field in which you primarily teach?

Answer	%	Count
Very Important	41.18%	7
Somewhat Important	58.82%	10
Somewhat Not Important	0.00%	0
Very Unimportant	0.00%	0
Does not apply	0.00%	0
Total	100%	17

In your opinion, what are the barriers for students taking certification tests?  
Check all that apply.

Answer	%	Count
Cost of the test	76.47%	13
No time to take the test	17.65%	3
Under-prepared to take the test	70.59%	12
Not interested in certifications	41.18%	7
Other	23.53%	4
Total	100%	17

## Responses to Faculty Perceptions Survey (continued)

## Formative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained prior to employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance							Total
	1	2	3	4	5	6	7	
CompTIA A+	4	3	1		1			9
Microsoft Technology Associate (MTA)	1	1	1	1	1	1		6
Microsoft Office Specialist (MOS) (No other detail)	1		2	1			1	5
CompTIA Network+	1		1	1		1		4
CompTIA Security+			2			1	1	4
CompTIA (no other detail)		1	1					2
CompTIA Linux+				1	1			2
IC3 Digital Literacy Certification				1		1		2
Microsoft Certified Solutions Associate (MCSA) Exam 697-1				1	1			2
Project Management Professional (PMP)					1			1
Cisco Certified Entry Networking Technician (CCENT)	1							1
Cisco Certified Network Associate (CCNA)		1						1
Microsoft Cert. Solutions Associate (MCSA) Exam 70-410		1						1
Microsoft Cert. Solutions Associate (MCSA) Exam 70-411			1					1
Microsoft Certified Solutions Expert (MCSE)							1	1
Microsoft Specialist (Windows Desktop OS or Server)	1							1
MOS (Database)			1					1
MOS (Excel)					1			1

## Responses to Faculty Perceptions Survey (continued)

## Formative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the first year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance							Total
	1	2	3	4	5	6	7	
CompTIA A+	2	2						4
Cisco Certified Network Associate (CCNA)	2							2
Cisco Certified Network Professional (CCNP)	1	1						2
Microsoft Office Specialist (MOS) (No other detail)			1				1	2
Microsoft Technology Associate (MTA)	2							2
CompTIA Linux+						1		1
CompTIA Network+			1					1
CompTIA Security+				1				1
Microsoft Certified Solutions Associate (MCSA) (no other detail)					1			1
Microsoft Certified Solutions Associate (MCSA) Exam 697-1		1						1
Microsoft Specialist (Windows Desktop OS or Server)		1						1
MOS (Database)		1						1
MOS (Excel)			1					1
MOS (Word)				1				1

## Responses to Faculty Perceptions Survey (continued)

## Formative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the second year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance							Total
	1	2	3	4	5	6	7	
CompTIA A+		2	1					3
CompTIA Network+			1	1				2
Microsoft Office Specialist (MOS) (No other detail)			1				1	2
Microsoft Technology Associate (MTA)	2							2
MOS (Database)	1	1						2
Cisco Certified Internetwork Expert (CCIE)	1							1
Cisco Certified Network Associate (CCNA)	1							1
CompTIA Linux+					1			1
CompTIA Security+				1				1
Microsoft Certified Professional (MCP)	1							1
Microsoft Cert. Solutions Associate (MCSA) (no other detail)						1		1
Microsoft Cert. Solutions Associate (MCSA) Exam 697-2			1					1
Microsoft Cert. Solutions Associate (MCSA) Exam 70-410	1							1
Microsoft Cert. Solutions Associate (MCSA) Exam 70-411		1						1
Microsoft Certified Solutions Expert (MCSE)	1							1
MOS (Excel)			1					1
MOS (Word)		1						1

## Responses to Faculty Perceptions Survey (continued)

## Formative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the third year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance			Total
	1	2	3	
Cisco Certified Network Professional (CCNP)	2			2
Microsoft Certified Solutions Expert (MCSE)		2		2
Microsoft Technology Associate (MTA)	1	1		2
Amazon Web Services Certification (AWS)	1			1
Certified Information Systems Security Professional (CISSP)			1	1
Cisco Certified Network Associate (CCNA)	1			1
CompTIA A+		1		1
Information Technology Infrastructure Library (ITIL)		1		1
Microsoft Office Specialist (MOS) (No other detail)			1	1
Microsoft Specialist (Windows Desktop OS or Server)	1			1
MOS (Database)		1		1

## Responses to Current Student Perceptions Survey

## Formative Evaluation

How important are certifications in the technology industry?

Answer	%	Count
Very Important	80.00%	24
Somewhat Important	16.67%	5
Somewhat Not Important	0.00%	0
Very Unimportant	0.00%	0
Somewhat Disagree	0.00%	0
Does Not Apply	0.00%	0
I Do Not Know	3.33%	1
Total	100%	30

As a student, how important are industry certifications to you?

Answer	%	Count
Very Important	66.67%	20
Somewhat Important	30.00%	9
Somewhat Not Important	3.33%	1
Very Unimportant	0.00%	0
Somewhat Disagree	0.00%	0
Does Not Apply	0.00%	0
I Do Not Know	0.00%	0
Total	100%	30

What are the barriers to taking certification tests? Check all that apply.

Answer	%	Count
Cost of the test	83.33%	25
No time to take the test	20.00%	6
Underprepared to take the test	30.00%	9
Not interested in certifications	3.33%	1
Other	20.00%	6
Total	100%	30



## Responses to Current Student Perceptions Survey (continued)

## Formative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained prior to employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance						Total
	1	2	3	4	5	6	
CompTIA A+	6	4		1			11
Cisco Certified Network Associate (CCNA)	2	1	1	2			6
CompTIA Network+	1	1	1				3
CompTIA Security+			1		1	1	3
Microsoft Certified Solutions Associate (MCSA)			2	1			3
Microsoft Office Specialist MOS	1				2		3
IC3		1		1			2
Microsoft Certified Technology Specialist (MCTS)		1	1				2
Program Specific (no other detail)			1			1	2
Aaa (no other detail)				1			1
C++ (no other detail)	1						1
Cisco Certified Entry Networking Technician (CCENT)		1					1
Cisco Certified Network Professional (CCNP)			1				1
Cisco Certified Technician (CCT)			1				1
CIT (no other detail)			1				1
CompTIA Cloud+				1			1
CompTIA Linux+				1			1
CompTIA IT Fundamentals	1						1
GIAC Security Essentials					1		1
Linux Essentials					1		1
Microsoft Certified Solutions Expert (MCSE)						1	1
MS Office (no other detail)	1						1
Network (nonspecific)		1					1
OS Specific (no other detail)				1			1
Project Management Professional (PMP)					1		1
Red Hat Certified Engineer (RHCE)	1						1
VMware Certified Associate		1					1
Wireless (no other detail)					1		1
Electronics (no other detail)	1						1

## Responses to Current Student Perceptions Survey (continued)

## Formative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the first year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance					Total
	1	2	3	4		
CompTIA Network +	2	2	1			5
CompTIA A+	2					2
C++	1					1
Cisco Certified Design Associate (CCDA)	1					1
Cisco Certified Network Associate (CCNA)		1				1
CompTIA Cloud+	1					1
CompTIA Linux+		1				1
CompTIA Security+	1					1
Linux Essentials				1		1
Microsoft Certified Solutions Associate (MCSA)			1			1
Microsoft Certified Technology Specialist (MCTS)			1			1
MS Office (no other detail)	1					1
Networking (no other detail)		1				1
VMware Certified Associate		1				1

## Responses to Current Student Perceptions Survey (continued)

## Formative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the second year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance						Total
	1	2	3	4	5	6	
CompTIA A+	1		1		1		3
CompTIA Security+	1	1		1			3
Cisco Certified Network Associate (CCNA) Cloud	1		1				2
Cisco Certified Entry Networking Technician (CCENT)	1						1
Cisco Certified Network Associate (CCNA)		1					1
Cisco Certified Network Associate (CCNA) Collaboration	1						1
CompTIA Network +		1					1
CompTIA Server+	1						1
IC3						1	1
Microsoft Certified Solutions Associate (MCSA)				1			1
Microsoft Certified Technology Specialist (MCTS)			1				1
Microsoft Office Specialist MOS					1		1

## Responses to Current Student Perceptions Survey (continued)

## Formative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the third year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance			
	1	2	3	Total
Cisco Certified Network Associate (CCNA)		1		1
Cisco Certified Network Associate (CCNA) Data Center	1			1
Cisco Certified Network Associate (CCNA) Industrial		1		1
Cisco Certified Network Professional (CCNP)			1	1
CompTIA Linux+			1	1
Microsoft Specialist (no other detail)	1			1
Red Hat Certified Engineer (RHCE)	1			1

## Responses to Recent Graduate Perceptions Survey

How important are certifications in the technology industry?

Answer	%	Answer
Very Important	100%	2
Somewhat Important	0.00%	0
Somewhat Not Important	0.00%	0
Very Unimportant	0.00%	0
Does Not Apply	0.00%	0
I Do Not Know	0.00%	0
Total	100%	2

As a student, how important were industry certifications to you?

