WAKE TECH®
COMMUNITY COLLEGE

Problem-Solving
With an Emphasis on Communication

A Quality Enhancement Plan

Submitted to Members of the Reaffirmation Committee of the
Southern Association of Colleges and Schools – Commission on Colleges
by
Wake Technical Community College
Dr. Scott Ralls, College President
August 19, 2024

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August 16, 2024

Dear Members of the Reaffirmation Committee of the Southern Association of Colleges and Schools Commission on Colleges (SACSCOC):

I am proud to transmit our newest Quality Enhancement Plan (QEP) as part of our 2025 decennial reaffirmation. Developed by a faculty-led process, "*Solve It, Say It!*" represents Wake Tech's dedication to the continuous improvement of student learning in fulfillment of our mission to provide equitable access to education that transforms lives through economic mobility and personal fulfillment.

Just a few weeks ago, I participated on a panel before the North Carolina State Board of Community Colleges with other North Carolina community college presidents as well as executives from two of North Carolina's fastest-growing technology companies. The Chair of the State Board put a question to the two executives, "What is the number one area where our community college graduates are lacking in the skills they need for your companies?" Without hesitation, one of the executives clearly proclaimed, "problem-solving skills."

Her response is consistent with the conclusion of a broad-based and representative group of Wake Tech faculty, staff, students, our Board of Trustees, and other area employers. Rapid changes in workforce needs, including proficiency with automation and artificial intelligence, will require our students to develop innovative solutions to future problems in their careers. However, while problem-solving skills are clearly some of the top skills employers value most, our research suggests students lack confidence and struggle in demonstrating them. By strengthening their problem-solving skills, students will be able to "ladder up" in a workforce that will increasingly demand resilience, creativity, and adaptability.

"*Solve It, Say It!*" aims to improve the ability of our students to solve and communicate complex problems. While problem-solving is not an easy area of learning to address, I agree with the faculty who developed it: It is the right area of learning to improve at the right time. This QEP is not only vital to improving our students' learning at Wake Tech but is also important to their upward mobility in their chosen careers. To ensure success, we have committed significant human and financial resources to implement and complete the plan.

We appreciate the time and talent you are lending us in your review of the "*Solve It, Say It!*" QEP. We look forward to discussing it with you during our on-site visit in October 2024.

Respectfully,

R. Scott Ralls, Ph.D., President
Wake Technical Community College

EXECUTIVE SUMMARY

Wake Technical Community College (Wake Tech) will fulfill the strategies prescribed in its *Reach 'n Rally Strategic Plan* by implementing a Quality Enhancement Plan (QEP) focused on improving students' problem-solving skills. A faculty discovery team arrived at this topic by reviewing data, collaborating with peers, departments, and divisions, and researching literature to discover an area of learning most in need of improvement. A faculty survey ranking four proposed topics led to *Problem-Solving with an Emphasis on Communication* as the area of learning that most needed to be addressed. The data showed a significant portion of general education courses that directly assess learning outcomes aligned with problem-solving did not meet the standards, and courses where problem-solving is taught did not meet performance targets for all demographic groups. Problem-solving is one of the top skills sought by employers in Wake County (Lightcast, 2024; Wake County Economic Development, 2024), and surveys of Wake Tech students (CCCSE, Spring 2022), graduates (Wake Tech, 2023), and employers (Wake Tech, 2023b) indicate we could do better at teaching problem-solving.

The faculty-led development team then reviewed the literature, defined, and refined the topic and created a problem-solving process that emphasized the importance of communication, leading to our QEP title: *Solve It, Say It! Problem-Solving With an Emphasis on Communication.* The literature showed that the most effective way to improve problem-solving skill is to teach a process and to provide the students with an opportunity to apply what they have learned (Stice, 2007). Accordingly, the team developed strategies that will enhance, extend, and accentuate the faculty's ability to teach a standardized problem-solving process to help students learn and apply problem-solving skills and develop solutions. Well-defined terms and student-friendly language will also help students learn the problem-solving in welcoming learning environments that reach across racial, ethnic, gender and ability differences. The application of the problem-solving process will be incentivized by providing students with a means of sharing their newly gained problem-solving competencies through a digital badging program.

The aim of this QEP is to accomplish the following summative outcomes:

1. Students will demonstrate the problem-solving process in their courses through graded learning assignments/assessments.
    a. Target: 75% of students will demonstrate the problem-solving process through graded learning assignments/assessments by Spring 2030.
2. Students' problem-solving skills will improve because of their education at Wake Tech.
    a. Target: 75% of students will indicate that their level of proficiency in problem-solving strongly improved by Spring 2030.
3. Employers will indicate that Wake Tech students are able to implement problem-solving skills in jobs and careers.
    a. Target: 3.75 overall mean (between Very Good and Outstanding) for items in the Problem-Solving and Decision--Making category as indicated by Wake Tech employers by Spring 2030.

INTRODUCTION

As a publicly funded two-year college with a mission to provide equitable access to education that transforms lives through economic mobility and personal fulfillment. Wake Technical Community College (Wake Tech) has an open-door admissions policy and a strategic plan focusing the college on reaching students in every part of Wake County and rallying around them to go as far as their dreams, talents, and resilience take them.

Wake Tech is the largest of the 58 community colleges in North Carolina, serving more than 31,000 for-credit students in degree programs and 35,000 non-degree students each year. The student body in degree programs is diverse: 54% female, 51% students of color and 57% aged 18-24. A majority of degree students (64%) attended part-time and 22% were living in low economic health zones of Wake County during fall 2023.

Degree students can enroll in more than 250 associate degree, diploma, and certificate programs. In fall 2023, 48% of degree students were enrolled in University Transfer programs (Associate in Arts, Associate in Fine Arts, Associate in Science, Associate in Engineering, Associate in Arts/Science in Teacher Preparation) and 50% were enrolled in Associate in Applied Science programs (Career Programs). Depending on their programs, students take courses on the college's main campus and/or eight off-campus instructional sites, including high school students dually enrolled in two college and career academies. During fall 2023, 75% of students took at least one online course.

In support of its mission and strategic plan, Wake Tech's Quality Enhancement Plan (QEP) will focus on 1) improving students' problem-solving skills and 2) supporting faculty and staff in building problem-solving exercises and guidance into their courses and services. Students, faculty, and staff will have the opportunity to earn competency-based recognition for their efforts through a digital badging program.

THE TOPIC

To identify the area of learning in need of improvement at Wake Tech, a faculty-led QEP-Discovery Steering Committee (Appendix A) and a QEP-Development Steering Committee (Appendix B) reviewed Reach 'n Rally data as well as other data, engaged colleagues, researched QEPs at other institutions, and reviewed literature. The following sections document how the area of learning for improvement was identified and developed and makes a case as to why it is important to our students' academic and professional success.

Topic Identified Through Institutional Planning

Wake Tech's Reach 'n Rally strategic plan includes the creation of our next QEP as part of our comprehensive planning and evaluation processes. The QEP will directly address our Learning Goal, which is to ensure that "Students gain the knowledge, skills, and abilities they need for the labor market and transfer" (WTCC, 2022, p.23) and will focus on improving several strategic objectives identified during the planning process:

Table 1. Strategic objectives associated with Learning Goal and QEP

Strategic Objective	Baseline		Target	Details/Rationale
Improve Program Learning Outcomes	73%		75%	In accordance with SACSCOC principles, we should be meeting a majority of our learning outcomes among all demographic groups,
Improve overall course success rates in each modality	Seated	73%	75%	
	Blended	76%	75%	
	Hybrid	70%	75%	

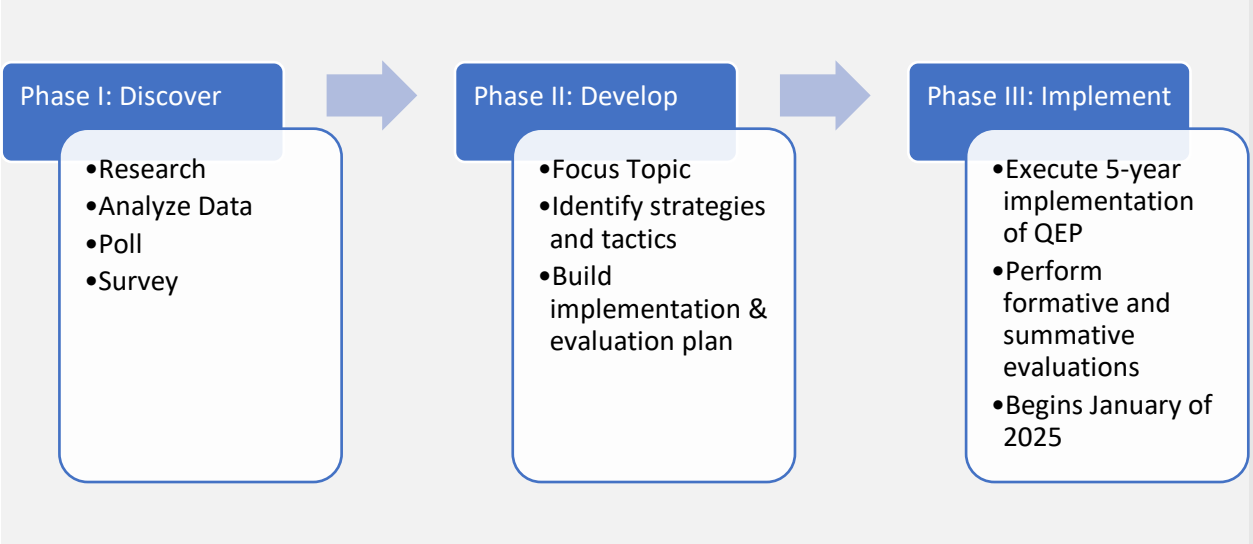
Close equity gaps in course success rates	Online	69%	75%	and each demographic group should be progressing through our courses to successful completion.
	BL	59%	75%	
	HIS	72%	75%	
	WH	76%	75%	

The QEP is one of three strategies aimed at fulfilling the Learning Goal and its related strategic objectives. The QEP strategy states: "Through a faculty-led process, identify an area of learning for improvement for the college's next QEP, a requirement for SACSCOC[1] reaffirmation in 2025" (WTCC, 2022a, p.24).

Topic Identified Using a Representative Process

Wake Tech used a three-phase approach to discover, develop, then implement the next Quality Enhancement Plan (Figure 1) through an ongoing, comprehensive planning and evaluation process that engaged a wide range of faculty, staff, and students.

Figure 1. Phases of the QEP



The first phase identified the topic of the next QEP. The second phase narrowed the focus, identified outcomes, and built the implementation and evaluation plan. The plan will be implemented in the third phase.

Phase I –Topic Identification

1. **September – November 2022:** Faculty interest forms and materials were sent to faculty and Q&A sessions were held for faculty and staff at their department and division meetings.
2. **November 2022**: All faculty were invited to an all-day Reach 'n Rally Annual Faculty Rally. The rally was focused on celebrating what has been accomplished in the strategic plan, reviewing Reach and Rally strategic planning data, and using those reviews to begin to identify topics for the next QEP. During the Faculty Rally, the faculty worked together in small groups and

[1] Southern Association of Colleges and Schools Commission on Colleges

submitted 25 ideas. Of these ideas, four focused on problem-solving/quantitative literacy as an area to explore and one centered on communication skills.

3. **December 2022 – February 2023**: the QEP faculty chair and faculty deputy were hired, and the QEP-Discovery Steering Committee was formed (See Appendix A and B).

The QEP-Discovery Steering Committee formed during Phase I consisted of faculty representing a majority of the academic divisions across the college (Appendix A). The steering committee members were charged with reviewing the input from the Faculty Rally, reviewing data and research from Wake Tech's planning and evaluation processes, collecting ideas from their peers, collaborating with the department heads, associate department heads and program managers/directors, and ultimately identifying an area of learning that would have the largest impact on our students' ability to climb the ladder of economic opportunity and mobility.

Over ten weeks, the QEP-Discovery Steering Committee received input from their faculty peers and reviewed relevant data and research. As a result, four topics emerged, and four white papers were written by the committee to present the data and reasoning why each topic should be the focus of our next QEP. The four papers were distributed via a survey to 798 full-time faculty members (both for-credit degree faculty and non-degree faculty), department heads, associate department heads and managers/directors, and academic deans. The survey encouraged faculty to seek input from their students, and was also made available to part-time faculty, staff members, and students. The survey asked for the papers to be ranked based on the evidence presented and gave each participant the opportunity to add their comments and/or additional evidence or provide their own topic and evidence to support it.

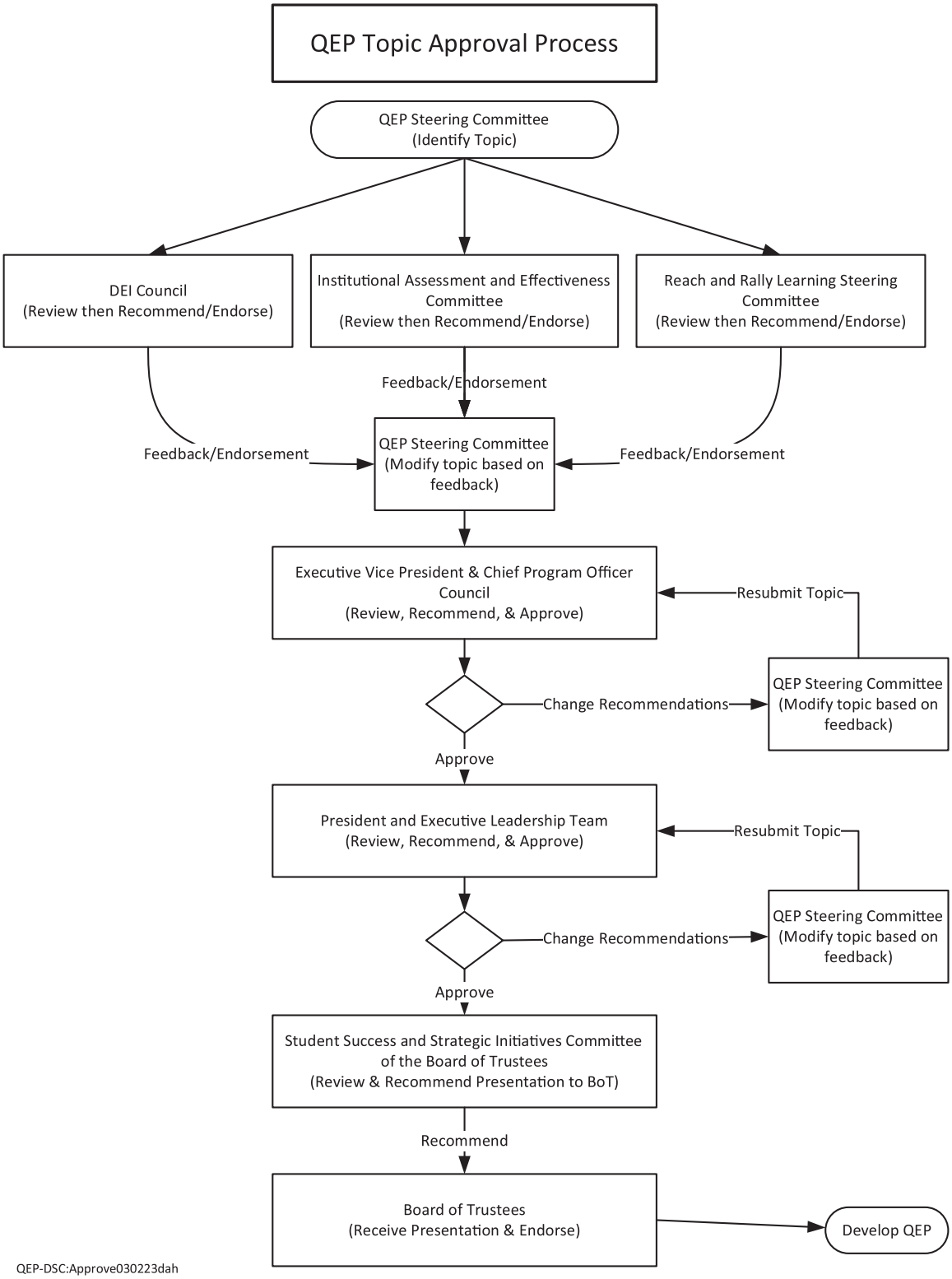
Table 2 provides the results of the survey. It shows the order of the ranking and input gathered from the 242 respondents, which indicated "Problem-Solving", and "Communication" were top ranked areas of learning that need to improve at Wake Tech.