Answer	%	Answer
Very Important	100%	2
Somewhat Important	0.00%	0
Somewhat Not Important	0.00%	0
Very Unimportant	0.00%	0
Does Not Apply	0.00%	0
I Do Not Know	0.00%	0
Total	100%	2

In your opinion, what are the barriers for students taking certification tests? Check all that apply.

Answer	%	Answer
Cost of the test	50%	2
No time to take the test	0.00%	0
Underprepared to take the test	25%	1
Not interested in certifications	0.00%	0
Other	25%	1
Total	100%	4

Responses to Recent Graduate Perceptions Survey (continued)

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the second year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance	
	1	Total
CompTIA A+	1	1

No answers were provided to the following questions:

1. Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained prior to employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
2. Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the first year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
3. Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the third year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

## Responses to Employer Perceptions Survey

How important are technology certifications in your industry?

Answer	%	Count
Very Important	0.00%	0
Somewhat Important	100.00%	1
Somewhat Not Important	0.00%	0
Very Unimportant	0.00%	0
Somewhat Disagree	0.00%	0
Does Not Apply	0.00%	0
I Do Not Know	0.00%	0
Total	100%	1

As an employer, how important are industry certifications to you?

Answer	%	Count
Very Important	0.00%	0
Somewhat Important	100.00%	1
Somewhat Not Important	0.00%	0
Very Unimportant	0.00%	0
Somewhat Disagree	0.00%	0
Does Not Apply	0.00%	0
I Do Not Know	0.00%	0
Total	100%	1

No answers were provided to the following questions:

1. Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained prior to employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
2. Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the first year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Responses to Employer Perceptions Survey (continued)

3. Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the second year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)
4. Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the third year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)



**Appendix M: Program Certification Milestones**

# Information Systems – A25590A

## *Program Certification Milestones*

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Upon successful completion of the below courses or course sequences (including prerequisites), students will be prepared to attempt certification or achieve partial requirements towards certification.

<b>Course</b>	<b>Exam or Certification</b>
<b>NOS 130 – Windows Single User</b>	<b>Exam 70-687 Configuring Windows 8.1</b> (Part 1 of 2 required for the Microsoft Certified Solutions Associate - Windows 8 Certification)
<b>DBA 110 – Database Concepts</b>	<b>Microsoft Office Specialist – Access</b>
<b>CTS 130 – Spreadsheets</b>	<b>Microsoft Office Specialist – Excel</b>
<b>DBA 115 – Database Applications</b>	<b>Exam 364 - Microsoft Technology Associate Database Fundamentals</b>
<b>NOS 230 – Windows Administration I</b>	<b>Exam 70-410 Installing and Configuring Windows Server 2012 R2</b> (Part 1 of 3 required for the Microsoft Certified Solutions Associate Windows Server 2012 R2 Certification)
<b>CTS 220 – Advanced Hardware\Software Support</b>	<b>CompTIA A+ Certification</b>
<b>All of the above</b>	<b>Certiport’s Internet and Computing Core Certification (IC3)</b>
<b>Conclusion of first and last term</b>	<b>ACT’s Career Readiness Certification</b>

## Appendix N: Curriculum Sequence

### Curriculum Sequence Checklist

**Program:** Information Technology  
**Concentration:** *Information Systems*  
**Program Code:** A25590A

#### Course and Hour Requirements:

	<u>Prerequisite</u>	<u>Class</u>	<u>Lab</u>	<u>Clin/Exp</u>	<u>Credit</u>
<b>First Semester (Fall)</b>					
ACA 122	College Transfer Success	0	2	0	1
CIS 110	Introduction to Computers	2	2	0	3
CTS 115	Info Sys Business Concept	3	0	0	3
MAT 143	Quantitative Literacy	2	2	0	3
CTI 110	Web, Pgm & DB Foundation	2	3	0	3
ENG 111	Writing and Inquiry	3	0	0	3
					<b>16</b>
<b>Second Semester (Spring)</b>					
CTI 120	Network & Sec Foundation	2	2	0	3
NOS 120	Linux/UNIX Single User	2	2	0	3
NOS 130	Windows Single User	2	2	0	3
WEB 140	Web Development Tools	2	2	0	3
CSC 151	Java Programming	2	3	0	3
					<b>15</b>
<b>Third Semester (Summer)</b>					
DBA 110	Database Concepts	2	3	0	3
HUM 115	Critical Thinking	3	0	0	3
CTS 130	Spreadsheets	2	2	0	3
					<b>9</b>
<b>Fourth Semester (Fall)</b>					
COM 110	Introduction to Communication	3	0	0	3
CTS 120	Hardware/Software Support	2	3	0	3
DBA 115	Database Applications	2	2	0	3
NOS 230	Windows Admin I	2	2	0	3
CTI 141	Cloud & Storage Concepts	1	4	0	3
					<b>15</b>
<b>Fifth Semester (Spring)</b>					
CTS 287	Emerging Technologies	3	0	0	3
CTI 150	Mobile Computing Devices	2	2	0	3
CTS 220	Adv Hard/Software Support	2	3	0	3
CTS 289	System Support Project	1	4	0	3
					<i>&amp; Instructor Permission</i>
PSY 150	General Psychology	3	0	0	3
WBL 111	Work Based Learning I	0	10	0	1
					<b>16</b>
<b>Total Hours for Graduation</b>					<b>71</b>

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### Appendix O: Faculty Summative Perception Survey Descriptive Analysis

How important are industry certifications to employers in field in which you primarily teach?

Answer	%	Count
Very Important	57.14%	4
Somewhat Important	42.86%	3
Somewhat Not Important	0.00%	0
Very Unimportant	0.00%	0
Does not apply	0.00%	0
Total	100%	7

In your opinion, what are the barriers for students taking certification tests?

Check all that apply.

Answer	%	Count
Cost of the test	71.43%	5
No time to take the test	42.86%	3
Under-prepared to take the test	57.14%	4
Not interested in certifications	14.29%	1
Other	0.00%	0
Total	100%	7

## Responses to Faculty Perceptions Survey (continued)

## Summative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained prior to employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance				Total
	1	2	3	4	
CompTIA A+	2				2
Cisco Certified Network Associate (CCNA)				1	1
CompTIA Network+			1		1
Microsoft Office Specialist MOS		2			2
IC3			1		1
Cisco Certified Entry Networking Technician (CCENT)		1			1
Microsoft Technology Associate (MTA)	1				1

## Responses to Faculty Perceptions Survey (continued)

## Summative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the first year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance					Total
	1	2	3	4	5	
CompTIA A+	1	1				2
Microsoft Technology Associate (MTA)		1		1		2
CompTIA Network +			1			1
CompTIA Security+				1		1
Cisco Certified Entry Networking Technician (CCENT)	1					1
Cisco Certified Network Professional (CCNP)	1					1
VMware (no other detail)		1				1

## Responses to Faculty Perceptions Survey (continued)

## Summative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the second year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance						Total
	1	2	3	4	5	6	
CompTIA A+	1	1					2
Microsoft Technology Associate (MTA)		1				1	2
CompTIA Network+			1				1
Cisco Certified Internetwork Expert (CCIE)	1						1
Cisco Certified Network Associate (CCNA)	1						1
CompTIA Linux+					1		1
CompTIA Security+				1			1

## Responses to Faculty Perceptions Survey (continued)

## Summative Evaluation

Listing in the order of importance (#1 being the most important), what certifications, specifically for Computer Information Systems students, should be obtained by the end of the third year of employment in the technology field? If you do not know of any, you may skip this question and move on to the next. (Limit of 10)

Certification Name	Certification Level of Importance			Total
	1	2	3	
CompTIA A+	1			1
Cisco Certified Network Associate (CCNA)	1			1
Microsoft Technology Associate (MTA)		1		1
Microsoft Certified Professional (MCP)			1	1
Microsoft Certified Solutions Expert (MCSE)		1		1

### Appendix P: Student Summative Perception Survey Descriptive Analysis

How important are certifications in the technology industry?

Answer	%	Count
Very Important	100%	3
Somewhat Important	0.00%	3
Somewhat Not Important	0.00%	0
Very Unimportant	0.00%	0
Does not apply	0.00%	0
Total	100%	3

As a student, how important are industry certifications to you?

Answer	%	Count
Very Important	66.67%	2
Somewhat Important	0.00%	0
Somewhat Not Important	33.33%	1
Very Unimportant	0.00%	0
Does not apply	0.00%	0
Total	100%	3

What are the barriers to taking certification tests? Check all that apply.  
Check all that apply.

Answer	%	Count
Cost of the test	66.67%	2
No time to take the test	66.67%	2
Under-prepared to take the test	66.67%	2
Not interested in certifications	0.00%	0
Other	0.00%	0
Total		3



**Artifact: Manuscript for a Practitioner Journal**

## ABSTRACT

RE-IMAGINING COMPETENCIES IN NORTH CAROLINA COMMUNITY COLLEGES:  
INTEGRATING CERTIFICATIONS INTO ACADEMIC PROGRAMS AT TWO  
COMMUNITY COLLEGES

Jonathan S. Vester, Ed.D.

Shelley Y. White, Ed.D.