Table 2. Topic survey results.

Topics for Ranking	Number of #1 Rankings	Number of #2 Rankings	Number of #3 Rankings	Number of #4 Rankings	**Total Votes**
Problem-Solving with an Emphasis on Communication	92	77	51	21	**242**
Problem-Solving	51	81	66	44	**242**
Effective Communication	62	57	105	18	**242**
Global Competency	37	26	20	159	**242**
Total Votes	**242**	**242**	**242**	**242**	

Problem-Solving with an Emphasis on Communication was well received through each step of the topic approval process (see Figure 2 below). Recommendations that strengthened the proposal were included at each step. After updating supporting arguments with data from the 2022-23 General Education Report and benefits to our students, the QEP Topic Proposal moved from the Executive Vice President of Programs Council to Dr. Ralls and the Executive Leadership Team (ELT). On July 24th, 2023, the President and ELT approved the topic to move on to the Student Success and Strategic Initiatives (SSSI) sub-committee of the Board of Trustees. After some clarifying questions and a recommendation for the presentation, the SSSI recommended the topic to the Board of Trustees for approval. On August 15th, 2023, the Board of Trustees approved the proposed topic (Wake Tech Board of Trustees, 2023, p.27).

Figure 2. QEP Topic Approval Process



Topic Identified Based on Institutional Needs

The QEP-Discovery Steering committee reviewed a variety of learning and labor market data that led to the selection of *Problem-Solving with an Emphasis on Communication*, summarized below.

Learning Data

Direct Measures: Problem-Solving Assessed in General Education Courses:

One source of evidence for college-wide areas of learning is provided in the 2022-2023 General Education Assessment Report (Madsen & Porch, 2023). Because Wake Tech's core competencies "Effective Communication" and "Problem-Solving" were measured in General Education courses required across all Wake Tech associate degree programs, assessments from these courses provide a reliable way to gauge the extent to which students are learning these competencies in the General Education core of all associate-level programs.

As shown in Table 3, 69 to 2,325 students were assessed for their proficiency in the problem-solving competency in 22 General Education courses. Half of those courses - 11 out of 22 across all programs - did not meet proficiency of at least 70% in 2021 and 10 out of 22 did not meet proficiency of at least 70% in 2022.

Table 3. Percentage of assessed General Education courses meeting "Problem-Solving" core competency target (70%).

COURSE	TOTAL ENROLLED SEATS IN FA21	TOTAL AVERAGE PROFICIENCY RATE in FA21	TOTAL ENROLLED SEATS IN FA22	TOTAL AVERAGE PROFICIENCY RATE IN FA22
ACA-122	1784	MEASURE DEEMED UNRELIABLE	2303	**69.0%**
ECO-151	287	83.0%	322	82.0%
ECO-251	988	73.6%	865	89.2%
ECO-252	474	89.8%	425	88.6%
HIS-131	560	85.0%	668	85.3%
HUM-115	790	76.3%	848	80.5%
BIO-161	162	**31.7%**	113	**43.4%**
BIO-168	678	**32.2%**	489	**61.3%**
CHM-130	118	**64.2%**	69	**66.2%**
MAT-110	335	83.3%	346	79.5%
MAT-121	138	**47.2%**	120	**63.1%**
MAT-143	437	**52.3%**	441	71.7%
MAT-152	689	**56.9%**	679	**65.7%**
MAT-171	1391	**68.4%**	1646	75.9%
MAT-172	418	**45.6%**	404	**66.5%**
MAT-263	157	**55.1%**	166	75.0%
MAT-271	388	**63.1%**	414	**57.1%**
MAT-272	152	70.9%	178	72.7%
POL-120	402	82.8%	349	93.5%
PSY-118	388	80.0%	409	**62.7%**
PSY-150	2321	**68.8%**	2325	72.9%
SOC-210	1408	76.9%	1524	**69.4%**

Direct Learning Measures: Problem-Solving Assessed in Career Programs:

Core competencies assessed in select Associate in Applied Science (AAS) program courses were also reviewed. Many of the program courses that were used to measure the core competencies were upper 200-level courses normally taken by students who persisted to the end of their programs. The courses measuring these competencies vary from year to year. Of the 26 Career Programs courses assessing Effective Communication in 2022-2023, a majority (23 out of 26, 88% of the courses measured) met or exceeded the proficiency goal. However, of the 28 courses where Problem-Solving was assessed (Table 4), fewer met the proficiency target: 22 met or exceeded the 70% goal for Problem-Solving, 76% of the courses measured (Madsen & Porch, 2023).

Table 4. Percentage of assessed Career Programs courses meeting "Problem-Solving" core competency target (70%).

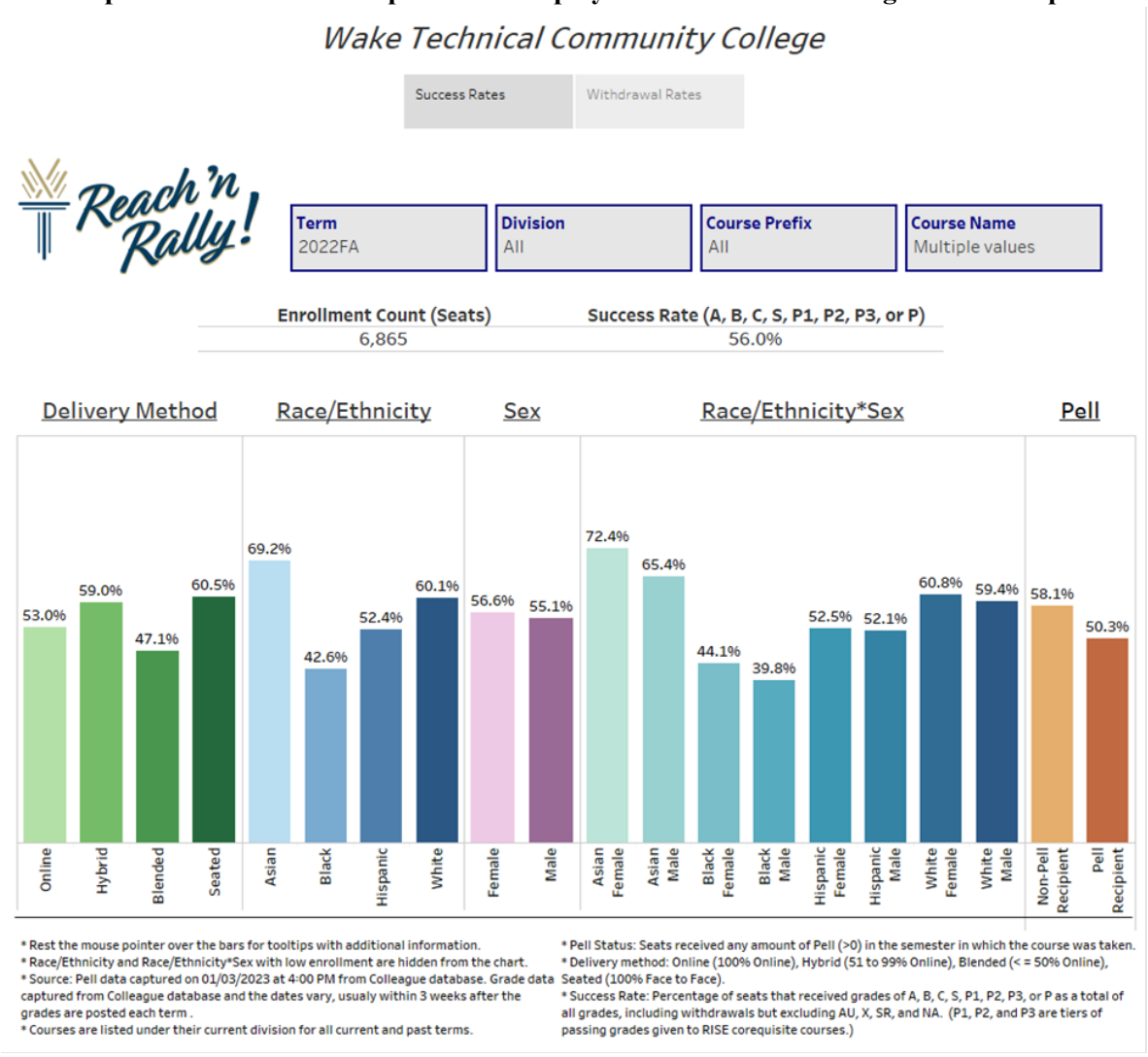
COURSE	TOTAL ENROLLED SEATS 2022	RESULTS IN FA22
SGD-212	43	MET
OST-286	77	EXCEEDED
CTS-115	229	MET
CSC-121	157	EXCEEDED
CTS-289	8*	MET
CSC-134	133	MET
CSC-289	37*	MET
BAS-121	45	MET
BAS-270	16	EXCEEDED
GRD-246	24	MET
DES-285	14*	**NOT MET**
AHR-211	7	MET
ELC-114	24	MET
CST-241	56*	**NOT MET**
ARC-213	15	MET
CEG-211	21	MET
ELN-132	Unknown	MET
WLD-262	21	**NOT MET**
ACC 175	8*	MET
BPA 250	10	MET
CUL 250	12	**NOT MET**
LOG 211	25*	**NOT MET**
LOG 215	33*	EXCEEDED
COS 114	24	MET
ACC 215	58	MET
ACC 227	41*	EXCEEDED
EDU 284	14	**NOT MET**
BUS 115	415	EXCEEDED

**Enrollments for these courses are from Spring 2022. All other enrollments are from Fall 2022*

Indirect Learning Measures: Success Rates in General Education Courses

The QEP Steering Committee also reviewed course success rates where core competencies were measured. Figure 3 shows the overall, combined course success rates (A, B, C) in general education courses in fall 2022 that did not meet proficiency in problem-solving in 2021 (11 courses). Course success rates were below the *Reach 'n Rally* target of 75% across all groups. Black students, students in blended courses, and students receiving Pell grants experienced the lowest success rates. Because these courses all involve extensive problem-solving, improving the problem-solving skills of students taking these courses may also improve the success rates in those courses.

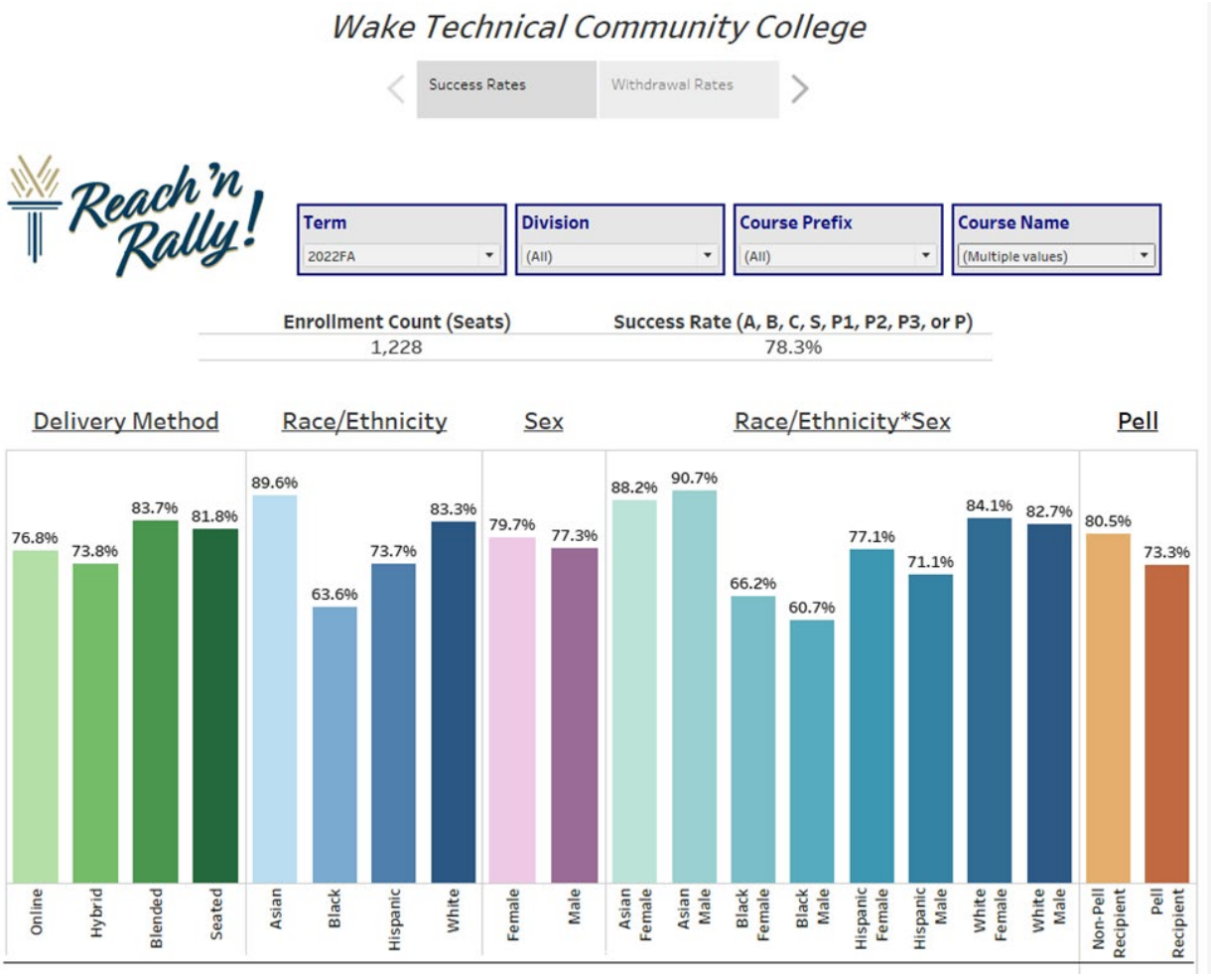
Figure 3. Wake Tech Community College Course Dashboard showing combined student success rates for all courses that did not meet targets for Problem-Solving. The data include BIO-161, BIO-168, CHM-130, MAT-121, MAT-143, MAT-152, MAT-171, MAT-172, MAT-263, MAT-271, PSY-150 (2023, March 23). Retrieved from internal Portal website: https://waketechedu.sharepoint.com/employee/data-services/SitePages/Course.aspx



Indirect Learning Measures: Success Rates in Career Programs Courses

Among the 19 Career Programs courses where problem-solving was taught and assessed in Fall 2022, gaps in course performance exist for different demographic groups. Figure 4 shows that while the success rates in online, blended, and seated courses, and among Asian, White, and Non-Pell students met or exceeded the *Reach 'n Rally* target of 75% for course performance in these courses, students in hybrid courses, Black and Hispanic students, and Pell students did not meet the 75% performance target. Improving problem-solving skills in these courses may also help close the performance gaps in success rates in these courses.

Figure 4. Wake Tech Community College Course Dashboard showing combined student success rates for all Career Programs courses measuring Problem-Solving in Fall 2022: The data include SGD-212, OST-286, CTS-115m CSC-121, CSC-134, BAS-121, BAS-270, GRD-246, AHR-211, ELC-114, CST-241, CEG-211, WLD-262, BPA 250, CUL 250, COS 114, ACC 215, EDU 284, BUS 115. Retrieved from internal Portal website: https://waketechedu.sharepoint.com/employee/data-services/SitePages/Course.aspx

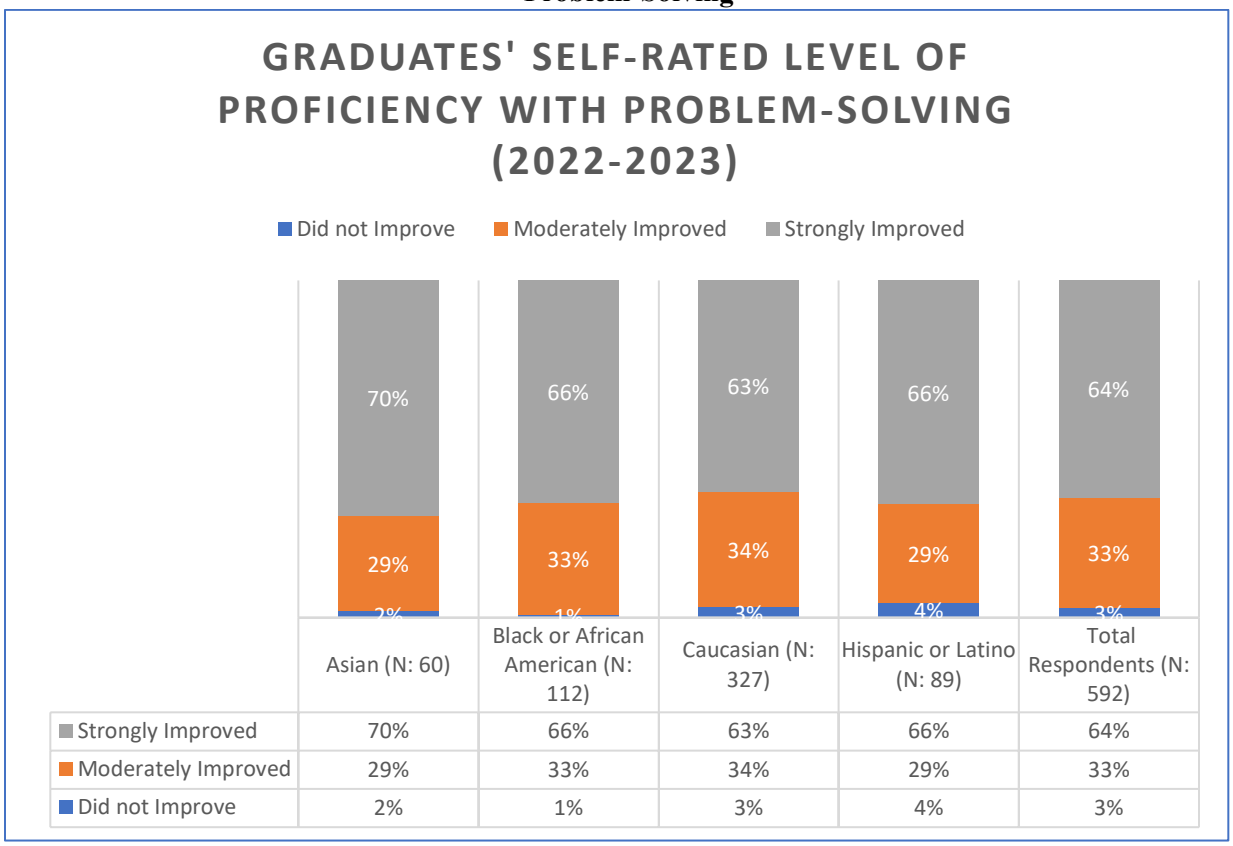


Indirect Learning Measures: Graduate Survey

Of the 592 graduates who took Wake Tech's Graduate Survey in 2022-2023, about 2/3 (64%) indicated their level of proficiency with problem-solving strongly improved because of their Wake Tech education,

and 33% reported their proficiency moderately improved (Figure 5). Caucasian students were the least likely to report their problem-solving proficiency strongly improved (63%). Hispanic students were most likely to report their proficiency with problem-solving did not improve (4%). By improving student proficiency in problem-solving (Tables 3 and 4) and addressing low course success rates where problem-solving is taught (Figures 3 and 4), Wake Tech has an opportunity to boost the proportion of students reporting their problem-solving skills have strongly improved among different demographic groups.

Figure 5. Wake Tech Graduate Survey Results 2022-2023
Problem-Solving



	Asian (N: 60)	Black or African American (N: 112)	Caucasian (N: 327)	Hispanic or Latino (N: 89)	Total Respondents (N: 592)
Strongly Improved	70%	66%	63%	66%	64%
Moderately Improved	29%	33%	34%	29%	33%
Did not Improve	2%	1%	3%	4%	3%

Source: Wake Tech Graduate Survey 2022-2023

Indirect Learning Measures: Community College Survey of Student Engagement (CSSSE)

Table 5 shows the mean scores of Wake Tech student responses on Item 11 of the spring 2022 administration of the Community College Survey of Student Engagement (CCCSE, 2022). Item 11 asks students "How much has your experience at this college contributed to your knowledge, skills and personal development in the following areas?" Many of the areas of learning surveyed are those employers value and those needed for problem-solving (see Figure 5 and literature review), such as "Speaking clearly and effectively", "Thinking critically and analytically", "Solving numerical problems", and "Working effectively with others".

Comparing Wake Tech student responses among the different areas of learning shows the mean scores for Wake Tech students were lowest in "Acquiring job- or work-related knowledge and skills", "Speaking clearly and effectively", "Solving numerical problems", and "Working effectively with others".

Comparing Wake Tech student responses to other student responses at extra-large colleges in the cohort shows that Wake Tech mean scores were below those of other extra-large colleges in "Writing clearly and effectively", "Speaking clearly and effectively", "Thinking critically and analytically, and "Working effectively with others".

Table 5. Wake Tech Mean Scores Compared to Cohorts
Item 11, Spring 2022 Community College Survey of Student Engagement

Item 11: How much has your experience at this college contributed to your knowledge, skills, and personal development in the following areas?	Wake Tech		Ex-Large Colleges		2022 Cohort	
	N	Mean	N	Mean	N	Mean
11a. Acquiring job- or work-related knowledge and skills	734	2.66	33517	2.52	181739	2.63
11b. Writing clearly and effectively	735	2.79	33576	2.89	181956	2.84
11c. Speaking clearly and effectively	734	2.63	33538	2.77	181833	2.75
11d. Thinking critically and analytically	734	3.05	33526	3.09	181834	3.09
11e. Solving numerical problems	733	2.66	33523	2.66	181770	2.66
11f. Working effectively with others	733	2.66	33517	2.72	181764	2.77
11g. Learning effectively on your own	735	3.24	33546	3.18	181834	3.16
11h. Developing clearer career goals	735	2.89	33539	2.83	181802	2.87
11i. Gaining information about career opportunities	734	2.83	33535	2.68	181862	2.72

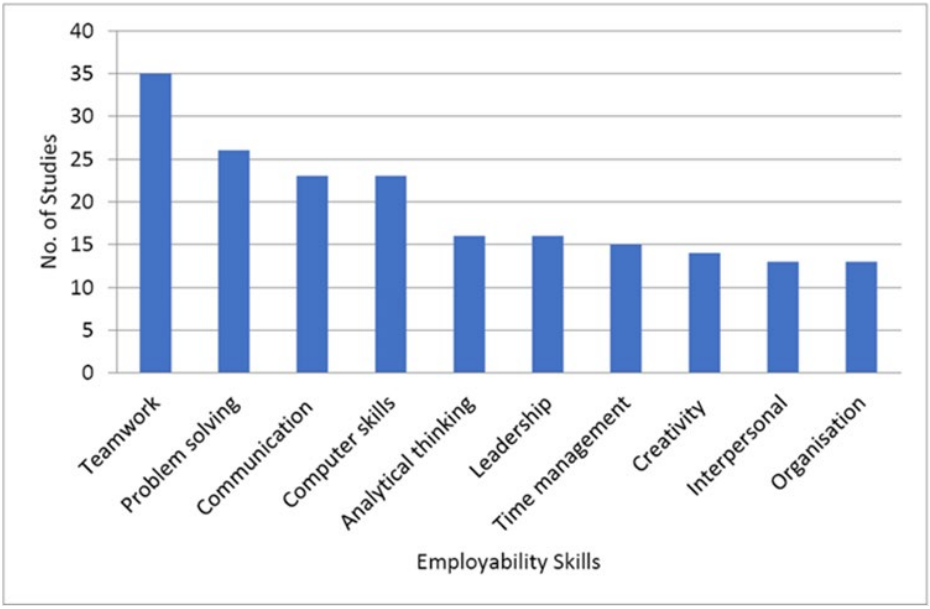
Source: Item 11. CCCSE (Spring 2022). Community College Survey of Student Engagement 2022. Results for Wake Technical Community College. The University of Texas at Austin.

Labor Market Data

National Labor Market Data

According to Sarfraz et al. (2018) (Figure 6), Problem-Solving and Communication are among the top three employability skills in global studies on workforce needs.

Figure 6. Top 10 Employability Skills (Sarfaz et al., 2018)



According to Casner-Lotto and Barrington (2006), while more than half of the employer respondents (58%) indicated that problem-solving/critical thinking abilities are "very important" to successful performance on the job for new entrants into the workforce, 70% percent report that high school graduates who enter the workforce lack problem-solving skills. Although employers rate problem-solving/critical thinking as one of the top five "very important" skills for job success, only 28% classify college graduates' problem-solving as excellent. Another recent survey showed a similar perspective, with 400 employers saying that only 24% of the recent college graduates were well prepared to engage in analyzing and solving complex problems (Hart Research Associates, 2015).

Regional Labor Market Data

Problem-Solving and Communication are among the top 5 skills employers are looking for in job postings in Wake and surrounding counties (Table 6). With a 24-percentage point increase in job postings requiring problem-solving between 2023 and 2024, problem-solving is the fastest growing skill in the region. Communication is the most frequently cited skill in job postings, with a 13-percentage point increase in job postings between 2023 and 2024.

Table 6. Job Posting Analytics Report, Lightcast Q3 2024
Top skills in demand by employers.

Skill	Postings in August 2023	Postings in July 2024	Change	Percent Change
Problem-Solving	3,194	3,949	755	24%
Leadership	4,481	5,169	688	15%
Communication	10,073	11,404	1,331	13%
Operations	4,683	5,295	612	13%
Management	7,207	7,873	666	9%

Source: Hot and Cold Skills by Job Postings, Lightcast Q3 2024 Data Set, August 2024. Retrieved 8/16/2024.

The most recent survey by Wake County Economic Development (2024) on workforce needs in the region echoes the data reflected in regional job posting data. When asked what skills are most important for hiring, respondents from industry sectors with the largest numbers of jobs in the region indicated that effective communication and aspects of problem-solving were among the top five most important skills needed for hiring (Table 7).

Table 7. Regional In-demand skills needed in top industries (by number of jobs) in Wake and Surrounding Counties

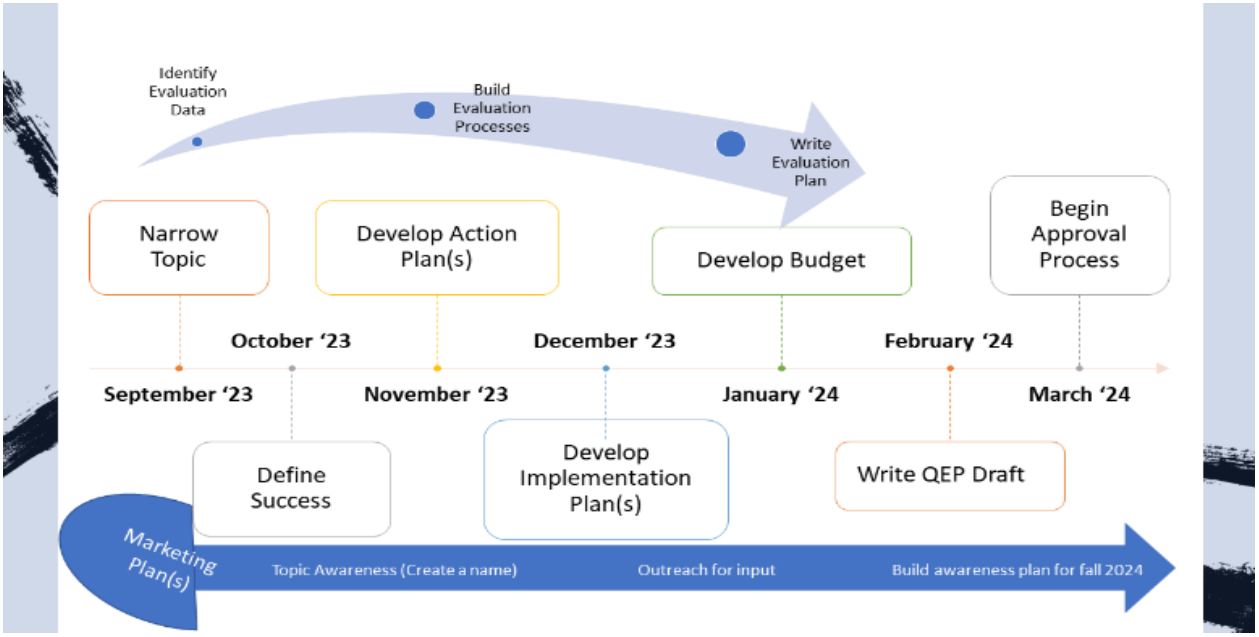
	Lightcast Q3 2024*		Triangle Talent Skills Most Important for Hiring**	
Industry	2023 Number of Jobs	Change in Jobs from 2018	Number of Respondents: Effective Communication	Number of Respondents: Analysis/Problem-Solving/Adaptability
Professional, Scientific, and Technical Services	129,083	28,576	106	77
IT, Software, Analytics	N/A	N/A	21	13
Life Science and Biosciences	N/A	N/A	21	25
Health Care and Social Assistance	139,761	19,862	42	44
Transportation and Warehousing	37,143	16,468	11	6
Construction	76,401	13,964	39	23

** Source: Economy Overview, Lightcast Q3 2024 Data Set, August 2024. Retrieved 8/16/2024.*
***Source: Triangle Talent: A Regional Skills Analysis, Volume 3. Retrieved from:* https://raleigh-wake.org/talent-workforce/regional-workforce-skills-analysis.
N/A: IT, Software, Analytics industries, as well as Life Science/Biosciences, are included in Professional, Scientific and Technical Services job numbers from Lightcast.

Topic Developed

Armed with the data and analysis provided above, as well as the approval of the topic "Problem-Solving with an Emphasis on Communication" by the Wake Tech Board of Trustees, the QEP topic was narrowed and developed during Phase II (Figure 7) by a faculty-led committee comprised of faculty and support personnel (Appendix B).

Figure 7. Phase II Timeline



Defining

As the QEP-Development Steering committee reviewed the data and literature it became clear they needed to clarify terms and definitions. After reviewing the American Association of Colleges and Universities (n.d.) Value Rubrics, gathering input from their respective division faculty, and engaging in robust dialogue, the following working definition emerged:

> *Problem-Solving with an Emphasis on Communication* is a cognitive process that combines quantitative, qualitative, and critical-thinking skills to address problems and communicate their solutions.