Once a community college graduate completes an associate's degree, the institution is committing to the public that the graduate possesses a prescriptive set of knowledge, skills, and abilities either gained through, or enhanced by, their college attendance. At most institutions, these skills are assessed almost exclusively through internal measures by the same faculty who delivered the course content. But what if the institution could also provide the student, and their future employer, additional assurance regarding the quality and depth of instruction? In this article, we present two different approaches to increase integration of credentialing into the curriculum programs in the community college. One strategy examines intra-institutional articulation between continuing education and curriculum, while the other advocates integrating external certifications into curriculum programs as a validation of established learning outcomes.

### **Author's Bios**

Jonathan Vester has worked in technology for 20 years, and 18 of those years in higher education. He has held positions ranging from PC Technician to Director of Institutional Research, and has consulted for many institutions as a technology, institutional data, and curriculum design analyst. His current position as Vice President of Technology and Chief Information Officer for Nash Community College provides him opportunities to implement new technologies both inside and outside of the classroom, and to advocate for the thoughtful use of available and emerging data and technology.

Shelley White is Vice President of Economic & Workforce Development / Continuing Education at Asheville-Buncombe Technical Community College and has 16 years of experience in higher education. She started her career as an instructor of employability skills and has since progressed to positions coordinating training and expanding her supervisory role. In her current role, she focuses on building community partnerships and leveraging internal resources to promote student success, community development, and lifelong learning.

Re-Imagining Competencies in North Carolina Community Colleges:  
Integrating Certifications into Academic Programs at Two Community Colleges

**Introduction**

The American community college enjoys a very important place between the education and workforce ecosystems. Because both of these systems are touch points with students, the community college shapes, and is also shaped by, their unique needs and trends. With many community colleges struggling to adopt President Obama's completion agenda in a manner that is realistic and sustainable (O'Banion, 2010), administrators must look for ways to increase the value-added benefits of a community college education and graduate students with employable credentials. Community college academic programs such as nursing, which rely upon competency-based education to validate what students learn, demonstrate how to create close program alignment with the expectations of the workforce upon a student's completion (Klein, 2006; Darling-Hammond, Wilhoit, & Pittenger, 2014). As employers' expectations of specific proficiencies from a graduate increases, community colleges are considering expanding the credential offerings in other curriculums to include intra-institutional articulation policies and micro-credentialing in the form of industry certification as an external validation of program rigor, and to acknowledge the value of non-credit activities (Oliver, 2013; Flynn, 2004). Emphasized in a 2012 study of IT hiring practices, community college students must have a means to differentiate themselves from bachelor's degree credentialed job seekers to obtain jobs in their chosen field (Van Noy & Jacobs, 2012). The inclusion of trade certifications into community college program outcomes requires investigation and resolution of how they will influence program planning, curriculum mapping, recruitment, professional development, and retention (Uchiyama & Radin, 2009).

In this article, we present two different approaches to address increasing the integration of credentialing into curriculum programs at community colleges. The first method takes advantage of the continuing education opportunities available to students before enrolling into curriculum courses. Research and discussion regarding improving intra-institutional understanding of the tangible learning outcomes from continuing education courses are presented by Shelley White to describe how Asheville-Buncombe Technical Community College (A-B Tech) can increase retention and completion in both continuing education and curriculum courses. The first strategy presents a creation of tight linkages between both operational units of the community college to create new career pipelines for students interested in transitioning from specific job training provided by continuing education courses to vocational and technical education curriculum programs.

Conversely, by using external, trade-specific certifications, colleges could validate instruction as state of the industry, and provide students with a marketable credential earned concurrently with their degree. In the second strategy of this article, Jonathan Vester describes how Nash Community College used historical perspectives of competency-based education as an influencer on a proposed variant to the evidence-driven curriculum style. Contemporary perceptions of competency-based education in higher education are described in brief. We also describe research to develop an instrument to inform program planning using student and faculty perceptions as well as explicit employer needs.

### **Improving Non-credit to Credit Articulation at A-B Tech**

Completion rates among students enrolled at community colleges have room for improvement and expectations for increased accountability are high. Community colleges can do more to encourage students' completion of degree, diploma, and certificate programs. One

approach awards credit for prior learning through completion of non-credit occupational skill based courses. Although policies exist at A-B Tech to support the practice of awarding credit for prior learning in non-credit workforce training, this beneficial service has been underutilized. No artifacts, workflow documentation, or practical application of procedures have been created, adopted, or accepted to facilitate the implementation of this policy. A lack of awareness exists on the part of staff, faculty, and students regarding opportunities to provide internal articulation of credit from non-credit coursework. Encouraging students to persist to higher levels of education is important because future wages, job prospects, and upward mobility are improved when individuals have attained any credential, be it a degree, diploma, or certificate (US Census Bureau, 2014). Students have an increased rate of completion when awarded credit for prior learning obtained through non-credit courses (Heyward & Williams, 2015).

#### **Background: Intra-institutional Articulation at A-B Tech**

A-B Tech is a comprehensive two-year educational institution offering diplomas, degrees, certificates, workforce training, customized training for industry and community enrichment courses. A-B Tech is one of 58 community colleges in the North Carolina Community College System (NCCCS) and is the eighth largest community college in the state, serving over 8,000 credit and over 15,000 non-credit students annually (A-B Tech, 2015). Of the 15,000 non-credit students, nearly 10,000 per year complete non-credit, or continuing education, workforce focused training courses (A-B Tech, 2015). Students completing these courses cannot readily or easily receive credit for prior learning when persisting into similar credit-bearing programs at the College. As indicated by the few requests for awarding credit for non-credit workforce training, it could be inferred that few students, faculty and staff at A-B Tech are aware of the existing policy. Students enroll in workforce courses for a variety of reasons including

work requirements, building additional skills for work, personal interest, or training for a career change. Some students view non-credit workforce training as a cautious return to education, when they have not attended school in many years.

Taking non-credit courses is often viewed by students as less intimidating than enrolling in a curriculum program of study and can serve as a bridge for continuation into credit-bearing programs. However, at most community colleges, there is no formal institutional structure to support this transition (Van Noy et al., 2008). While non-credit workforce courses are positive training options, students completing these courses at A-B Tech cannot readily or easily receive credit for prior learning when transitioning into similar credit-bearing programs at the Community College. Current policies at A-B Tech allow the awarding of credit for non-credit or continuing education programming. A-B Tech Policy 802, Awarding of Curriculum Credit, states, "Curriculum credit may also be awarded based upon proficiency testing or other academic analyses of competencies" (2012). Continuing education classes leading to a credential or certification may be considered for course equivalency, with approval from the department chair (A-B Tech, 2014). Although a policy and a procedure have existed for many years at A-B Tech allowing the awarding of credit, no artifacts, workflow documentation, or practical application of procedures have been created, adopted, or accepted to facilitate the implementation of this policy. A lack of awareness regarding the policy exists on behalf of the students, staff, and faculty at A-B Tech.

Persistence, the progression of students to the completion of a program, is a vital concern for community college retention. Students involved in non-credit training are engaged in continued learning by completing short-term workforce courses, but are inconsistently shown pathways to persist in further education. If these courses are redesigned to seamlessly transition

students into credit-bearing programs with credit for the prior non-credit courses, students may be more likely to persist through the completion of the degree, diploma, or certificate.

Previously, no coordinated efforts existed to address the issue of improving non-credit to credit articulation at A-B Tech. Individual examples of students seeking credit for continuing education courses have been reported by the Student Services division; however, these instances are addressed on a case-by-case basis with no central coordination or documentation to capture the credit on the student's record at the time earned. Although policies are in place at the Community College to support the practice of awarding credit for prior learning, there appears to be lack of awareness toward pursuing more of these practices to benefit students. Businesses sponsoring students are frequently interested in whether the non-credit workforce training completed by their employees could lead to community college credit as a step toward earning a degree, certificate or diploma.

### **Review of Literature**

Nearly 90% of all education and training offered in the United States is non-credit; yet colleges typically focus on credit-bearing programs as more significant (Flynn, 2001). Leading national education and training organizations, such as the American Association of Community Colleges (AACC) and the National Council of Continuing Education and Training (NCCET) outline goals for community colleges to prioritize non-credit credentialing; yet this credentialing often remains undervalued and overlooked (Van Noy, Jacobs, Korey, Bailey & Hughes, 2008). Community college dean and popular higher education blogger, Matt Reid (2014), acknowledges articulating credit is a complex but important issue for community colleges to consider. Ganzglass, Bird & Prince (2011) express the need for colleges to allow the adults participating in necessary occupational education to receive credit for non-credit training.

Engaging students in learning pathways designed to progressively build job skills through stackable credentials is critical. The US Census Bureau (2014) reports lifetime earning potential is much higher for students earning a degree beyond high school. Job prospects and future upward mobility are also improved when individuals have attained any level of credential, be it a degree, diploma or certificate. By having more pathways to receiving credit for non-credit educational experiences, students have more flexibility in their education, higher earning potential, a better outlook in the job market, and return to the workforce faster.

By aligning existing policy while implementing proven best practices, students at A-B Tech will have more opportunities to receive credit for their non-credit course work. As these processes are implemented and awareness is increased for students, faculty and staff, the number of students transitioning from non-credit to credit programs through internal articulation will increase. As a result, the students' likelihood of completing their certificate, degree, or diploma is expected to increase.

## **Methodology**

### **Intervention Design**

The first problem of practice addressed in this improvement plan is the absence of a practical workflow to assist students with the awarding of credit for non-credit coursework, potentially due to a lack of awareness on the part of faculty and staff regarding the existing policy at A-B Tech. That is, staff and faculty in both divisions have not been encouraged to align program development between credit and non-credit courses to encourage utilization of the policy. An intervention is necessary to identify and address barriers, establish a practical workflow based on the existing policy, and increase awareness among faculty and staff, the primary stakeholders who will implement the policy on behalf of students.



A-B Tech should clearly articulate and better advertise the new procedure in order to establish a defined pathway for students interested in seeking credit for their completed non-credit programming. A more detailed and structured workflow will be incorporated for targeted programming that meets the policy criteria. Benefits to this approach include increasing the number of students successfully transitioning from non-credit to credit programs, while intentionally developing the selected pathways offered to students. The intervention involves the review of a 330-contact hour continuing education course, Machining Fundamentals, and counterpart courses within the curriculum (credit) division of Engineering and Applied Technology. A delegation of stakeholders representing both credit and non-credit programming serve as the implementation team and reviewed the Machining Fundamentals course to determine appropriate courses and credit hours to be awarded in the curriculum program of study. This implementation team oversaw the development of a rubric to be used to evaluate students' skill levels at the end of the Machining Fundamentals course and helped create and review approval forms to allow formal documentation of the credit awarded to appear on the students' transcripts. A survey to gauge awareness of the existing policy and confidence administering the policy was administered during and after the intervention. The survey was administered to a broad group of non-credit and credit faculty and staff to assess changing awareness and confidence as a result of the increased activity surrounding non-credit to credit articulation at A-B Tech.

Heyward & Williams (2015) studied adult learner completion rates and examined the existence of a relationship between prior learning method and graduation. The researchers tested the statistical significance of differences in graduation rates between adults who received credit for prior learning and those who did not in four U.S. community colleges, tested the statistical

significance of differences in graduation rates by method, and examined the relationship between adult graduation and method. Adult learners who received credit for prior learning graduated at 2.4 times the rate of those who did not receive credit for prior learning (28.4% to 11.8%) overall (Heyward & Williams, 2015).

Klein-Collins (2011) used data from a 2010 Council for Adult and Experiential Learning (CAEL) report on a multi-institutional study of prior learning assessment and adult student outcomes. The author examined data from 62,475 adult students at 48 colleges and universities, following the students' academic progress over the course of seven years. The data from the 48 postsecondary institutions in this study show that students with prior learning credit had better academic outcomes, particularly in terms of graduation rates and persistence than other adult students. Many students who received credit for prior learning also shortened the time required to earn a degree, depending on the number of credits earned. The positive findings for low-income, black non-Hispanic and Hispanic students suggest that awarding college credit for significant life learning could be an effective way to accelerate degree completion, while lowering the cost, for underserved student populations (Klein-Collins, 2011).

### **Intervention Rationale and Implementation Team**

The Community College and the communities it serves gain numerous benefits to having pathways between credit and non-credit courses. Students, who are the primary beneficiaries of this intervention, are now aware of training pathways from non-credit to credit programs of study in machining. Over time, more students will take advantage of these training pathways and more students will earn credits for these activities. Staff in both continuing education and curriculum programs benefit by having an established and adopted process for transitioning credit. The Community College benefits from increased enrollment due to more students persisting from

non-credit to credit workforce training options. Finally, employers benefit by having employees (students) engaged in progressive learning environments and earning credit toward a degree, addressing the mid-skills employment gap (Holzer & Lerman, 2009).

By focusing on the internal stakeholders (employees, staff, faculty) first, an agreed upon method, process, and workflow was established, reducing the stress on students to navigate through a maze of approvals, forms, and bureaucracy. By aligning existing policy while implementing proven best practices, students at A-B Tech have more opportunities to receive credit for their non-credit course work. As these processes are implemented, the number of students transitioning from non-credit to credit programs through internal articulation will increase as more pathways are identified.

### **Implementation Plan**

The implementation design is embedded mixed methods to explore (1) the level of awareness of internal stakeholders of non-credit articulation pathways, (2) the partnership activities of internal stakeholders, and (3) the number of students engaging in non-credit to credit articulation. This non-experimental exercise engaged in action research, as improvement cycles were implemented and reviewed with a pilot workflow to create non-credit to credit pathways. Target populations are internal and external stakeholders engaged in various activities surrounding the review of non-credit to credit articulation. Because this intervention involved very small populations (less than 10 in each stakeholder area), ethical considerations were made regarding the confidentiality of data collection. Due to the small numbers, developing a smaller subset was not practical. The goal was to collect data from every stakeholder involved in the process.

## **Data Collection and Implementation Timeline**

Data were collected at various points during the intervention. A survey was administered to ascertain internal stakeholders' level of awareness with non-credit to credit articulation policies and procedures at A-B Tech. This survey utilized a nominal scale, collecting demographic data, prioritization of items related to the issue, and engaged a self-efficacy scale to explore attitudes and understanding of policies and procedures related to the awarding of curriculum credit.

As the implementation team developed, reviewed and adjusted a new, shared workflow, the survey was re-administered to determine if the creation of a new workflow had increased awareness and confidence in the policy and procedure. Data were also collected on the number of students participating in training, receiving evaluation and credit, completing the curriculum application and choosing to transition from the non-credit Machining Fundamentals course to credit bearing courses in a curriculum program of study. I expected awareness and confidence in the existing policy and procedure to increase over the duration of the study among the faculty and staff in both curriculum and continuing education programs.

The intervention occurred over three, roughly 90-day cycles and involved the review of a 330-contact hour continuing education course, Machining Fundamentals, and counterpart courses within the curriculum (credit) division of Engineering and Applied Technology. The implementation team reviewed the Machining Fundamentals course and determined appropriate courses and credit hours to be awarded from the curriculum program of study. The curriculum members of the team supervised the development of a rubric to be used to evaluate students' skill levels at the end of the Machining Fundamentals course and helped create and review approval forms to allow formal documentation of the credit awarded to appear on the students' transcripts.

A survey to gauge awareness of the existing policy and confidence administering the policy was administered to a broad group of non-credit and credit faculty and staff to assess changing awareness and confidence as a result of the increased activity surrounding non-credit to credit articulation at A-B Tech. Planning occurred prior to the first 90-day cycle and included preliminary data collection from 30 staff and faculty in both credit and non-credit areas that established the topic of non-credit articulation as a viable concern.

During the intervention, one continuing education course, Machining Fundamentals, was evaluated for credit in the spring of 2016. A form to document departmental approval and awarding of credit was tested during the course and reviewed for improvement following the completion of each course. Students self-selected participation in the CE to CU transfer option; evaluation matrix and rubric were tested during spring course, reviewed for improvement, and re-evaluated during the summer 2016 and fall 2016 courses. Deliverables of the intervention included a learning assessment rubric for the Machining Fundamentals course and the evaluation of up to three curriculum program options for students completing Machining Fundamentals with up to eight curriculum credits awarded. In addition, deliverables of the improvement plan included the creation of a formalized approval and notification workflow for awarding credit for non-credit coursework and a procedure that can be applied to any program of study for evaluation of internal credit articulation.

Currently, survey data confirm a lack of awareness on behalf of both continuing education and curriculum staff and faculty. Based on the policy, curriculum department chairs are the primary stakeholders outside of continuing education and need to be fully engaged in order to implement the policy of awarding credit for non-credit coursework.

An environment exists at A-B Tech where the practice is allowed; however, lack of awareness and the absence of a process framework limit implementation. By raising awareness with stakeholders and creating a sound process based on best practices and continuous improvement, systematically awarding credit for non-credit workforce education at A-B Tech can become an integral part of program offerings. Non-credit to credit articulation can be improved at A-B Tech by an intentional evaluation of stakeholder understanding of the relevant policies and procedures, increasing awareness, and establishing collaborative work teams to create a new workflow to ease student access to these services.

Influenced by the Carnegie 90-day cycle framework, there were several phases of data collection. The following timeline lists the major events of the project.

*Fall 2015*

Pre-intervention survey to faculty and staff

Pre-intervention interview and focus group with selected staff

Pre-work with implementation team

Review of policy, discussion of pre-intervention survey results, selection of  
Machining Fundamentals as focus of intervention

*March 2016 – Cycle 1 Began*

Implementation team:

Reviews Machining Fundamentals course equivalents in curriculum

Develops shared rubric to assess student learning

Spring 2016 Machining Fundamentals course begins

*April-May 2016*

Implementation team developed draft approval form to formalize new workflow

Summer 2016 Machining Fundamentals course begins

*June 2016 – Cycle 1 Ends*

Machining Fundamentals students in Spring 2016 course evaluated

Spring 2016 Machining Fundamentals course ends

Data collected on student outcomes from Spring 2016 students

Discuss outcomes and strategies for improvement of new workflow

*July 2016 – Cycle 2 Begins*

Implement changes to new workflow for Summer 2016 students

Addition of Student Services representative visit to the course

Machining Fundamentals students in Summer 2016 course evaluated

*August 2016*

Fall 2016 Machining Fundamentals course begins

*September 2016 – Cycle 2 Ends*

Data collected on student outcomes from Summer 2016 students

Discuss outcomes and strategies for improvement of new workflow

*October 2016 – Cycle 3 Begins*

Survey distributed to Faculty & Staff

New strategies implemented for improvement of workflow for Fall 2016

*December 2016 – Cycle 3 Ends*

Fall 2016 Machining Fundamentals course ends

Distribute final survey to faculty & staff

Collect data on student outcomes & review survey data

During Cycle 1 the shared rubric was developed by the curriculum faculty and reviewed

by the continuing education instructors. The rubric outlines class projects in Machining Fundamentals mapped to corresponding curriculum courses and the level to which those projects must be completed in order for credit to be awarded. The implementation team discussed the communication to be shared with the students enrolled in the first class regarding the option to have projects reviewed for possible credit should those projects meet the standards defined in the rubric. During Cycle 1, seven students were enrolled in Machining Fundamentals and only one student chose to have his project work evaluated for credit. This student did not complete the projects to the required standards in order to be awarded credit.