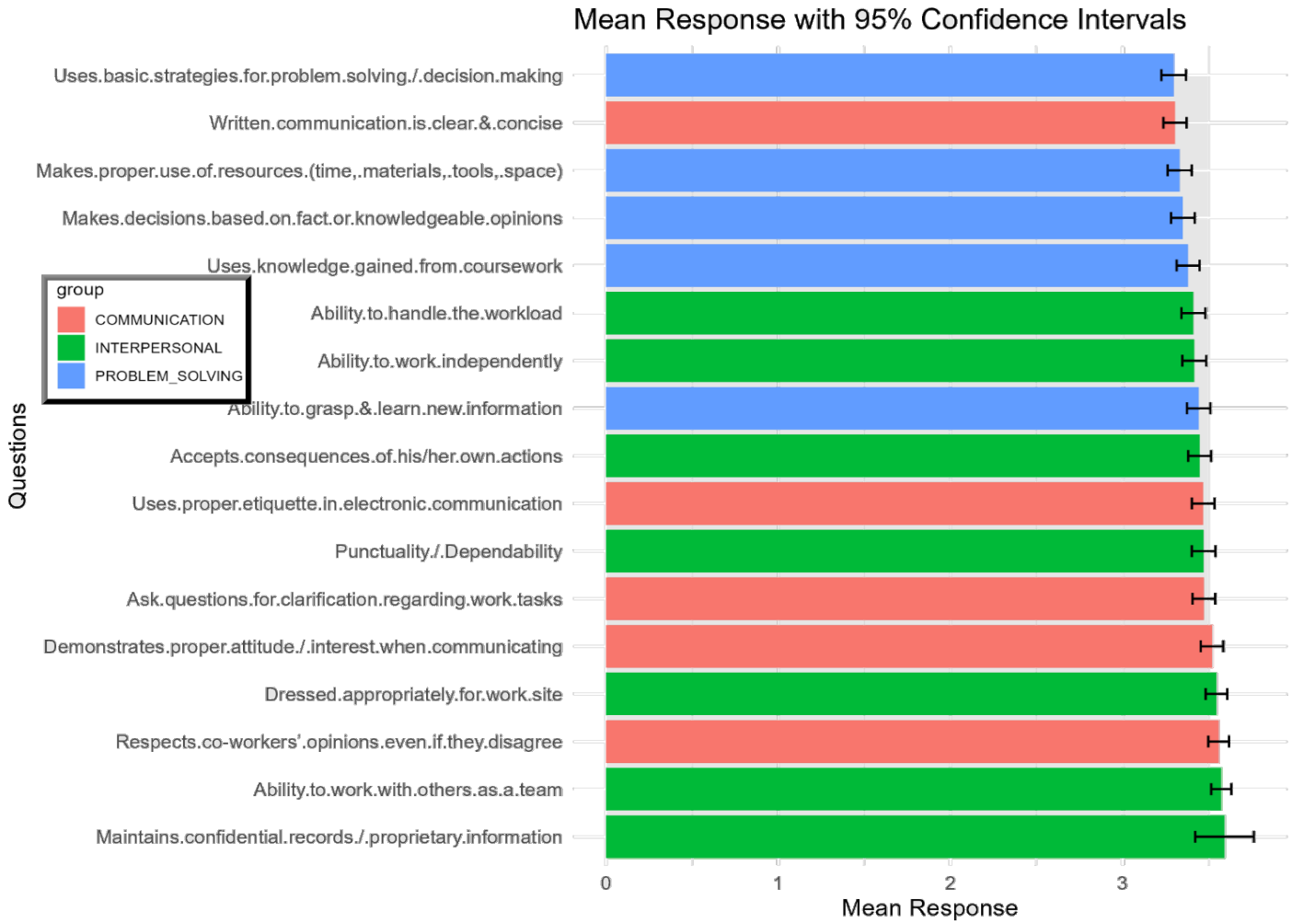
Additional Data Analysis

Work-Based Learning Data

The QEP-Development Steering committee also sought additional data to determine the extent to which Wake Tech students have the problem-solving skills they need when they are employed. The college's Work-Based Learning (WBL) program surveys employers at the end of each semester to evaluate the proficiency of students who worked for them. The WBL survey includes the skill areas of Communication, Interpersonal Skills, and Teamwork, and Problem-Solving and Decision-Making (WTCC, 2023; Appendix E).

Figure 8 compares the mean scores for each question on the WBL survey grouped by skill area. Of the five lowest mean scores on the survey conducted in the 2022-2023 academic year, four were in the problem-solving skill area and one belonged to the written communication skill area. This indicated that employers feel problem-solving is the weakest skill area among our WBL students.

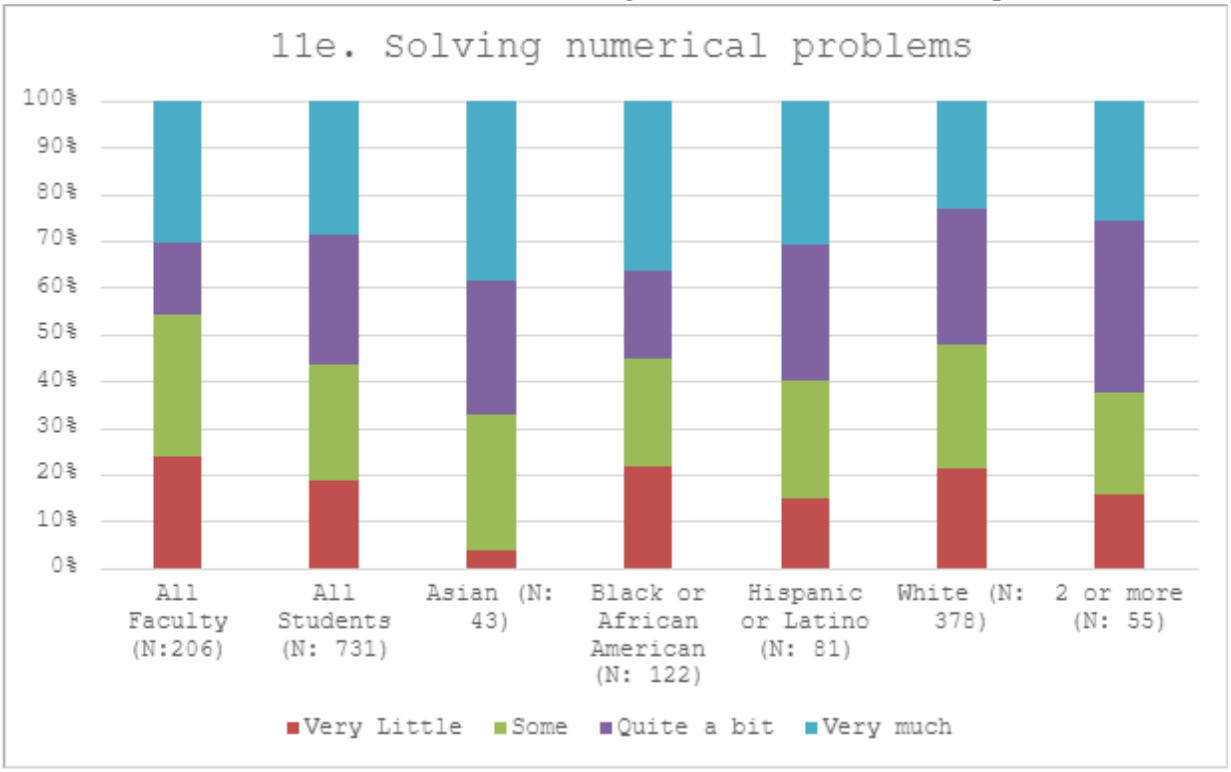
Figure 8. Analysis of WBL Survey Data for the 2022-23 Academic Year



Student Experience Data

We found that our students and faculty indicated through the Community College Survey of Student Engagement (CCSSE, 2022) and the Community College Faculty Survey of Student Engagement (CCFSSE, 2022) that solving numerical problems required our attention, especially for Black or African American students. More than 20% of the faculty respondents and almost 20% of the student respondents felt the student experience at Wake Tech contributed very little to students' competency in solving numerical problems (Figure 9).

Figure 9. Comparison of CCSSE and CCFSSE Responses to "How the Student's Experience at Wake Tech Contributed to Their Knowledge, Skill, and Personal Development in…":



Conclusions from Data Analysis

In summary, both the Phase I and Phase II data analysis confirmed an area of learning that would improve student achievement at Wake Tech, and student success in the workforce, is the extent to which students can solve problems and communicate solutions. Learning data, both direct and indirect, indicate our students struggle with various dimensions of both problem-solving and communication. Labor market data indicate problem-solving is the fastest growing skill and communication is the most frequently cited skill in job postings for the region. As discussed in the following literature review, communication is embedded in every step of the problem-solving process (Patterson, 2008).

Based on this information, the QEP Teams (Appendix B and C) developed these summative outcomes to guide further research and develop strategies and tactics to address the topic:

Students Learn Problem-Solving Skills

1. Students will demonstrate the problem-solving process in their courses through graded learning assignments/assessments.
    a. Target: 75% of students will demonstrate the problem-solving process through graded learning assignments/assessments by Spring 2030.
2. Students' problem-solving skills will improve because of their education at Wake Tech.
    a. Target: 75% of students will indicate that their level of proficiency in problem-solving strongly improved by Spring 2030.

Students Implement Problem-Solving in the Workforce

3. Employers will indicate that Wake Tech students are able to implement problem-solving skills in jobs and careers.
    a. Target: 3.75 overall mean (between Very Good and Outstanding) for items in the Problem-Solving and Decision-making category as indicated by Wake Tech employers by Spring 2030.

Topic Research

Problem-solving involves the development of the cognitive ability to think logically, make decisions, and use social and communication skills to interact and communicate effectively (Patterson, 2008). It is often associated with concrete (quantitative) disciplines that evaluate evidence objectively. In fields such as mathematics, chemistry, and engineering, results are quantified and compared to agreed-upon standards; therefore, evaluating evidence is relatively straightforward (Kirkley, 2003).

Problem-solving is also associated with affective or soft skills (e.g., teamwork, decision-making, sociability, self-management, etc.): evaluation of qualitative evidence is important in the problem-solving process (Sedlár, 2020). Both quantitative and qualitative methods are used to solve problems in many of the programs at Wake Tech. For example, it is mandatory for student paramedics in the Emergency Medical Sciences (EMS) department to demonstrate at least a minimum level of competence when identifying life-threatening heart rhythms (the quantitative); however, their affective domain will also be evaluated. The affective domain involves a student's ability to consider emotional, social, and environmental factors when determining the best course of action and how they interact with their patient (the qualitative).

Teaching Methods

Stice (2007) and Woods (1987) tell us that providing information alone is not instruction. Adult learners need relevant activities where they can apply information to solve problems. Faculty teaching problem-solving need to develop appropriate learning activities that accomplish two important goals:

1. Teach adult learners a structured method of approaching and solving problems, and
2. Help adult learners understand why structured methods should be used when approaching and solving problems.

The second goal is important because many adults do not see the value in taking the time to follow a proven process (Jozwiak, 2004). To accomplish these goals, the process of problem-solving should be developed and shared with the students, then the instructor should incorporate the use of open-ended activities into their course. It will be critical that the instructor knows the process well enough to guide the students through the process without leading them to a solution. The last step of the exercise is to take the students through a reflection of the solutions developed, data collected, ideas generated, and thoughts on how they could improve their process. Additionally, the open-ended activities should be relevant to the subject discipline to be effective and transferrable (Stice, 2007; Woods, 1987). Applications to real-world problems in the discipline will reinforce the importance of learning the process.

Problem-Solving in Different Academic Disciplines

There are many problem-solving processes or strategies found in literature and all are similar in their basic steps (Stice, 2007). McCain (2005) distills these basic steps down to four "D's": Define, Design, Do, Debrief. Polya (1971) defined the process as: Define, Plan, Carry Out Plan, and Look Back. Woods added *Think About It* as the second step to Polya's process (Stice 2007). Downing's (2011) "Wise Choice Process" promotes the use of six questions and is taught in Wake Tech's *On Course* modules. *On Course*

is an evidence-based faculty training program grounded in cognitive neuroscience that focuses on empowering students to take greater responsibility for their education.

When Price et al. (2021) looked at the problem-solving process in science and engineering, they found that problem-solving steps might change by discipline, particularly when they are being taught and assessed by instructors. They also found that rigid, straight-line process steps do not address real word problems that are more complex and unstructured. These problems require a more flexible set of heuristics to define a solution path and recommended a framework with eight categories:

- Selection of Goal of the Problem
- Frame the Problem
- Plan the Process for Solving
- Interpret Information and Choose Solution(s)
- Reflect
- Implications and Communication of Results
- Ongoing Skill and Knowledge Development

Wake Tech's programs span across 13 diverse career fields, many of which have specific problem-solving processes unique to their discipline. Although they are unique, most have elements common to one another. Many of our students in the sciences solve problems using the scientific method (Khan Academy, n.d.):

1. Make an observation.
2. Ask a question.
3. Form a hypothesis, or testable explanation.
4. Make a prediction based on the hypothesis.
5. Test the prediction.
6. Iterate: use the result to make new hypotheses or predictions.

Those studying various disciplines in the Information Technology (IT) field will use a variety of problem-solving and design processes or frameworks. As an example, one of those methodologies is called Agile. Here IT student will learn a six-step process (Clifford, 2023):

1. Define the problem: Clearly define the problem that needs to be solved. Use data and facts to support your understanding of the problem.
2. Identify the stakeholders: Identify all the stakeholders who may be affected by the problem or its solution.
3. Brainstorm solutions: With the stakeholders, brainstorm possible solutions to the problem. Encourage everyone to contribute and generate as many ideas as possible.
4. Evaluate solutions: Evaluate each solution against a set of criteria, such as feasibility, impact, and cost. Use a scoring system to determine the best solution.
5. Implement the solution: Once the best solution has been identified, implement it. Assign roles and responsibilities, set timelines, and track progress.
6. Review and learn: After the solution has been implemented, review the results and learn from the experience. Identify what worked well and what could be improved for future problem-solving.

IT students and engineering students may both be exposed to Six Sigma methodology, or DMAIC for identifying and solving problems (Nickols, 2020):

1. Define
2. Measure
3. Analyze
4. Improve
5. Control

In HVAC and Refrigeration, students learn a 5-step problem-solving strategy (McMorrow, 2021) that starts with continuous learning and moves forward with:

- Observe the symptoms.
- Determine the probable cause.
- Take corrective action.
- Test the results.

They are also given the instruction to "Repeat the steps as needed." This is an important step found in most all the problem-solving processes.

In summary, while there are variations in the number and types of elements, reviews of the literature and problem-solving processes across disciplines at Wake Tech reveal there are commonalities among each process. Some disciplines combine steps into one, others use names specific to their industry and purpose.

The AAC&U VALUE rubric for Problem-Solving (AAC&U, 2024) distills the common elements of problem-solving across all disciplines. The elements in the rubric are broad enough to accommodate variations across disciplines but are also specific and measurable to determine how well students can solve problems and communicate. The AAC&U (2024) Value Rubric for problem-solving includes the following elements:

- Define Problem
- Identify Strategies
- Propose Solutions/Hypotheses
- Evaluate Potential Solutions
- Implement Solution
- Evaluate Outcomes

Faculty Professional Learning and Support

Evangelisto (2023) argues problem-solving can be taught, modeled, and evaluated to benefit students. Unfortunately, many faculty at community colleges say they are not prepared to teach it. There is evidence that the faculty can learn a problem-solving process and hone their own skills through professional learning experiences. Peer and institutional support are also needed to overcome any knowledge gaps in teaching problem-solving skills (Evangelisto, 2023).

Peer support can come in a variety of modalities, including department meetings, peer mentoring, and communities of practice where best practices are shared. Institutional support also comes in a variety of modalities, including, professional learning opportunities, incentives, rewards, and most importantly supervisor support. Supervisors, which in most cases include department heads, associate department heads, and program directors/managers, can provide three critical dimensions of support: direct assistance, guidance, and emotional support (Blume et al., 2024). When reporting about the role managers play in supporting the transfer of professional learning into actions, Foxon (2008) writes:

> Perception of manager support for the utilization of the skills exerted considerably more influence on the [learning] transfer process than did motivation. The influence of the action planning intervention was ambiguous. The findings suggest that designers and evaluators must take such influences, especially manager support, into account throughout the design, development, implementation, and evaluation phases of training programs (p. 42).