Following the completion of the first course, the implementation team met again to review the progress of the first class. The rubric was found to be an effective tool against which the continuing education instructors could pre-screen students prior to recommendation for review of the curriculum faculty. Concern was expressed regarding the number of students interested in participating in the evaluation process. It was discussed that students enrolling in a short-term workforce training program, such as Machining Fundamentals, likely had an immediate job as a goal, rather than the completion of a degree or diploma. In order to increase the number of students potentially participating in the evaluation process, a decision was made for the division Dean and a member of the Student Services recruitment team to visit the students of the second class. The Dean visited at approximately the 75% mark of the second cohort of students. He shared information regarding programs of study that would be good options for students wishing to continue their studies beyond the short-term training course and reiterated the option to seek credit for their time spent in the course. During the last week of class, a recruiter from the Student Services division visited the course to provide an in-class option for students to make application to the College. Three students took advantage of this opportunity



and the same three had their projects evaluated by curriculum faculty prior to the end of class. All three students performed at the level to receive credit for MAC 141.

Following completion of the second course, the implementation team met again to review the process and progress since the first two cohorts of students. There appeared to be confusion among the team as to the documentation flow that would close the loop for the students to be awarded credit from the second cohort. Based on the current forms, the process needed to originate from the student following their project evaluation to the continuing education instructor before being submitted to the curriculum program for review. This process was reiterated with the team and extra steps were taken to ensure that the three students from the second cohort had been awarded proper credit for MAC 141. A workflow chart was developed by the department chair to document the communication, review, and approval flow to map out the entire process. There was agreement that the addition of the Student Services recruiter helped to encourage and streamline the application process for the students and motivate them to push forward to have their projects reviewed for credit. It was also discussed that all students should have projects evaluated for credit, regardless of their current interest in pursuing additional education. One of the concerns expressed through this process is the nature of short-term workforce education. Because students are primarily interested in obtaining immediate employment following the completion of the course, the awarding of credit for future use should be built-in as a part of the course, rather than an option. Students then would have the credit available on their record at a time in the future where they may be interested in seeking a higher credential or further education for a promotion or raise.

For the third cohort of students, the Student Services recruiter visited at approximately the 75% mark in order for the students to have more time to prepare their final projects for

review by the curriculum faculty. Rather than being heavily communicated as an option, students were told about internal articulation, and encouraged to participate in the final review by striving to complete projects at this level. Following the additional communication, one student pursued the awarding of credit and completion of the approval form.

Table 1 depicts student outcomes including the number of students enrolled in each cohort, students assessed, students awarded credit, college application status, and future enrollment status.

Table 1.

*Machining Fundamentals Student Outcomes from 2016*

Cohort	Enrolled	Assessed	Awarded Credit	CU Application	CU Enrollment
1	7	1	0	0	0
2	6	3	3	3	0
3	10	1	1	1	1
Total	23	5	4	4	1

## Analysis

### Survey Results

The faculty and staff survey prompted respondents to rate their understanding and confidence level with internal articulation at A-B Tech. The survey was sent to all faculty and staff in Continuing Education and to all faculty and staff in career and technical education divisions including Allied Health, Business & Hospitality, Emergency Services, and Engineering & Applied Technology. In all, there were 44 respondents in the initial survey representing faculty and staff from all areas. The median length of service at A-B Tech for respondents was

9.5 years. Following an update on the activities of the Machining Fundamentals internal articulation project, policy review, and workflow documentation, the survey was sent a second time to determine if awareness and confidence levels had changed.

In the initial survey, respondents ranked student centered statements as the most important reasons for engaging in additional activities to increase internal articulation at A-B Tech. Statements such as “Students are more likely to persist in their education” and “Students are given a clear pathway for continuing with their career development” were ranked higher than statements that were employer or college centered, such as “Employers have more employees advancing their skills” and “The college retains students longer, increasing completion rates and ultimately increasing funding.”

Forty-four percent of initial respondents indicated they were not confident in their understanding of the policies and procedures that guide internal articulation at A-B Tech. Similarly, over 61% were unfamiliar with the location of the policy, over 66% were unclear on what coursework qualifies for internal articulation, and over 55% were unsure of their ability to execute such a policy. Respondents indicated the top challenges of implementing internal articulation to be 1) general lack of awareness of the current policy and procedure, 2) aligning coursework takes time and effort, and 3) evaluating coursework takes time and effort. Concerns regarding interest levels of stakeholders and forming new internal partnerships were ranked lower.

Following an update to faculty and staff on the activities of the Machining Fundamentals internal articulation project, confidence levels improved. Twenty-nine percent of final respondents indicated they were not confident in their understanding of the policies and procedures that guide internal articulation at A-B Tech, an improvement from 44% initially.

Similarly, only 43% were unfamiliar with the location of the policy, 33% were unclear on what coursework qualifies for internal articulation, and 48% were unsure of their ability to execute such a policy.

## **Limitations**

### **Optional vs. Required**

A theme that emerged through all cohorts of students and many discussions of the implementation team was the nature of the internal articulation; should it be a requirement, a built-in expectation of the course outcomes or was this option something students could decide to pursue if they chose? After two cohorts where the communication to students was heavily crafted as an optional activity, the shift began toward making the evaluation for credit a built-in expectation of the course. Students enrolling in the short-term, workforce development course for strictly immediate employment may not value the credit at this time, but in the future, the credit becomes much more valuable when they are seeking additional training, perhaps due to a promotion or raise opportunity.

### **Procedure Finalization**

The process of developing a formalized procedure and forms to aid the awarding of credit for non-credit coursework has undergone multiple iterations and continues to evolve. After two cycles of students, the department chair developed a workflow documenting the process developed through the pilot course offerings, focusing on portfolio or project review as the primary means of evaluation. As a result of a broader discussion on integrating internal articulation at the College, a cross-functional team involved in A-B Tech's Executive Leadership Institute also developed a draft workflow that incorporated options for evaluation in addition to portfolio or project review. The two versions are currently being reviewed for the possibility of

their being combined into one document that will be included as a reference attached to the official procedure for awarding credit.

### **Additional Instances of Internal Articulation**

During this process, I have learned that the Student Services division receives requests for internal articulation on an occasional basis. While requests do fall within the scope of the current policy, no documentation exists on the student's record until the time of the request and it is the responsibility of the student to ask. This lack of documentation does not work in the student's favor because it potentially hinders the student from receiving credit as it requires maintaining documentation in each department rather than having the credit appear on the student's permanent record with the Community College.

### **Recommendations**

During this process, additional areas for internal articulation review have been identified, both within and outside of the division involved in the intervention. These conversations have evolved naturally as a result of increased communication and awareness surrounding this topic. The process of integrating internal articulation at A-B Tech is moving forward following the work over the past year with the Machining Fundamentals course. An effort to broaden the courses participating in internal articulation is the next step. Work will continue on improving communication to students, streamlining the process of documentation, and increasing overall institutional awareness of this opportunity.

### **Identifying a Need for Curriculum Change at Nash Community College**

At Nash Community College, a semi-rural community college in eastern North Carolina, the majority of for-credit curriculums are general in their approach to preparing students for industry certifications. Most programs in the Community College's catalog do not explicitly

prepare the student for external credentials such as trade or job-specific certifications (Nash Community College, 2015). Such broad application of the subject matter can lead to completing students being less marketable upon graduation. In this section, we outline how one community college determined which specific programmatic changes within the Computer Information Technologies (CIT) degree program should be made to integrate external certifications into the curriculum.

### **Background: Framing of the Problem**

Community college vocational and technical degree programs rarely address the competitive advantage graduates might have if their college degree was supplemented by external certifications. Historically, Nash Community College has abstained from addressing this issue within the programs of study because faculty perceive obtaining external certifications as the responsibility of the student, and therefore direct alignments of courses or programs to certifications has not been a priority. If programs or courses were better aligned for certification obtainment, students would be more marketable, the program could validate its content as being relevant and current, and faculty could benefit from extra professional development as the program bridged the skills gap to meet this challenge.

As the sixth-ranked state in economic growth and with over 254,000 employees in technology occupations (Abernathy, 2015) there is great potential for North Carolina's technology students who possess degrees coupled with industry credentials. Nash's misalignment of program-level outcomes with the expressed need of the local workforce (Lee, 2015), absence of any substantial data collection regarding certification of graduates, and the various trends in the recent higher education ecosystem creates a problem of practice for Nash Community College.

Building competencies into a program of study has been a challenge for community college administrators because of the breadth of knowledge students possess before coming to the classroom. There is a challenge in determining what the student already knows, and what the community college experience imbued upon them. For example, many think of the modern community college student, and in particular the traditional-aged student, as inherently possessing technical competencies, or being digitally native. Several recent studies challenge this perception of the digital native student. One study of faculty reported students directly out of high school lack the ability to navigate a menu-driven website that contained their course content for hybrid or completely online courses, which is counter-intuitive to many commonly held conceptions of the digitally native student (Smith, 2012). Another contributor to this belief is that for several decades, college students have been overestimating their ability to use the personal computer (Grant, Malloy, & Murphy, 2009), and this opinion has sustained the notion of preparedness in technology-dependent courses. With courses directly addressing the competencies students need for success, as well as providing external validation of this learning, colleges can bridge the digital native skill set with the digital workplace.

A long-standing practice in higher education is the use of prerequisite courses to introduce or reinforce knowledge or skills needed in subsequent courses. Although there have been some studies finding little evidence prerequisites lead to improved performance in targeted courses (Abou-Sayf, 2008; Marcal & Roberts, 2000) prerequisite courses can allow for measured introduction of material that can gradually be mastered. Acknowledging the spectrum of students attending a community college, any prerequisite course would need to be (1) well structured, (2) focused on delivering instruction in a non-threatening manner, and (3) taught by faculty who understand the social implications of CIT students not possessing basic digital

literacy skills. In their study of suburban university students, Lin, Shih, and Lu (2013) found little gender differences in digital literacy skills, but males were more likely to use technology outside of the classroom. Studies such as these highlight the need for colleges to be aware of the multiple influences on student performance in courses addressing computer competencies.

### **Review of Literature**

To create explicit connections between workplace skills and the classroom, many colleges and universities have implemented competency-based education (CBE) academic programs with varied levels of success (Wesselink, de Jong, & Biemans, 2010; Gruppen, Mangrulkar, & Kolars, 2012; Hill, 2012). For example, Schneider and Yin (2012) found successful CBE programs cut dropout rates by half, and have helped Florida's Valencia College achieve a 40% graduation rate. Historically, one of the major benefits of CBE is the student's ability to convert experiential learning events to course credits that count toward graduation--tightening the link between mastery of a skill and completion of a degree (Leggett, 2015). However, for Southern Association of Colleges and Schools Commission on Colleges (SACSCOC) colleges like Nash Community College, there is an administrative barrier to the institution offering CBE as a strategic solution to the skills gap in the form of accreditation procedures. SACSCOC requires a college to submit a prospectus for every program offering the institution considers competency-based (SACSCOC, 2013). This prospectus process also requires the college to pay \$500 per program reviewed. The reason for this level of scrutiny by the accreditors is as a result of how a full competency-based education program fundamentally changes how an institution awards and processes course credits.



## **Causes and Costs of the Problem**

Curriculum planning that acknowledges the importance of trade and industry certification demonstrates the institutional commitment to local stakeholders and student success after graduation, while simultaneously supporting faculty control over academic rigor. When programs of study can demonstrate relevance to the working world, students have a greater tendency to persist to graduation (Woods, 2015). With competition for high paying entry-level jobs in the wide-ranging industries such as the technology or electrical engineering sectors, Nash Community College has an obligation to prepare program completers for success before they enter the workforce.

Changing an entire curriculum to align with external evaluations will take a substantial commitment from the institution. A significant hurdle to overcome will be developing program competencies due to the difficulty in conceptualizing and executing the changes. Course content and overall learning outcomes have many influencers with varied expectations of the program graduates (Epstein & Hundert, 2002). Program planning and course redesign may come at a financial cost and/or in the form of faculty release time. Successful program redesigns rely on active collaboration with community stakeholders including the employers who will eventually receive the community college graduates as employees (Woods, 2015). Among the requirements of any change effort to an academic program, considerations must be made for the faculty who will directly interact with the content and students. In their study, Rosser and Townsend (2006) found ignoring the faculty perspective can lead to disenfranchisement, and ultimately cost the institution talented instructors.

Like many change efforts, transitioning an institution from a traditional, passive learning model to a fully engaged design, such as one that employs competency-based education (CBE),

is extremely challenging and complex (Alonso, Manrique, Martinez, & Viñes, 2011; Hensel & Stanley, 2014; Uchiyama & Radin, 2009). College leaders responsible for change, faced with balancing all of the current burdens of the institution with the unknown impact of CBE, must be considerate of all stakeholder needs and expectations ranging from the student to the employer (Weick, 1976; Sharma, 2009). At the core of a competency-centric change effort is the task of defining what the institution perceives as the final goal. To comply with this model, courses must be redesigned with the complete student experience in clear focus, encouraging faculty to consider all material as an essential piece of an inter-woven learning matrix. A benefit to this arrangement is the faculty are vested in the success of the implementation and sustainability of the changes. By promoting engagement at the institutional level, college leaders can see higher job satisfaction from faculty, leading to improved retention of faculty who are not change adverse (Rosser & Townsend, 2006).

Not only do faculty benefit from acknowledgment of their efforts, so do students (Wallar & Papadopoulos, 2015). In their study of a group of health sciences students who were partnered with professionals with similar disciplinary interests, the researchers found students had a deeper understanding of the material and the overall connections between the course learning outcomes when those outcomes were explicitly defined. The authors suggested the applied competencies taught in the courses gave the students a foundation to communicate with their in-field professional. With clear learning objectives, the students were also more engaged in the experience because they knew what they should be learning (Wallar & Papadopoulos, 2015). The need for clear learning outcomes and objectives is echoed in David and Lewis's (2014) study of embedded competencies. The researchers concluded that unless explicitly

directed, students are likely to omit content from artifacts demonstrating competencies that are latticed within the curriculum.

### **Organizational Challenges to Change**

Nash Community College strives to embrace the ideas around innovation and cross-departmental collaboration. However, where high-risk or mandated projects are concerned, community college leadership prefer a top-down approach to decision making, solution design, and execution (Bolman & Deal, 2003). The “machine bureaucracy” (Bolman & Deal, 2003, p. 80) serves as an efficient model to distribute new policies or legislated directives without regard for employees or students who might be adversely influenced post-implementation. It is in this closed bureaucratic system that administrators can distance themselves from humanistic implications and focus primarily on the task completion (Bolman & Deal, 2003).

Because of its dual structure, change, or information that could inform change, travels through the organization slowly and diminishes Nash’s overall agility. When innovation channels are blocked by the organizational structure, individuals furthest from the decision making process have little time to react before improvement is expected by those enacting the change (Goldstein, Hazy, & Lichtenstein, 2010). Nash’s dual structure allows miscommunication to occur when employees hesitate to act while processing the directive. The employees must also decide whether or not this particular initiative is expecting change and action to come from the bottom, or if a prescriptive plan of action is forthcoming from upper administrative levels. This type of organizational dynamic can lead to either initiative cohesiveness or initiative entropy, wherein the complexity of the system can contribute to it being sustained or to its degradation (Zuchowski, 2012).

Structurally, the information and change channels of many organizations, including those of Nash Community College, resemble the shape of a tension spring, commonly referred to as a Slinky. Using high speed photography, Cross & Wheatland (2012) recorded the delay in movement of the different parts of the Slinky upon the release of the top-most section. It would appear to the observer of this phenomenon that the bottom of the Slinky hovers in mid-air long after the moment the top is released. To describe the physical change, “the collapse of tension in the slinky occurs from the top down, and a finite time is required for a wavefront to propagate down the Slinky communicating the release of the top” (Cross & Wheatland, 2012, p. 2).

Parallels can be observed in the manner information about the drop state of a Slinky is transmitted down the coil (Cross & Wheatland, 2012) and information is transferred from the top to the bottom of the institution, and vice versa. The capacity to react, appropriate organizational structure, and time needed to communicate change operate as factors influencing the institutional wavefront, just as the coils of the spring influence the Slinky. The Slinky analogy is key to understanding the institution as a dynamically coupled knowledge network. The dynamically coupled knowledge network is a new organizational theory informed by Goldstein, Hazy, and Lichtenstein’s (2010) work on complexity theory, and developed through our improvement process. Organization structure, culture, and capacity also share similarities with other physical properties important to the wavefront in that the length of time information takes to travel down the coil is directly related to the size of the coil, the tightness of the turns, and the elasticity of the material (Cross & Wheatland, 2012; Holmes, Borum, Moore, Plaut, & Dillard, 2014). Authentic and sustainable change will not happen instantly, just as the whole of the Slinky does not fall through space as one cohesive, rigid object. The desired state and acknowledgement of successes must be malleable and accept adjustments as various parts of the institution undergo

the iterative Plan, Do, Study, Act (PDSA) cycles (Langley, Moen, Nolan, Nolan, Norman, & Provost, 2009).

To meet the expressed need of local employers and advisory groups, as well as student expectations to be prepared for gainful employment upon graduation (Nielsen, 2015), it is imperative that the institution take advantage of every opportunity to improve its curriculums (Albashiry, Voogt, & Pieters, 2015; Nielsen, 2015). While unforeseen at the outset of this study or the conceptualization of competency-validated education, there is now specific external pressure to reevaluate how NCC acknowledges the importance of third-party credentials to students and employers. To be in compliance with the mandate given by the North Carolina Community College System, NCC must make explicit integrations of external certifications into the Information Technology Curriculum Standard by the fall semester of 2017 (NCCCS, n.d.).