Department heads, associate department heads, and program directors/managers will play an important role in the support of faculty in implementing new activities in their classroom environments to facilitate student learning of problem-solving skills. Accordingly, department heads, associate department heads, and program directors/managers will also need support from their deans and supervisors.

Reaching All Students – Common Terms, Definitions and Student-Friendly Communication

To improve the rates at which students learn problem-solving in courses, are successful in courses that teach problem-solving skills, and can demonstrate these skills in their careers, it is essential to increase the likelihood of learning transfer. Common terms and definitions and a vocabulary that is welcoming to students of different races, cultures, religions, ability statuses, etc. will help students learn, retain, and apply problem-solving skills across Wake Tech classrooms and beyond (Christian & Zippay, 2012). Having a sense of belonging and feeling connected is also crucial for student success among diverse populations like those at Wake Tech, particularly with online courses. Student-friendly communication that promotes welcoming learning environments goes a long way to promoting sense of belonging and connection (Prodgers et al., 2023).

Digital Badging

Goal-directed behavior increases motivation and promotes responsibility (Bañeres et al., 2023). As living-wage jobs give way to work environments that require problem-solving, it has become more important to provide our students with credentials that demonstrate a mastery of these skills (Gurjar et al., 2024). Carey and Stefaniak (2018) define digital badging as, "…electronic symbols used to document performance and achievement…" (p. 1212) and can be used as virtual credentialing to showcase acquired skills. Adding digital badges to a resume increases the employer interest in a candidate for entry level jobs (McGovern, 2019). As employers use educational and occupational credentials in the hiring process, a digital badge in problem-solving will tell employers that this student is ready to be productive and adaptive in an ever-changing, competitive work environment (Burk, 2019; Welch, n.d.). Hamilton (2023) states, "Digital badges encourage individuals to continually learn and progress." By building a pathway to this digital badge through a series of problem-solving skill demonstrations, the student will have a goal to achieve before completing passage through Wake Tech.

For many of the same reasons, we will develop a digital badging system to recognize and incentivize Wake Tech's faculty and staff to complete professional learning modules designed to assist our students in the development of these skills (Gamrat et al., 2014).

STRATEGIES AND TACTICS

Based on a review of the literature, combined with analysis of data and engagement of their colleagues, faculty on the QEP-Development Steering Committee refined their definition of problem-solving to align closely with the AAC&U Value Rubrics (2024) and the definition used in assessing the Wake Tech's problem-solving competency:

Problem-solving is the cognitive process of addressing challenges or obstacles by systematically and sequentially analyzing, evaluating, and implementing strategies to achieve desired outcomes considering relevant contextual factors and diverse perspectives (see Appendix G).

The committee also developed the following strategies (the "what" and the "why") and tactics (the "how") to improve the problem-solving abilities and skills of Wake Tech students.

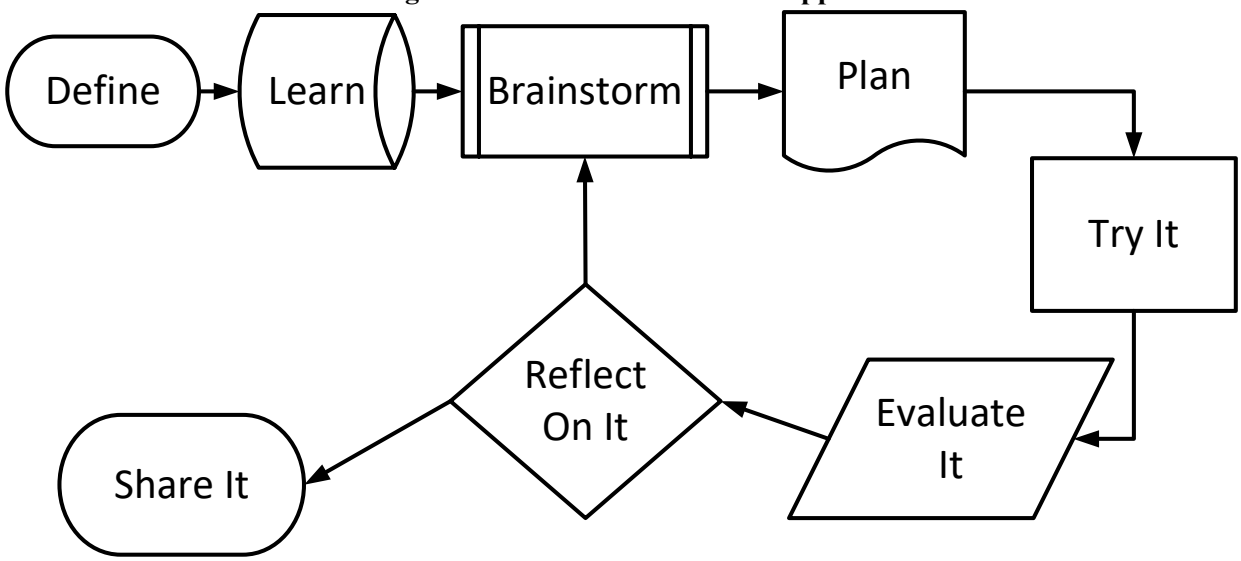
Develop College-Wide Terms, Definitions, and Steps

Using information gathered from the literature reviews and disciplines across Wake Tech, faculty on the QEP-Development Steering committee worked with faculty on the General Education and QEP Assessment teams to develop and adopt problem-solving steps with common terms and definitions for each step. The steps closely align with the AAC&U VALUE rubric for problem-solving (AAC&U, 2024) and Wake Tech's revised General Education competency for problem-solving (see Appendix G).

- **Define the problem –** (Define) Clearly and succinctly state the problem while taking the contextual factors into consideration.
- **Research and investigate –** (Learn) Thoroughly investigate and gather relevant information from credible sources to gain a comprehensive understanding of the problem.
- **Identify pathways to solve the problem –** (Brainstorm) Determine multiple, specific pathways available for solving the problem.
- **Examine various pathways to solve the problem –** (Plan) Critically assess, analyze, and determine the degree to which a pathway would achieve its intended goal.
- **Select & implement a solution –** (Try it out) Decide in favor of one solution pathway and apply it as appropriate.
- **Evaluate the solution –** (Evaluate it) Systematically examine how well the implemented solution worked to solve the problem.
- **Revise –** (Reflect on it) Make revisions or improvements to the solution based on the evaluation of the solution's effectiveness.
- **Justify the solution –** (Share it) Present an argument as to why the selected solution is the most suitable approach.

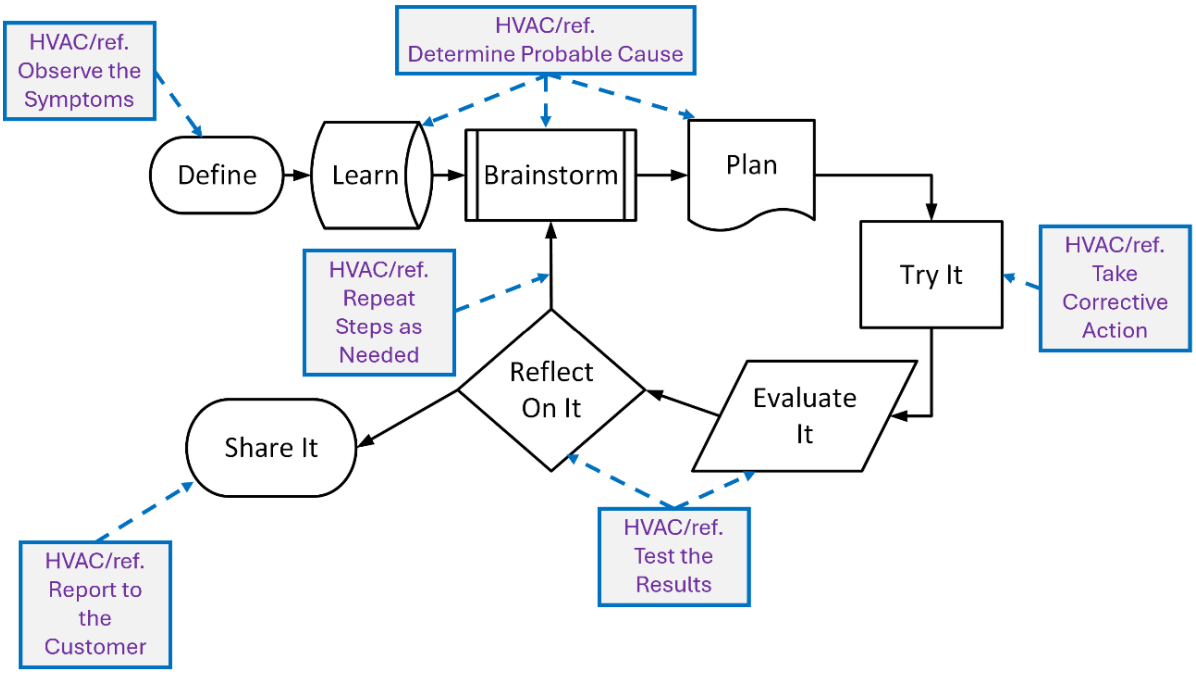
As shown in Figure 10, while each step is listed in linear, progressive order, often the problem-solving process will be iterative, and in some disciplines, some steps may be skipped. Each step can be mapped to any of the discipline-specific problem-solving processes already taught in degree programs at Wake Tech.

Figure 10. Wake Tech Process Mapped



For example, there is a five-step process described by McMorrow (January 2021) for HVAC and refrigeration service technicians. The first step is Continuous Learning, which means gaining the technical knowledge technicians need in that career. The second step is Observe the Symptoms. This step maps to Define in the Wake Tech process. The third step is Determine the Probable Cause. This step maps to Learn, Brainstorm, and Plan in the Wake Tech process. The fourth step is Take Corrective Action. This step maps to Try It Out in the Wake Tech process. The fifth step in the HVAC/refrigeration problem-solving process is Test the Results. This maps to Evaluate It and Reflect On It in the Wake Tech process. McMorrow (January 2021) goes on to say, “Repeat the steps as needed”. This instruction ties into the loop built into the Wake Tech process that takes the problem-solver back to Brainstorming. The additional step in the HVAC/refrigeration process that is left out is informing the customer that the problem has been identified and corrected. In the Wake Tech process this in known as Share It. Figure 11 shows how the HVAC/refrigeration process directly aligns with the Wake Tech process.

Figure 11. HVAC/refrigeration Process Mapped to the Wake Tech Process



Support Faculty and Staff Through Professional Learning

As noted in the literature review, faculty, and staff, as much as students, need to learn and use common terms and teach a structured process for students to be able to learn and apply problem-solving in their courses, jobs, and careers. Short professional learning modules will provide excellent opportunities to share a common vocabulary, understand new requirements, and learn new teaching methods. Three modules (one- to two-hours each) will be developed by faculty and offered via in-person, hybrid, and asynchronous online modalities through the Center for Excellence in Teaching and Learning (CETL), as follows:

Common Language and Steps (Required)

The first module, Common Language, will be required of all faculty and staff and will focus on introducing *Solve It, Say It!* by defining terms, explaining the process, and sharing some general prompts and activities that can be used in everyday interactions with students. There will be a focus on common terms and definitions so that everyone can support the effort by having a common understanding of what each term means.

- This module will be created during the spring of 2025 and first offered in the fall of 2025.
- This module will be required of all faculty members and staff.
    - The faculty will complete the module by the spring of 2027.
    - Staff will complete the module by the fall of 2027.

College Standards (Required)

The second module, College Standards, will also be required of all faculty and their supervisors. It will review the college-wide standards used to assess problem-solving and explain how to support the learning and assessment of student proficiency of this core competency skill.

- This module will be created during the spring of 2025 and first offered in the fall of 2025.
- This module will be required of all faculty members and their supervisors.
    - The faculty will complete the module by the spring of 2026.
    - Department heads, associate department heads, and program managers/directors will complete the module with or before the first faculty from their departments/programs complete this course.

Student-Friendly Language (Optional)

The third module will introduce techniques to move away from "academic speak" toward verbiage that creates more inviting and supportive learning environments and builds more personal connections with Wake Tech's diverse students. For example, "Office Hours" is a term that some students may not associate with a time to get assistance from their instructor. "Student Assistance Time" may be more descriptive and inviting for students who are timid and fear meeting with a faculty member.

Because Wake Tech currently offers a professional learning course focused on teaching culturally relevant language through the eLearning Support and Instructional Design department, developers of the "Student-Friendly Language" module will collaborate with eLearning Support and Instructional Design to avoid duplication.

- This module will be created during the spring of 2025 and first offered in the fall of 2025.
- This module will be optional for all faculty and staff. An incentive may be offered to encourage attendance.

Support Faculty Supervisors

As noted in the literature review, manager support and encouragement are essential to the success of a new initiative. A participant's training transfers into action much quicker and is sustained when supported by their direct supervisors (Blume et al., 2024). Since faculty will be learning how to create an activity or assignment as well as assessments that ask students to demonstrate their problem-solving skills, it is important that their immediate supervisor have the knowledge and tools to support the faculty in this effort. Therefore, all department heads, associate department heads, and program managers/directors will take the second module, "College Standards" either before or with the first faculty that take that course from their department.

Count Modules Toward Professional Development

Faculty and staff will be able to count the completion of the professional learning modules as part of their professional development requirements. Wake Tech's Professional Development policy (Policy #E0912, June 20, 2022) requirements vary by employee type, but all require at least 15 hours of professional learning annually:

- All staff, salaried (exempt) and hourly (non-exempt), must complete 20 hours of professional development each fiscal year between July 1st and June 30th.
- Twelve-month faculty members must complete 20 hours of professional development each fiscal year, between July 1st and June 30th.
- Ten-month faculty members must complete 17 hours of professional development each fiscal year, between August 1st and May 31st.

- Nine-month faculty members must complete 15 hours of professional development each fiscal year, between August 1st and May 31st.

Additionally, part-time adjunct faculty are paid for successfully completing professional development. A payment schedule is provided in Wake Tech's Professional Development policy (Policy #E0912, June 20, 2022).

Teach and Assess Problem-Solving

Teach and Assess Problem-Solving in Each Degree Program

Many general education courses and career and technical courses at Wake Tech already contain exercises, activities, or assignments that give students the opportunity to focus on problem-solving. Most of these courses assess the students' proficiency in that skill. By fall of 2026 at least one required course in each degree program will give students the opportunity to learn the problem-solving process through exercises or assignments and graded assessments. The college recognizes that Career and Technical Education programs already teach industry standard problem-solving methodologies. In these cases, instructors would help students see how the industry standard aligns with the college-wide problem-solving process.

Teach and Assess Problem-Solving in ACA Courses

As noted in the Introduction, almost half of Wake Tech students are enrolled in University Transfer programs. All the degree pathways for University Transfer students require the course ACA 122: *College Transfer Success*. This course already has an assignment that teaches problem-solving and will be updated and adapted to align with the *Solve It, Say It!* terms and process.

The other half of our students are enrolled in Career Programs that are designed to lead directly to the workforce upon graduation. The course ACA 115: Success & Study Skills is often recommended to students in Career Programs. This course will also contain an assignment focused on teaching the *Solve It, Say It!* terms and process.

Certify Any Course That Includes the Problem-Solving Process

In addition to General Education or program-specific courses required to teach and assess problem-solving in each for-credit degree program, (see Appendix I), faculty teams will be able to engage in a process that certifies all sections of any course where problem-solving is taught according to the Wake Tech standard. The certification will verify all sections of a course offers an exercise or assignment that teaches the problem-solving process and assesses the students' proficiency in those skills based on the problem-solving standard. Courses may create more than one exercise or assignment so that faculty teaching the course sections will have a choice of options to use, and each course section must use at least one exercise or assignment. Course certification requirements will be determined at the division or department level. The certification process will have a sign-off approval from the department head and/or dean that these exercises or assignments will be used in all sections, including those taught by adjuncts.