Nash's desired state is an institution-wide culture that welcomes the critical appraisal of how well existing academic programs align with externally recognized competencies and certifications. Additionally, the critical appraisal will serve as a catalyst to the inclusion of external validations as a means to continuously improve (Austin & Claassen, 2008). This cultural shift will require Nash to make accommodations for change and accept the fundamental principles of change theory that establishes it as iterative, reflective, and inevitable (Johnson & Kruse, 2009).

### **Introduction and Integration of Competency-validated Education**

Using a non-experimental design, I implemented an evidence-based, action research plan to change a curriculum program of Nash Community College. Evaluation of best practices and emerging trends regarding the integration of external credentials in program outcomes informed the change plan. Specifically, the following problem of practice was addressed: Nash

Community College needed to strengthen the curriculum, focus on employer concerns regarding workforce preparedness, and improve retention and graduation rates of the Computer Information Technology degree program. Our intervention consisted of incorporating the industry or third-party certifications as an embedded evaluation of program efficacy and micro-credentialing of student achievement. The intervention was implemented using the varying perceptions of value given to third-party credentialing among employers, community college students, and faculty. While competency-based education programs are well established in higher education, and there are many best practice models to choose from, our intervention presented an opportunity to develop a new method of program design that fits Nash Community College's specific needs: competency-validated education. Competency-validated education (CVE) is an academic planning model that acknowledges the importance of workplace competencies in academic planning, the benefits of applied constructivist theory, and the best classroom practices of CBE (Al-Huneidi & Schreurs, 2012). Similarly titled, competency-validated education is significantly different from competency-based education. SACSCOC defines competency-based education as "outcome-based and assesses a student's attainment of competencies as the sole means of determining whether the student earns a degree or a credential" (SACSCOC, 2013, p. 1).

Competency-validated education uses specific, measurable achievements such as third-party certifications, standardized tests, or any other assessment method that accurately blends institutional requirements and workforce standards to assure alignment or "validation" of the program learning outcomes and course progression with employment preparedness after graduation. Competency-validated education is a new educational planning model created through our improvement plan. Because of its newness, there may be some challenges from

accrediting agencies confusing CVE with competency-based education (CBE). By choosing CVE as the method of program improvement, it will be imperative that Nash demonstrate its legitimacy using artifacts such as clear documentation of the program-level learning outcomes, program validation criteria, assessment data, and evidence of program and student success.

### **Methodology**

In its mission statement, Nash Community College states that it creates an “educational environment which prepares students for successful college transfer and rewarding careers” (Nash Community College, 2015). However, NCC is currently without any policy describing how it performs this task or attempts to collect data to support the claim. This omission signaled the need for further research and a course of action that would establish explicit links between instruction and employment preparedness. The only significant data on external certification obtainment by North Carolina Community Colleges come from the annual Performance Measures of Student Success report published by the North Carolina Community College System Office (NCCCS). The Performance Measures for Student Success report limits the data on certification achievement to first time test takers in primarily health science and public safety fields, which are only a fraction of the program offerings at Nash Community College (North Carolina Community College System, 2014).

Along with the institutional need to continually evaluate and improve the academic offerings, the College has a responsibility to the community to prepare graduates for successful careers. To ignore, or to at least not investigate for action, a possible gap in what Nash perceives are the proper knowledge, skills, or abilities one needs to have sustained employment is socially unjust and irresponsible to both the student and the communities that we service. The core of Nash’s problem of practice was a misalignment of program-level outcomes with the expressed

need of the local workforce, and a lack of data regarding certification of graduates. Without an understanding of how well graduates are prepared for the workforce, NCC is unable to effect appropriate changes to academic programs. It was not until the 2015 annual program review of the CIT curriculum that the inclusion of external credentials occurred in program planning discussions. During this meeting, attended by the program faculty and several local industry leaders, committee members stated a rising need for graduates to have skills beyond the degree to not only make them more attractive in a shrinking job market, but also to better prepare them for a wider range of job duties (N. Floyd, personal communication, October 19, 2016).

### **Implementation Plan**

To determine if the institution successfully addressed the problem of practice and the essential research questions, data were gathered in two phases. The survey data generated in this intervention was based on an embedded mixed methods approach (Creswell, 2011), and establishment of a grounded theory for data comparison (Corbin & Strauss, 1990) was formed through descriptive statistical analysis (Creswell, 2011). The theoretical framework guiding this improvement plan considered the incoming curriculum student as having the potential to achieve external credentials while still enrolled at the NCC. Through the student's completion of courses containing the certification validation points, the overall curriculum is strengthened, and the student is better prepared for gainful employment.

### **Data Collection**

The Carnegie 90-day cycle framework (Langley et al., 2009) influenced the several phases of implementation. The groups chosen for data collection were (1) currently enrolled Computer Information Technology Associate in Applied Science (CIT-AAS) students, (2) recent CIT-AAS graduates, (3) current full and part-time faculty in the NCC CIT department, and (4)



local employers identified through their association with the Carolinas Gateway Partnership, a regional workforce and economic development board. The operational definition of recent graduates used in this improvement plan is any Nash Community College Computer Information Technology Associate of Applied Science alumni who graduated during or after May of 2016. Based upon their relevance to the overall implementation and improvement process, the groups were surveyed at various points during the semester.

To establish pre-intervention similarities and differences in external certificate opinions, data collection was performed at the beginning of the fall 2016 semester for all of the participant groups. The surveys were administered electronically to all participants via an email invitation. The surveys posed questions essential to making informed decisions about possible programmatic changes. A group of trained evaluators validated all of the survey instruments.

The results of the surveys were used to foster discussion amongst the Implementation Team during the planning phase, and was later used with the summative evaluations to check for any improvements in the respondents' ability to identify relevant certifications. Further review of the survey instruments and participant selection process will take place as the College expands the integration of CVE into other programs. By continuously refining the instrument, these same surveys can be used as data sources for future program reviews and as a means to gauge improvements resulting from the use of CVE.

The participant groups listed, in order of ranked importance, up to 10 third-party certifications they thought were most important for CIT majors to obtain before, directly after, and before the end of their third year of employment. Ranking certifications aided in the prioritization of certification training within the program of study and established if there were misgivings in any respondent group regarding realistic goals for certifications resulting from

participation in the CIT-AAS curriculum. The certification ranking was also useful in determining the feasibility and scope of the embedded validations for program planning.

### **Analysis**

The results of this intervention are separated into three distinct parts, formative, intervention strategy, and summative. The results from the formative survey were used to construct the intervention strategy that was later evaluated with the summative survey. This methodology was chosen as an application of a PDSA cycle wherein understanding of the environment needing change is established, an intervention occurs and is then evaluated, and finally corrections are made to the intervention based on observations of the data (Langley et al., 2009).

### **Formative evaluation results**

The formative surveys allowed the participants to provide their opinions on how important third-party certifications are to both themselves and to the career field of information technology. Respondents were also prompted to provide a rated list of the most relevant technology certifications for students prior to graduation, and then during the first three years of employment. The results of these formative surveys indicate current students, recent graduates, and faculty have some general agreement that certifications are important for successful employment, but hold different views on what are the most important certifications to obtain during, and after, they complete their degree. The exception to this inference is the CompTIA A+ certification, a widely recognized certification required for most entry-level computer support positions. When asked to rate which certifications were important for a student to obtain prior to employment in the technology field, the CompTIA A+ certification was listed as the most important by 42% of the 47 student and faculty respondents.

The formative data collected from the CIT alumni and employer groups did not yield as much substantive data as anticipated. Only two of the three (66%) CIT graduates and two of the 18 (11%) employers responded to the survey request. The original employer pool of 48 was unobtainable through the Carolina's Gateway Partnership due to missing or outdated email addresses and contact information.

### **Intervention strategy and results**

During the fall 2016 semester, development and implementation of modifications to the course content took place to change the misaligned perceptions at the academic program and student level. The Implementation Team met several times to review the survey data and come to a consensus on how the topic of certifications should be introduced to their classes in both seated and online sections, specifically to courses being taught in the fall 2016 and the spring 2017 terms. Specifically, the team held ongoing conversations around the preliminary survey data, presented ideas on possible classroom discussions or events focused on certifications, continued the deliberation on what courses constitute exam readiness, explored funding options, and looked at opportunities in the upcoming spring semester for ways to increase awareness to have students sit for certifications.

Once the Implementation Team created a plan for fall 2016 and spring 2017, the first two semesters impacted by the study, they then assumed the task of mapping the curriculum to the most realistically obtainable certifications. Because of the unique structure of the community college, students who attend these institutions need flexible, and sometimes disjointed, paths to completion (Laanan, 2003). As opposed to their peers in traditional university programs, community college students rarely have an opportunity or desire to take courses in a lock-step cohort (Maher, 2005). The nontraditional course completion behavior observed in both the

literature and through local experience led the Implementation Team to the conclusion that the creation of a linear certification pathway would not be a viable solution. In team discussions it was determined that providing the students with a preparation checklist, or Program Certification Milestones document, would be a more appropriate tool for communicating the efforts toward certificate attainment. A certification obtainment document was also created that aligned with the standardized curriculum sequence document; however, this document was primarily used for informational purposes within the Implementation Team meetings.

A major discussion point among the members of the Implementation Team was the ways that the curriculum had been modified to address the integration of CVE. The CIT-AAS program courses taught in the fall of 2016 contained elements of CVE in several ways. The courses directly related to third-party certifications used textbooks explicitly designed to prepare the student for specific exams, often published by the test vendor. The majority of textbooks for CIT courses come bundled with access to online materials, including certification test preparation. Many CIT courses require the use of the online labs for simulation and assessment of the knowledge, skills, and abilities contained in the course learning outcomes. By using the online tools, the students are provided with professionally produced supplemental materials for their graded coursework while concurrently exposing them to a close facsimile of the actual exam. Nash proactively addressed the exam access barriers to certifications by becoming a Certiport testing center in 2013 (N. Floyd, personal communication, November 21, 2016). Students interested in taking any of the Microsoft, Certiport, or ACT tests can do so without leaving the campus.

Increasing the use of online content and textbooks by the exam publisher was not the only strategy devised to increase student preparedness and eventual certification

obtainment. Upon reviewing the survey data and taking into consideration the comments of the CIT Advisory Committee, the Implementation Team successfully petitioned the CIT department chair for the addition of a reflection assignment to each course containing certification outcomes beginning in the spring of 2017. During the 2017-2018 academic planning cycle, the CVE-influenced course learning outcomes and information regarding exams relevant to the course will appear on the syllabus.

Resulting from the planning and preliminary environmental scanning needed for this intervention, Nash also took action at an institutional level to demonstrate its commitment to CVE. At the direction of the President, all academic transcripts printed after the spring of 2016 contain a section for certifications and other institutional awards. By providing the student a single, official document to communicate their academic and external competencies, the College aims to improve the students' employability and bolster the institution's standing with the community as a value-added partner.

### **Summative Evaluation**

The summative evaluation took place at the conclusion of the fall 2016 semester. A survey was issued to the current students and CIT faculty to determine if the embedded course content regarding external certifications and competencies improved their knowledge of certifications. While there were multiple attempts to promote participation by both groups, there was limited response to the survey requests. The faculty response rate was 54% (n=7) and there was only a six percent response rate for currently enrolled students (n=3). The only data of note was that the faculty responding to the summative survey showed continued high regard for the CompTIA A+ certification as being important to the CIT program graduate. None of the student participants listed any certifications in their responses.

Without substantial data to perform a full statistical analysis, a mathematical comparison of the formative and summative survey results of the students was not possible. However, 100% of the responding students still indicated an opinion that certifications are important to the technology industry. Of those responding, 67% also maintained their opinion of how important certifications are to the technology career field.

### **Limitations**

A limitation to demonstrate the success of this intervention was the time needed for students to benefit from the changes to the program, and then attempt certification. Changes to the program will be observed outside of the initial 90-day PDSA cycle (Langley et al., 2009) due to student attendance behaviors, required course progressions, and other factors outside of the control or influence of the College. With many community college students taking courses beyond the traditional two-year period, gathering conclusive evidence of the benefits of CVE will extend several years (Laanan, 2003; Hodara & Jaggars, 2014).

Additionally, one of the first observations made by the Implementation Team regarding the survey data was the lack of responses from the students, employers, and even some CIT faculty. The group eventually agreed that the most likely reason for the suboptimal participation was survey apathy common to the use of email-delivered instruments (Porter, Whitcomb, & Weitzer, 2004; Leeuw, 2012; Rush, Adamack, Gordon, Lilly, & Janke, 2013). Questionnaires inundate students from various campus groups, faculty planners, and college-wide initiatives. Due to the volume of competing requests for the students' time outside of class and homework, the electronic invitation may have been ignored. According to Farley Phillips, the Associate Dean of Institutional Effectiveness, the normal response rate for NCC's students is 35%, regardless of the survey type (F. Phillips, personal communication, December 15,

2016). Employers, while expressing interest in the quality of prospective employees in program advisory meetings (S. Yates, personal communication, October 26, 2016), have similar demands of their time that contributed to the limited response to survey requests. Abraham, Helms, and Presser (2009) provided an interesting perspective on survey taking as a form of volunteerism with reduced social pressure to respond due to the anonymity of the online survey. The authors additionally echoed Knack's (1992) notion that potential respondents will opt out of altruistically giving their time to a cause that offers no personal benefit. While CVE offers a benefit to all surveyed groups, there was insufficient incentive to participate or ask clarifying questions. Despite the fact that the response rate for the students was inadequate to make any comparison with the formative group, lower response rates did provide information useful in compiling the future recommendations related to the intervention.

### **Recommendations**

To foster more understanding about the importance of certifications, the CIT Department Chair has asked the CIT faculty to engage their students at least once a semester in a discussion or class event focused on external certifications and the application of CVE. This interaction, aided through the Program Certification Milestones document, will be to highlight how the program of study prepares students for credentials beyond their community college degree.

To counter the influence survey apathy may have had on early data collection, students should be given more of a direct notice of the survey being conducted, or the survey should be given at a time in the semester with the least likely chance to be disregarded due to other surveys or college-wide assessments. To gain more employer participation, a wider group should be used through organizations such as the Chamber of Commerce, Rotary, and other economic development boards. While most if not all of the businesses associated with the Carolinas

Gateway Partnership are also associated with these groups, having multiple paths to their inbox may increase the likelihood of their participation.

To prepare for the time when CVE is embedded in all curriculums, the College must address the concerns expressed by the student and faculty groups. According to the formative and summative surveys of faculty and students, the major barriers to certification obtainment are the cost and preparation for the exams. The College has addressed preparation through the aforementioned curriculum changes, and the Implementation Team developed viable recommendations to overcome the cost problem.

The Carl D. Perkins Career and Technical Education Improvement Act of 2006, or Perkins Act, which is the contemporary name given to the Carl D. Perkins Vocational and Applied Technology Education Act of 1990, sets specific guidelines for the use of federal funds to promote vocational and technical education in community colleges across the country (Carl D. Perkins Career & Technical Education Act, 2006). The Perkins Act serves as a financial resource for community colleges to establish, enhance, or sustain curriculum programs that directly lead to gainful employment. Perkins Act funds are limited to vocational and technical programs, effectively excluding their use for college transfer or continuing education operations (Lakes, 2007). The majority of programs impacted by the integration of CVE are vocational and technical associate in applied science degrees, allowing these students access to Perkins Act funds to cover some or all of the cost to test.

Another local option for supplementing or otherwise offsetting the costs associated with external certifications is through the establishment of a student fee in accordance with the North Carolina Community College code 1E SBCCC 700.6 (North Carolina Community College System, 2014). The establishment of a student fee would create a dedicated financial resource



for payment of exams. Curriculum students would pay into the fund regardless of completion or intent to take the certification tests. The Implementation Team agreed that the financial investment of a fee by the student might create motivation to take the exams.

A final implementation issue to overcome will be the lack of patience on the part of the College. The administrators of NCC were very excited when the idea of a new CBE influenced method of program planning to aid in student success after graduation was first proposed. In the time leading up to the implementation of this intervention, there had been much discussion about the topic and some work on mapping courses to external competencies has already begun in other programs of study. To apply the Slinky theory, there can be a significant delay between the activation of the initiative and observation of results.

While this improvement initiative has been aided on the periphery by other college improvement initiatives, the chosen methodologies for those activities do not necessarily coincide with those recommended within this plan. It is conceivable that there will be some resistance from faculty who want to continue with their own methods rather than be a part of this effort. Demonstrating the research behind the proposed changes and predictions on the benefits should alleviate most faculty resistance. In their 2009 study of employers, students, and faculty, Wesselink, de Jong, and Biemans (2010) found competency-based education to be a vital part of a successful and meaningful vocational-technical education. However, the authors did find inconsistencies in the employers' expectations of the college to prepare students for specific job tasks. Establishing an understanding of how to create feasible outcomes and timelines will better prepare program faculty and administrators during the redesign of the curriculums.

## Conclusion

At many institutions, workforce development and curriculum initiatives are considered mutually exclusive. As described above and demonstrated using our theoretical framework, these two functions of the community college are not only similar, but can operate symbiotically to assure student success. Serving as an entryway into the community college, workforce development programs give students familiarity with the overall operations of higher education while providing a tangible credential instantly applicable to their career. Through intra-institutional articulation, that credential becomes a head start to completing a curriculum degree, acknowledging the students' prior achievements and shortening their time returning to the workforce. For those students taking the traditional curriculum degree route, certifications like those earned externally or in workforce development courses serve as incremental learning validation events on the path to completion.

By directly applying student, faculty, and employer feedback into the curriculums of both Asheville-Buncombe Technical College and Nash Community College, the institutions affirm the importance of all local stakeholders. The use of multi-phase research plans allows both community colleges a means to verify any changes to the programs that had a positive impact and to adjust where needed. While these action research activities were for the scale of just two programs at each location, the structures are replicable with the potential to change how both institutions gauge student success before and after degree completion. Improving credentialing options for students in both credit and non-credit programs addresses issues across the continuum of higher education, and allows for multiple opportunities to demonstrate workforce preparedness regardless of which program the student completes.

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