Add Problem-Solving to Work-Based Learning (WBL) Course Shells

Work-Based Learning (WBL) course shells in Blackboard Ultra do not have academic exercises for the students but function as a repository for the instructions and forms the students need to report on their learning experiences. The shells also contain a resource center for the students. An overview of the problem-solving process will be created to be inserted into the resource center in each of the WBL course shells. In addition, implementation teams will explore the feasibility and use of developing a course that

can be used with our customized training programs and as part of the WakeWorks® apprenticeship program.

Develop Career-Specific Course Activities

Beginning spring of 2026, there will be a focus on developing career-specific course activities that teach the problem-solving process. Faculty from various career paths will create course activities that focus on the specific needs of that career path and share them with other faculty in that field. Learning opportunities will be division specific and optional for faculty unless determined otherwise by division leadership.

Incentivize Teaching and Learning Through Digital Badging

Digital badges will provide students, faculty, and staff with a goal and a means to share their accomplishments.

Students

A poll sent to all Wake Tech students during the spring of 2024 revealed that there is strong support for the use of digital badges for demonstrating problem-solving skills to potential employers (Appendix H). Therefore, a program will be developed that will give students the opportunity to earn a digital badge when they have demonstrated competency in problem-solving. The digital badge will convey that the student has mastered the process, can solve problems, and communicate their solutions. Governance for digital badges is under development at the North Carolina Community College System office. Wake Tech has strong representation on the state-wide committee.

Faculty

Digital badges will also be provided to faculty who demonstrate they are teaching the problem-solving process. These badges can be earned by participating in professional learning or by providing evidence of teaching the problem-solving process in their classes.

Staff

A program will be developed that will give staff the opportunity to demonstrate their knowledge and skills in the *Solve It, Say It!* problem-solving process.

Reinforce Problem-Solving Through Student Support Services

Tutoring and Learning Center (TLC)

The Tutoring and Learning Center (TLC) offers a range of free tutoring services for students. The TLC's Academic Success Workshops are designed to help students develop successful college study habits. Three workshops supporting the QEP will be created and offered through the TLC. These workshops are free to any student who wishes to take them.

Advising Care Teams

Wake Tech uses a case management care team model for advising, providing each student with an assigned team of advisors and support staff, including a student success coach and a career coach. Currently, the student success coaches use a goal-oriented approach to keep students focused on successfully completing their program of study. The care teams are moving to a "barrier identification and removal" approach in the future using the *Solve It, Say It!* process as a model. Knowing each student has a goal, each care team will focus on helping students identify their barriers, which are the problems that

keep them from reaching their goals. Student success coaches will then be able to guide students using the *Solve It, Say It!* process to solve the problem, thereby removing the barriers that prevent them from reaching their goals.

Enrollment and Student Services

A taskforce will develop a short introduction on the importance of learning the *Solve It, Say It!* problem-solving process for the Enrollment and Student Services team to incorporate into both in-person and online student orientation.

Library Services

Library Services will embed the QEP problem-solving processes into their student interactions.

Other Supportive Activities Already in Progress

Student-Centered Syllabus Template

As part of its strategic plan, Wake Tech encourages faculty and staff to pilot innovative ideas that will contribute to the academic success of students and close racial/ethnic performance gaps. A request for proposals (RFP) program called the "Innovation Fund" invites faculty and staff to develop and submit innovative ideas that support the *Reach 'n Rally* Strategic Plan. Through one of the funded projects, *Creating an Engaging, Equity-Minded, Fluid, and Inclusive Syllabus*, a student-centered syllabus template was developed that all faculty will use in their courses and in fall 2024 will advance to the piloting phase. The template promotes student-friendly language throughout and is organized into three main areas:

- A college section with college-level information to be used in every syllabus across the college.
- A division section with division-level verbiage to be used in every syllabus for that division.
- A faculty section where faculty will introduce themselves and share information about the course.

Information will be added to the college section that reminds students about the General Education Core Competency skills they will learn in the course and will highlight *Problem-Solving with an Emphasis on Communication* as the subject of the college's QEP.

Digital Badging Pilot

Another pilot program focused on developing communication and problem-solving skills in a transdisciplinary project. Students in a communications course and a computer information systems course were given the opportunity to earn digital badges by working through three levels of competency in problem-solving and communication. This project will provide insights into the creation of a digital badging process for our students.

FOCUS

Wake Tech faculty and staff are dedicated to helping students learn to solve problems and communicate solutions at Wake Tech and as they move into the workforce or continue to higher levels of education. The strategies and tactics outlined above will enhance, expand, and accentuate opportunities to develop the skills students need to systematically solve problems and effectively communicate their solutions. By implementing them, Wake Tech is striving to achieve these summative outcomes:

Summative Outcomes

Students Learn Problem-Solving Skills

1. Students will demonstrate the problem-solving process in their courses through graded learning assignments/assessments.
    a. Target: 75% of students will demonstrate the problem-solving process through graded learning assignments/assessments by Spring 2030.
2. Students' problem-solving skills will improve because of their education at Wake Tech.
    a. Target: 75% of students will indicate that their level of proficiency in problem-solving strongly improved by Spring 2030.

Students Implement Problem-Solving in the Workforce

3. Employers will indicate that Wake Tech students are able to implement problem-solving skills in jobs and careers.
    a. Target: 3.75 overall mean (between Very Good and Outstanding) for items in the Problem-Solving and Decision-making category as indicated by Wake Tech employers by Spring 2030.

Changes, Gains and Benefits for Students

The logic model provided in Table 8 provides an overview of the expected changes, gains, and benefits students will experience because of implementing the *Solve It, Say It!* QEP, as well as the inputs and resources needed, the key activities, and the outputs and deliverables to achieve them. The QEP committees also used the logic model as a tool to develop an implementation plan and timeline and to estimate the budget needed to carry out the plan.

Table 8. QEP Logic Model

<table>
<tr><th colspan="6">LOGIC MODEL FRAMEWORK</th></tr>
<tr><td colspan="6"></td></tr>
<tr><td colspan="6">Situation: Through a faculty led process of data review, literature research, and peer collaboration and engagement, the topic of Problem-Solving with an Emphasis on Communication has emerged as the area of learning most in need of our attention.</td></tr>
<tr><td colspan="6">Theory of Change/Hypothesis: If we develop better pedagogical methods of teaching Solve It, Say It: Problem-Solving with an Emphasis on Communication, our students will become more proficient in these important life skills.</td></tr>
<tr><td colspan="6">College Strategic Objective(s)/Goal(s): This Quality Enhancement Plan (QEP) will directly address our Learning Goal, which is to ensure that “Students gain the knowledge, skills, and abilities they need for the labor market and transfer” and will focus on improving several strategic objectives identified during the planning process.</td></tr>
<tr><td rowspan="2"><u>Inputs/Resources</u>
The resources you need to carry out your activities, produce outputs, and make progress toward your outcomes.</td><td rowspan="2"><u>Activities</u>
The actions or work you do to produce outputs and make progress toward your outcomes.</td><td rowspan="2"><u>Outputs/Deliverables</u>
Direct products or services that come from carrying out your activities.</td><td colspan="3">Outcomes
The change, gains, or benefits WTCC students will experience as a result of the QEP</td></tr>
<tr><td>Initial/
Short-term
indicators and
outcomes</td><td>Intermediate/
Medium-term
indicators and
outcomes</td><td>Ultimate/
Long-term
indicators and
outcomes</td></tr>
</table>

Inputs/Resources The resources you need to carry out your activities, produce outputs, and make progress toward your outcomes.	**Activities** The actions or work you do to produce outputs and make progress toward your outcomes.	**Outputs/Deliverables** Direct products or services that come from carrying out your activities.	**Initial/ Short-term indicators and outcomes**	**Intermediate/ Medium-term indicators and outcomes**	**Ultimate/ Long-term indicators and outcomes**
Support of Executive Leadership Team and Deans Faculty Staff Department Heads and Program Directors/Managers Communications and Marketing Staff Enrollment and Student Services Staff Stipend, travel, change management budget. Institutional Effectiveness and Research Personnel Information Technology Personnel	Collaborate with the General Education assessment team in the creation of a rubric(s) to assess problem-solving competencies in our students. Develop and implement a communication plan that helps stakeholders become aware of the changes being made, the results of those changes, and how to be involved. Develop three professional learning courses to establish a common lexicon around problem-solving and the problem-solving process, promote student-centered language, share a common rubric	A set of rubrics that can be used to assess the effectiveness of classroom exercises in teaching problem-solving and communication skills. A common definition, set of terms, and assessment tool(s) will help to spotlight and bring focus to building problem-solving and communication skills in our students. A communication plan. Discipline specific student-centered professional learning modules that will teach how to apply the problem-solving skills needed for that discipline.	**Faculty and Staff Preparedness** Indicator 1. Faculty demonstrate the ability to guide students through the process for problem-solving in their courses. Indicator 2. Staff demonstrate their ability to guide students through a systematic process for problem-solving in their services. **Coursework Emphasizes Problem- Solving** Indicator 3. Students will indicate that their coursework at Wake Tech emphasizes the	**Students Learn Problem-Solving Skills** Outcome 1. Students will demonstrate the problem-solving process in their courses through graded learning assignments/assess-ments. Outcome 2. Students' problem-solving skills will improve as a result of their education at Wake Tech. **Courses Certified to Develop Students' Problem-Solving Skills** Indicator 5. Faculty will develop and certify courses using the QEP Problem-Solving Process.	**Students Implement Problem-Solving Skills in the Workforce** Outcome 3. Employers will indicate that Wake Tech students are able to implement problem-solving skills in jobs and careers

Inputs/Resources The resources you need to carry out your activities, produce outputs, and make progress toward your outcomes.	**Activities** The actions or work you do to produce outputs and make progress toward your outcomes.	**Outputs/Deliverables** Direct products or services that come from carrying out your activities.	**Initial/ Short-term indicators and outcomes**	**Intermediate/ Medium-term indicators and outcomes**	**Ultimate/ Long-term indicators and outcomes**
A method and/or technology to assist with disaggregating and reporting outcomes data. Center for Excellence in Teaching and Learning (CETL) Digital Badging Platform	for assessing problem-solving competencies, and provide some universal ideas on how we can assist students in the development of their problem-solving skills. Engage subject matter experts in each of our disciplines to create modules/courses to share the tools faculty need in those unique career pathways. Develop a micro-credential, digital badge, certification system to recognize the efforts faculty put into improving their teaching methods associated with *Solve It, Say It: A Problem-Solving Process*	A means to recognize and reinforce the efforts faculty will put into learning new student-centered methods to teach problem-solving skills. A collaborative process that identifies best teaching practices and shares them with faculty in other disciplines for use in their classrooms. A means to bring problem-solving skills to the forefront of every student's mind from the beginning of their trek through Wake Tech. A process that produces credentials that show a student has proven problem-solving skills	process needed for problem-solving. Indicator 4. Faculty will indicate that their coursework at Wake Tech emphasizes the process needed for problem-solving.		

Inputs/Resources The resources you need to carry out your activities, produce outputs, and make progress toward your outcomes.	**Activities** The actions or work you do to produce outputs and make progress toward your outcomes.	**Outputs/Deliverables** Direct products or services that come from carrying out your activities.	**Initial/ Short-term indicators and outcomes**	**Intermediate/ Medium-term indicators and outcomes**	**Ultimate/ Long-term indicators and outcomes**
	Emphasizing Communication. Work with CETL to create a method of gathering and distributing the best practices in teaching problem-solving skills across the college. Develop a pre-assessment, activity/application, reflection orientation module for incoming students. Develop a method for students to share their competencies in problem-solving with prospective employers utilizing micro-credentialing and digital badging.	and are recognized by potential employers across Wake County and beyond. A method to disaggregate learning outcomes data for problem-solving. Standards developed by teams of WTCC faculty experts representing departments from across the college through a process that examined many existing general education competencies, rubrics, and related documents from sources both internal and external to Wake Technical Community College (Appendix G)			

Challenges and Barriers

Change is challenging. It will be important to emphasize that the strategies in this QEP build on our current efforts to teach problem-solving. The professional learning requirements are minimal and will be easy to access through a variety of modalities.

Creating the digital badging program for students will present a challenge. There is no college-wide governance nor are there any processes in place to implement this type of program. However, as noted above, there is a pilot project that has laid the foundation for overcoming this challenge. In a voluntary transdisciplinary program between a communications course and an information technology course, students were awarded stackable badges for developing communication and problem-solving skills through a transdisciplinary dialogue. Additionally, there is an effort at the North Carolina Community College System Office to create policies and procedures governing the use of digital badges for both students and faculty. Wake Tech currently has a team contributing to this effort.

The faculty digital badging program will not be as large a challenge. Wake Tech utilized digital badging to recognize the extensive professional learning programs associated with Wake Tech's last QEP, *eLearning Preparedness Initiative across the College (EPIC)*. EPIC awarded digital badges to faculty for completing the 30-hour professional learning program needed to teach online, and there was an additional badge for those that went on to become EPIC Masters. Many of the processes and structures implemented during the *EPIC* program will be adopted for professional learning in this QEP.

While learning outcomes data is currently disaggregated by location and modality, disaggregating problem-solving learning data by student demographic group, like the disaggregation used for course grades, will be a challenge. Current processes for the assessment of learning outcomes at Wake Tech are diverse and can vary by course, program, and division. Both faculty-created sources and vendor-provided sources provide data for learning outcome assessment. The Information Technology Services (ITS) division of Wake Tech is currently developing a method to collect the needed data from its Learning Management System (LMS) for the courses teaching and assessing problem-solving. A taskforce on Learning Outcomes Assessment also recommended that Wake Tech prioritize the following activities: strengthen support for assessment; provide faculty release time for assessment; build technical capacity to improve usage of the gradebook function of the learning management system; and develop better data management processes. In addition, a task force is currently searching for new assessment management software that can integrate with our existing student information system and make learning outcomes data collection and disaggregation more manageable.

RESOURCES

A charter and budget approved by the President and Executive Leadership team have guided and resourced the discovery (Phase I) and development (Phase II) of the QEP. The budget was used to support a faculty-led steering committee through extra pay service contracts. Those contracts and supporting activities totaled close to $200,000.$\underline{00}$ over the 2022-23 and 2023-24 academic years. Future budget will be used to support faculty, department heads, and program managers/directors.

In addition to budget items enumerated below, Wake Tech commits to providing new and existing resources to support the project:

- The President and Executive Leadership Team (ELT) will provide funding and oversight for the QEP implementation.

- The EVP of Programs Council and Deans will serve as an Advisory Committee to provide expertise, insights, and coordination with other strategic plan projects.
- A faculty taskforce will lead the development and teaching of the professional learning modules outlined in the QEP's strategies.
- A new, faculty-led General Education Council will oversee assessment and reporting of Wake Tech's recently revised core competencies, including Problem-Solving.
- Department heads, associate department heads, and program directors/managers will support faculty in the development of assignments and exercises for their courses, assist in mapping course outcomes for assessment, and collaborate with their faculty and Deans on Course Certification.
- The Center for Excellence in Teaching and Learning (CETL) will provide support in the scheduling and administration of professional learning courses.
- Communications and Marketing will develop a communication plan and ensure communication of the QEP at every step.
- A Taskforce subcommittee will develop a short introduction on the importance of learning a problem-solving process for the Enrollment and Student Services team to incorporate into both in-person and online student orientation.
- The Institutional Effectiveness and Research (IER) office will provide project, data, and assessment support.
- Information Technology Services (ITS) will provide support for developing a solution for disaggregating learning outcomes.
- The Tutoring and Learning Center (TLC) will create three student workshops.
- Student support services, including Advising, the Library and Care Teams will embed the QEP problem-solving processes into their student service interactions.

As shown by the organizational structure, implementation plan, and budget that follow, Wake Tech has made an institutional commitment to resource and support the QEP throughout the lifetime of the project.

Organizational Structure

January of 2025 will mark the official launch of the *Solve It, Say It!* QEP. The following elements will be put into place during the five-year implementation plan to achieve the outcomes listed in the logic model (Table 8):

- An organizational structure to provide leadership, oversight, and inspiration.
- Various taskforces to create professional learning courses and build processes and procedures around the digital badging programs.
- An assessment team to track leading and lagging indicators of the success of Wake Tech's efforts and provide the data needed to make strategic adjustments to the QEP.
- A budget to support the efforts of faculty and staff during this implementation.

The Executive Vice President – Chief Programs Officer will be the Project's Champion. The Executive Director of Institutional Effectiveness and Research will serve as the Project Sponsor and the Director of College Initiatives will serve as the QEP Director. Faculty will continue to lead this effort since this plan has its largest impact on an area of learning. Table 9 describes the key roles supporting *Solve It, Say It!*

Table 9. Key Roles

Position	Project Role	Project Responsibilities
Executive Vice President & Chief Programs Officer	Chief Academic Officer	The Chief Academic Officer acts as the project's champion of the QEP and works with the President and Executive Vice President & Chief Operations Officer to ensure its support.
Executive Director, Institutional Effectiveness and Research	Project Sponsor	This person represents the QEP to the Executive Leadership of the College and seeks their final approvals for budget and purpose. The Project Sponsor is responsible for providing project oversight as well as direction and support to the QEP Director and Faculty Leads. In the context of this document, this person approves budget expenditures, the project scope and sets the priority of the project relative to other projects in their area of responsibility.
Director, College Initiatives	QEP Director	The QEP Director is responsible for guiding and directing the project through each of its phases and ensuring deliverables. This person provides support to the QEP Faculty Leads and defines and refines the processes and communication channels needed to successfully complete the purpose of this project.
Faculty (2)	QEP Faculty Lead and Deputy	These faculty are provided with part-time contracts to lead the QEP Steering Committee and action teams and guide the day-to-day implementation of the project and deliverables. The faculty lead and deputy report to the QEP Director.
Coordinator of College Initiatives	Project Coordinator	The Project Coordinator is responsible for providing logistical and administrative support for the project, including processing travel and stipend contracts, and coordinating meetings and events. The Project Coordinator reports to the QEP Director,
Faculty, Department Leaders, Staff, and Administration	QEP Steering Committee	Representatives from academic departments, academic leadership, student-facing staff and their leadership, Information Technology personnel, and a representative from CETL will provide leadership, oversight, and inspiration for the project. These key functional stakeholders will ensure the project is implemented as planned, review data, and recommend activities and changes to achieve the desired outcomes.

Position	Project Role	Project Responsibilities
EVP of Programs Council and Deans	QEP Advisory Committee	The QEP Advisory Committee will support the QEP as follows: provide expertise and insights into current instructional and service activities and initiatives that may impact QEP activities to ensure smooth coordination; provide input into policy matters related to the QEP; evaluate outcomes and recommend changes to ensure the success of the QEP and alignment with its stated outcomes and the college's strategic planning objectives; advocate for the QEP within the community to raise awareness and support; help promote the success of faculty and students working on the QEP.
Faculty, Department Leaders, Communications Staff	Communications Team	The communications team will develop and implement a communications plan that ensures all relevant stakeholders are aware of each step of the QEP.
Subject Matter Experts from Faculty, Staff, & Leadership plus Student Representatives (when appropriate)	QEP Taskforce Team	Taskforce Teams will address the development and support of specific strategies of the QEP. Taskforce team leaders and members will be the Subject Matter Experts that will lead these short-term teams to create courses, develop processes and procedures, and address other issues as they present themselves.
Senior Director of Assessment, Research, and Evaluation	QEP Lead Evaluator	The Lead Evaluator is responsible for guiding and directing the formative and summative assessment processes and data collection. For the purposes of this project, this person provides support and guidance to the Assessment Team Lead, refines processes, and assists with training to successfully achieve the outcomes.
Faculty	QEP Assessment Team Lead	The QEP Assessment Team Lead is a faculty member who is responsible for leading the QEP Assessment Team in the collection and analysis of formative and summative assessment data and sharing this information with the QEP Steering Committee and QEP Director. This position reports to the Senior Director of Assessment, Research and Evaluation.
Faculty and Staff	QEP Assessment Team	The Assessment Team Members are faculty and staff responsible for the collection and analysis of formative and summative assessment data. Faculty with experience as Assessment, Research and Evaluation fellows of the Institutional Effectiveness and Research Office are core members of this team.

Position	Project Role	Project Responsibilities
Faculty	General Education Assessment Manager	The General Education Assessment Manager is a half-time position held by a faculty member that oversees the assessment of Wake Tech's "Eagle Essentials", which are Wake Tech's institution-level core competencies (Written Communication, Oral Communication, Quantitative Literacy and Problem-Solving). This position chairs the General Education Council, ensures quality assessment of Wake Tech's Eagle Essentials, ensures the completion and communication of General Education assessment plans and reports, and works with the QEP Faculty Leads, and QEP Assessment Teams to ensure close alignment of activities with the QEP with regard to problem-solving. This position reports to the Senior Director of Assessment, Research and Evaluation.
Faculty (8)	General Education Council	The General Education Council is responsible for reviewing General Education data and plans and writing general education assessment reports and communicating the results and conducting professional learning sessions on General Education assessment.

The QEP Director will work directly with the QEP Faculty Leads to guide and direct each step of Phase III (implementation). The QEP Faculty Leads will play an active role in the implementation by guiding, supporting, and reporting on the various steps of the implementation as Wake Tech moves through this five-year plan. The QEP Steering Committee will be directed by the QEP Faculty Leads and provide leadership, oversight, and inspiration during the implementation. This group will meet twice in the spring and twice in the fall semesters. Taskforce Teams will be formed to address the creation of professional learning opportunities and courses; develop micro-credential/digital badging processes, procedures, and programs; and address new needs as they present themselves. Taskforce Teams will be very focused and consist of Subject Matter Experts in the area that the team has been assigned to address. Taskforce Teams are short-term and designed to address one topic. Their meeting structure will be determined by the deliverables they are commissioned to produce. The Assessment Team is a long-term team that will provide formative and summative assessment data and analysis to the QEP Director and QEP Steering Committee.

The QEP Faculty Leads, Assessment Team, and Taskforce Teams will be performing duties outside of their defined position descriptions and will either be compensated for the extra effort they put forth or their current job assignments will be realigned to the new service they are performing for the college. The investment of this compensation and assignment realignment will be a major portion of the implementation budget outlined in the next section.

Implementation Timeline

As noted in the "Strategies and Tactics" section, the following QEP strategies and their related tactics will be implemented over a five-year period:

- Develop a College-Wide Terms, Definitions and Steps (While this step is complete, it must still be implemented)
- Support Faculty and Staff Through Professional Learning
- Teach and Assess Problem-Solving
- Incentivize Teaching and Learning Through Digital Badging
- Reinforce Problem-Solving Through Student Support Services

Table 10 provides a timeline of activities to accomplish each strategy over the next five years.

Table 10. QEP Implementation Timeline

Strategy – Professional Learning		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
Create Common Language Module (Synchronous)	Faculty Taskforce	X														
Offer Create Common Language Module (Synchronous)	Faculty and CETL			X	X	X	X	X	X	X	X	X	X	X	X	X
Create Common Language Module (Asynchronous)	Faculty Taskforce		X													
Offer Create Common Language Module (Asynchronous)	Faculty and CETL			X	X	X	X	X	X	X	X	X	X	X	X	X
All Faculty required to complete the Common Language Module	Faculty							X	X	X	X	X	X	X	X	X

Strategy – Professional Learning		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
All Staff required to complete the Common Language Module	Staff									X	X	X	X	X	X	X
Create College Standards Module (Synchronous)	Faculty Taskforce	X														
Offer College Standards Module (Synchronous)	Faculty and CETL			X	X	X	X	X	X	X	X	X	X	X	X	X
Create College Standards Module (Asynchronous)	Faculty Taskforce		X													
Offer College Standards Module (Asynchronous)	Faculty and CETL			X	X	X	X	X	X	X	X	X	X	X	X	X
All Faculty required to complete the College Standards Module	Faculty						X	X	X	X	X	X	X	X	X	X
All department heads, associate department heads, program managers/directors required to complete the College Standards Module	Department heads, associate department heads, and program mangers/directors			X	X	X	X	X	X	X	X	X	X	X	X	X
Create Student-Centered Language Module (Synchronous)	Faculty Taskforce	X														

Strategy – Professional Learning		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
Offer Student-Centered Language Module (Synchronous)	Faculty and CETL			X	X	X	X	X	X	X	X	X	X	X	X	X
Create Student-Centered Language Module (Asynchronous)	Faculty Taskforce		X													
Offer Student-Centered Language Module (Asynchronous)	Faculty and CETL			X	X	X	X	X	X	X	X	X	X	X	X	X
Subject Matter Experts begin creating career specific activities, assignments, and exercises for program courses	Division/Department Lead				X	X	X	X	X	X	X	X	X	X	X	X

Strategy –Teach and Assess Problem-Solving		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
Teach and assess problem-solving in each degree program	Deans, program managers/directors, faculty						X	X	X	X	X	X	X	X	X	X
Strengthen learning outcomes assessment skills, knowledge, and culture	IER and CETL Staff	X	X	X	X	X										

Strategy –Teach and Assess Problem-Solving		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
Increase capacity and support of faculty in the collection and disaggregation of learning data	ELT and IER Office	X	X	X	X	X										
Identify a method for collecting and disaggregating problem-solving learning data (may include software demonstrations)	QEP Assessment Team; General Education Assessment Team, IER and ITS	X	X													
Pilot a method for collecting and disaggregating problem-solving learning data	QEP Assessment Team; General Education Assessment Team, IER and ITS			X	X	X										
Implement a method for collecting and disaggregating problem-solving learning data	QEP Assessment Team; General Education Assessment Team, IER and ITS						X	X	X	X	X	X	X	X	X	X
Create a process for certifying courses that teach and assess problem-solving process	Faculty Taskforce						X									

Strategy –Teach and Assess Problem-Solving		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
Implement process for certifying courses that teach and assess problem-solving process	Faculty Taskforce							X	X	X	X	X	X	X	X	X

Strategy – Reinforce Problem-Solving Through Student Support Services		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
Create an introduction to the problem-solving process and reasons it is important for the student orientation.	Enrollment and Student Services	X	X													
Offer an introduction to the problem-solving process and reasons it is important through the student orientation.	Enrollment and Student Services			X	X	X	X	X	X	X	X	X	X	X	X	X
Create TLC Workshops	Tutoring and Learning Center (TLC)			X	X											
Offer TLC Workshops	Tutoring and Learning Center (TLC)						X	X	X	X	X	X	X	X	X	X

Strategy – Digital Badging Processes		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
Create a digital badging process to recognize student proficiency in the problem-solving process	Faculty Taskforce and ITS				X											
Create a module to teach the digital badging process to recognize student proficiency in the problem-solving process	Faculty Taskforce, ITS						X									
Implement a digital badging process to recognize student proficiency in the problem-solving process	Faculty Taskforce						X	X	X	X	X	X	X	X	X	X
Offer a module to teach the digital badging process to recognize student proficiency in the problem-solving process	CETL							X	X	X	X	X	X	X	X	X

Strategy – Digital Badging Processes		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
Create a digital badging process to incentivize faculty to teach and assess the problem-solving process and learn how to award digital badges to students	Faculty Taskforce				X											
Offer a digital badging process to incentivize faculty to teach and assess the problem-solving process and learn how to award digital badges to students	CETL						X	X	X	X	X	X	X	X	X	X
Create a digital badging program to provide staff with the opportunity to demonstrate their knowledge and skills in the *Solve It! Say It!* problem-solving process	Faculty/Staff Taskforce				X											

Strategy – Digital Badging Processes		2024-25		2025-26			2026-27			2027-28			2028-29			2030
Activities	**Responsibility/Resources**	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA	SP	SU	FA
Create a digital badging program to provide staff with the opportunity to demonstrate their knowledge and skills in the *Solve It! Say It!* problem-solving process	CETL						X	X	X	X	X	X	X	X	X	X

Budget

In addition to the institutional commitment of existing resources described above, Wake Tech will devote budget to pay stipends to faculty, department heads, associate department heads, and program directors/managers to work on the project and to send faculty and staff to conferences, courses, and other learning opportunities to develop expertise. Wake Tech will also share the best practices that are developed with other institutions through presentations and publications. Table 11 is an estimate of the budget needed to implement the QEP over the next five years.

Table 11. QEP Budget (2025 – 2030 by Academic Year)

QEP Budget: 2025-2030 (by Academic Year)										
(All stipends calculated at $32 per hour with a fringe calculation of 33%)										
Item	**Description**	**2024-25**	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**New Money**	**Existing Money**	**Notes/Total Budget**
Stipends for Academic Personnel										
QEP Faculty Lead Stipends + Fringe or release time	Lead & Deputy > Spring & Fall (10 hrs./wk.) Summer (5hrs/wk.) - Begins Jan. 2025 - ends Dec. 2029	$13,619	$31,494	$31,494	$31,494	$31,494	$17,875		$157,470	IER budget
Taskforce Stipends + Fringe (Taskforce teams will create the Professional Learning modules, develop digital badging programs)	Estimated at 5 hrs./wk. for the lead and 2 hrs./wk. for members (5) of each Taskforce Team - Stipends for each team will be ~$10,214/semester	$43,680	$61,284					$104,964		

Item	Description	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	New Money	Existing Money	Notes/Total Budget
Stipends for Academic Personnel										
Stipend for Faculty to teach QEP Professional Learning Modules	Estimated at 1 hrs./wk. for 3 modules = $32/hr. x 42 hrs. (Fall +Spring + Summer -> 16 hrs. for Fall of 2029 only) + Fringe x 3 Instructors		$5,362	$5,362	$5,362	$5,362	$2,043	$23,491		
General Education Assessment Manager	Estimated at 20 hrs./wk.	$35,750	$35,750	$35,750	$35,750	$35,750	$35,750		$214,500	IER budget
Stipends for General Education Council	Estimated at 2 hrs./wk. for council members (8)	$21,791	$21,791	$21,791	$21,791	$21,791	$21,791	$130,746		
Stipends for General Education Competency Development Teams	Estimated at 1 hrs./wk. for 8 wks. for 17 team members	$5,788						$5,788		

Item	Description	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	New Money	Existing Money	Notes/Total Budget
Stipends for Academic Personnel										
Stipends for QEP Assessment Team	Estimated at 5 hrs./wk. for the lead and 2 hrs./wk. for members (3) x 2 semesters	$14,981	$14,981	$14,981	$14,981	$14,981	$14,981		$89,886	IER budget
Stipends for faculty leads and/or department heads/program managers responsible for the collection, disaggregation, and reporting of learning outcomes in the 22 courses where problem-solving will be directly assessed.	Estimated for ~22 people @ 2 hrs./wk. x 32 wks. in 2026-27; 1 hr./wk. x 32 wks. in 2027-28 and 1 hr./wk. x 16 wks. in 2028-29			$59,924	$29,926	$14,981		$104,831		Cost is for making the change: 1) from collecting aggregate learning outcomes data to student-level learning outcomes data; 2) reporting that data in a new Assessment Management System 3) mapping assignments to rubrics, outcomes, and the problem-solving competency

Item	Description	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	New Money	Existing Money	Notes/Total Budget
Stipends for Academic Personnel										
TLC Workshops Development	TLC PT Faculty - 5 hrs./wk. x 32 wks. X 2		$13,619	$13,619				$27,238		
Learning and Sharing										
Faculty and staff Conference Travel or Guest Speakers for Learning			$10,000	$10,000				$20,000		
Faculty and staff travel to share results					$10,000	$10,000	$10,000	$30,000		
Communication										
Promotional Items	Pens, note pads, stickers, magnets, stress reliever, cups, etc.	$2,000	$2,000	$1,000	$1,000	$1,000		$7,000		

Item	Description	2024-25	2025-26	2026-27	2027-28	2028-29	2029-30	New Money	Existing Money	Notes/Total Budget
Communication										
Printing	Posters, tent cards, info cards, etc.	$500	$500					$1,000		
Tablecloths	2	$600						$600		
Retractable Banners	2	$800						$800		
Food/Drink	Milestone Celebrations	$1,500			$1,500		$2,000	$5,000		
Totals		**$141,009**	**$196,781**	**$193,921**	**$151,804**	**$135,359**	**$104,440**	**$461,458**	**$461,856**	**$923,314**
		2024-25	**2025-26**	**2026-27**	**2027-28**	**2028-29**	**2029-30**	**New Money**	**Existing Money**	**Total Budget**

BROAD-BASED SUPPORT

Many stakeholders have been involved in the topic discovery and development of this QEP (See Appendices A, B, C and D). Faculty, staff, students, and leadership have engaged through the discovery and development phases and will remain engaged as we begin to implement *Solve It, Say It!* At every step of the Phases I and II, the QEP steering committees sought college-wide input and support for the initiative, continuously soliciting feedback from their peers, supervisors, divisions, and students to gain insights and institutional support for the strategies and tactics provided herein. Faculty and students were surveyed and provided feedback during the topic discovery process in Phase I. In Phase II, the faculty were invited to share in the creation of the strategies in focus groups or by survey if they could not attend a focus group. Students were surveyed regarding the digital badging program. A college-wide contest involving faculty, staff, and students contributed to the name and logo for this QEP. Finally, initial drafts of the QEP were sent college-wide for feedback and comment.

There is widespread support of the QEP. The challenge will be in sustaining this support. Change management strategies have been embedded in the QEP to sustain broad-based support over the next five years, as follows.

Students

As discussed in the Assessment and Evaluation Plan, students will have multiple opportunities to solve problems and communicate solutions in their classes. They will also learn the problem-solving process when they engage with student support services. Students will have multiple opportunities to reflect on the extent to which they are learning problem-solving through courses evaluations and surveys.Their learning will be incentivized through a digital badging program.

Faculty

Klempin and Pellegrino (2020) argue that practitioners are more likely to modify their behaviors to make a change when they participate in the planning of the change. That is why faculty led and developed this QEP. Faculty have taught problem-solving skills for a very long time, and while problem-solving doesn't represent an "add-on", it does ask them to modify and focus the instruction they are already delivering. There has never been a college-wide process or common terms and definitions that would help students learn and apply this skill from course to course or beyond Wake Tech. By taking a few hours of professional learning and applying it to courses where they are already teaching problem-solving, faculty will be able to improve the extent to which students learn and demonstrate problem-solving in the classroom and in their future jobs and careers.

However, learning a new way of teaching problem-solving does not automatically translate to practice (Bartek et.Al., 2022). Analyzing and communicating the results of the QEP Assessment and Evaluation plan, engaging supervisors at every step of the way, and communicating its importance from all levels of leadership will be important to changing teaching behaviors. Support, recognitions and incentives will also be provided all along the way. Faculty will be supported through learning modules, which will be incentivized through digital badging. As shown in the Assessment and Evaluation plan, faculty will have multiple opportunities to continue to provide feedback. They will also be able to certify their courses meet the college's standards for problem-solving. In addition to digital badging, they will be recognized for their efforts in newsletters and through other communications (see below).

Faculty Supervisors

Supporting faculty supervisors is critical, as change happens at the department level (Bartek et.Al. (2022). Therefore, supervisors will engage in the same professional learning experiences as their instructors, which will give them the tools to help faculty develop activities, assignments, and other opportunities for their students to learn the problem-solving process and assess student proficiency in these skills.

Student Support Staff

To reinforce the changes happening in the classroom, Wake Tech's student support staff will modify the terms and approaches they use to help students reach their goals. A change to common terms and language used to guide students will reinforce the activities in the classroom and provide students with the opportunity to apply these skills to problems that have a direct effect on their lives. Tutoring and Learning Center workshops will provide students the opportunity to learn and practice the problem-solving process as they get help in specific areas of learning where they struggle. Advising Care Teams will adopt the *SolveI! Say it!* process into their advising and student success models. Wake Tech Libraries and Enrollment and Student Services will reinforce the language in their interactions with students.

Communication

Continuous collaboration and communication about the importance of the QEP throughout its life cycle and among all levels of the college will be critical to sustain its momentum (Bartek et.Al., 2022). Therefore, a communication plan for all organizational levels will be developed for the next five years to ensure all stakeholders are aware of the importance of the changes that are being made, the results of those changes, how the campus community can become involved, and the recognitions and rewards for making the change. Events and newsletters celebrating accomplishments will recognize faculty and staff who have made the change. In addition, promotional items, banners, informative handouts, etc. will help build awareness.

ASSESSMENT AND EVALUATION

Assessment Team

The purpose of the Assessment Team is to complete formative and summative evaluation of the QEP to ensure the project is: (1) increasing student learning and success with problem-solving while students are at Wake Tech, and (2) increasing successful outcomes when the students move beyond Wake Tech to the workforce or on to other educational opportunities. The team will be responsible for developing (and revising as needed) a detailed formative and summative assessment plan including both direct and indirect measures for the different stages of development over the five years. The team will collect, compile, and review outcomes assessment reports with input from implementation teams, as well as use internal and external data sources to prepare internal reports for the QEP Steering Committee on the effectiveness of the QEP.

The assessment team has already formed in the development phase and includes an Assessment Lead (Professor of Sociology); three additional faculty who also serve as Assessment, Research, and Evaluation Fellows for the college, two research analysts; and a Senior Director of Assessment, Research and Evaluation. During the implementation stage of the project, others will join the team, such as the General Education Assessment Manager.

The Institutional Effectiveness and Research office has conducted many large-scale studies related to student success and outcomes, as well as supported the previous Quality Enhancement Plan to a successful completion. The Assessment Lead has five years of leadership expertise on Wake Tech's previous QEP, social science research experience, and more than seventeen years as a faculty member. The Assessment, Research, and Evaluation Fellows have expertise in conducting research, writing reports, and working as faculty members.

QEP Assessment and Evaluation Plan

Both a formative and summative evaluation using multiple measures will be used to evaluate the QEP. The formative evaluation will begin upon project implementation and last through the project's life cycle. Formative evaluation activities are designed to identify ways the project could be changed or refined to improve the likelihood that intended objectives and outcomes are obtained. There may be unexpected gains for the students or other stakeholders from the project, too, that would be captured through formative evaluation. Many of the formative indicators and related instruments discussed below are already a part of the existing assessment processes at the college. The information gained from them will support the success of the essential summative outcomes. In the cases where new material will need to be developed like Formative Indicator 1, the assessment lead can build on the success of similar work during the previous QEP in collaboration with the implementation teams.

Baseline data for the summative evaluation will begin in Spring 2025. Summative evaluation activities are designed to measure the degree to which intended objectives and outcomes are obtained. Through using multiple measures, the summative evaluation will assess the extent to which implementation of the QEP has achieved its desired results. New assessment processes are being developed to account for summative outcomes and will be discussed below. Additionally, targets for each of the measures for the summative outcomes can be found in the measures section for each outcome below.

Formative Assessment

Formative Indicator 1: Faculty demonstrate the ability to guide students through the process for problem-solving in their courses.

Formative Indicator 2: Staff demonstrate their ability to guide students through a systematic process for problem-solving in their services.

- **Module 1: Common Language** module will be created by Spring 2025 and will be offered starting Fall 2025. Faculty will complete the required module by Spring 2027, and staff will complete the required module by Fall 2027. See Annual Implementation Checks (Table 12) for formative operational assessment questions.
    - **Direct Assessment Measures (Knowledge Checks):**

      Knowledge checks will be developed within Module 1 to assess faculty and staff knowledge of common language, understanding the problem-solving process, and knowledge of types of prompts and activities to be used with students. Later in the implementation stage, a target will be set to identify the desired percentage of faculty and staff who demonstrate an acceptable level of proficiency.

    - **Indirect Assessment Measures (Stakeholder and Participant Feedback and Perception Data):**

A post-module survey will ask participants to indicate whether and how the module helped/increased their understanding of common language, the problem-solving process and prompts and activities. The survey will likely use a Likert scale for the participants to indicate the level of impact they believe the module had on each of these areas and will include an option for providing qualitative comments. The specific questions and scale values will be determined once the content of the modules is developed.

- **Module 2: College Standards** will be created by Spring 2025 and will be offered starting Fall 2025. Faculty will complete the required module by Spring 2026. All department heads, associate department heads, and program managers/directors will complete Module 2 with or before the first faculty from their departments. See Annual Implementation Checks (Table 12) for formative operational assessment questions.
    - **Direct Assessment Measures (Knowledge Checks):**

      Knowledge checks will be developed within Module 2 to assess faculty and supervisor knowledge of standards for assessing the problem-solving process, how to support learning of the problem-solving process, and how to support assessment of learning (e.g., developing rubrics in alignment with standards). Later in the implementation stage, a target will be set to identify the desired percentage of faculty and supervisors who demonstrate an acceptable level of proficiency.

    - **Indirect Assessment Measures (Stakeholder and Participant Feedback and Perception Data):**

      A post-module survey will ask participants to indicated whether and how the module helped/increased their knowledge of the standards for assessing the problem-solving process, how to support learning of the problem-solving process, and how to support assessment of learning. The survey will likely use a Likert scale for the participants to indicate the level of impact they believe the module had on each of these areas and will include an option for providing qualitative comments. The specific questions and scale values will be determined once the content of the modules is developed.

- **Module 3: Student-Friendly Language** will be created by Spring 2025 if existing professional development does not exist and will be offered starting Fall 2025. This module will be optional for all faculty and staff but perhaps an incentive (e.g., digital badging) will be offered to encourage participation. See Annual Implementation Checks (Table 12) for formative operational assessment questions.
    - **Direct Assessment Measures (Knowledge Checks):**

      Knowledge checks will be developed within Module 3 to assess faculty and staff knowledge of student-friendly language, inclusive pedagogy, and creating a welcoming environment. Later in the implementation stage, a target will be set to identify the desired percentage of faculty and supervisors who demonstrate an acceptable level of proficiency.

    - **Indirect Assessment Measures (Stakeholder and Participant Feedback and Perception Data):**

      A post-module survey will ask participants to indicate whether and how the module helped or increased their understanding of student-friendly language, inclusive pedagogy, and creating a welcoming environment. The survey will likely use a Likert scale for the

participants to indicate the level of impact they believe the module had on each of these areas and will include an option for providing qualitative comments. The specific questions and scale values will be determined once the content of the modules is developed.

Formative Indicator 3: Students will indicate that their coursework at Wake Tech emphasizes the process needed for problem-solving.

- **Direct Assessment Measures (Student Course Evaluations):**

  A Student Course Evaluation is already in place at Wake Tech and is available for students to take at the end of each course. In implementation, a few questions will be added to the survey to address the problem-solving process. These new questions will go through an approval process through the EVP of Programs Council. It is likely that some questions would go into the "Delivery of Content" section and be in the Likert-scale format, similar to the existing questions on a scale of Strongly Agree to Strongly Disagree. A new section on problem-solving may be considered. These questions could cover the process needed for problem-solving or perceived learning gains related to problem-solving, such as:

  - This course emphasized the problem-solving process.
  - I used the problem-solving process in this course.
  - This course improved my problem-solving skills.
  - I interacted with peers to solve problems.

  The proposed questions will be added before the modules are implemented to provide baseline data for comparison. The Assessment Team will explore adding a qualitative feedback question to determine students' experience of working through the process and how they feel it might benefit them in the future.

- **Indirect Assessment Measures (CCSSE):**

  Wake Tech administers the Community College Survey of Student Engagement (CCSSE) biennially. In addition to baseline data provided in Item 11 on the CCSSE as detailed in Table 5, Item 5 will also be monitored. Item 5 asks students to reflect on whether their coursework during the current academic year (the year in which the survey is administered) has emphasized several mental activities relevant to the problem-solving process, including:

  - Analyzing the basic elements of an idea, experience, or theory (relevant to Step 1: Define and Step 2: Learn)
  - Forming a new idea or understanding from various pieces of information (relevant to Step 3: Brainstorm)
  - Applying theories or concepts to practical problems or in new situations (relevant to Step 4: Plan and Step 5: Try it out)
  - Making judgments about the value or soundness of information, arguments, or methods (relevant to Step 6: Evaluate it and Step 7: Reflect on it)

  The mean scores for each element of Item 5 from the two previous CCSSE administrations (2019 and 2022) are listed below.

  - Analyzing the basic elements of an idea, experience, or theory

    - 2019 mean: 3.00 (N=1,569)
    - 2022 mean: 3.14 (N=868)
- Forming a new idea or understanding from various pieces of information
    - 2019 mean: 2.88 (N=1,560)
    - 2022 mean: 3.07 (N=868)
- Applying theories or concepts to practical problems or in new situations
    - 2019 mean: 2.85 (N=1,563)
    - 2022 mean: 3.01 (N=868)
- Making judgments about the value or soundness of information, arguments, or methods
    - 2019 mean: 2.69 (N=1,563)
    - 2022 mean: 2.83 (N=868)

Formative Indicator 4: Faculty will indicate that their coursework at Wake Tech emphasizes the process needed for problem-solving.

- **Indirect Assessment Measures (CCFSSE):**

  The Community College Faculty Survey of Student Engagement (CCFSSE) is also a national survey eliciting information from faculty about their perceptions regarding students' educational experiences, their teaching practices, and the ways they spend their professional time. The questions are similar to CCSSE and ask faculty to reflect on whether their coursework during the current academic year (the year in which the survey is administered) has emphasized several mental activities relevant to the problem-solving process, including:

  - Analyzing the basic elements of an idea, experience, or theory (relevant to Step 1: Define and Step 2: Learn)
  - Forming a new idea or understanding from various pieces of information (relevant to Step 3: Brainstorm)
  - Applying theories or concepts to practical problems or in new situations (relevant to Step 4: Plan and Step 5: Try it out)
  - Making judgments about the value or soundness of information, arguments, or methods (relevant

  The baseline mean scores for each of these items from the previous CCFSSE administration (2022) are provided below. Similar to the student perceptions, faculty indicated “making judgments about the value or soundness of information, arguments, or methods” was emphasized the least among these mental activities.

  - Analyzing the basic elements of an idea, experience, or theory
    - 2022 mean: 3.15 (N=314)
  - Forming a new idea or understanding from various pieces of information
    - 2022 mean: 3.12 (N=314)
  - Applying theories or concepts to practical problems or in new situations
    - 2022 mean: 3.21 (N=314)
  - Making judgments about the value or soundness of information, arguments, or methods
    - 2022 mean: 2.9 (N=314)

To gather trend data for these items and to monitor improvement over time following implementation of the QEP, the college plans to administer the CCFSSE on a biennial basis starting in Spring 2026.

Formative Indicator 5: Faculty will develop and certify courses using the QEP Problem-Solving Process

- **Direct Assessment Measures (Course Certifications):**

  Faculty teams will be able to certify all sections of their courses teach problem-solving according to the QEP process by including a student learning outcome linked to the problem-solving process, an exercise or assignment for students, and an assessment of student proficiency in the problem-solving process skills.

  Targets: The target for two years after the creation of the certification program will be for 20% of all courses in degree programs to be certified in the Problem-Solving Process.

The target for after four years will be for 40% of all curriculum courses to be certified.

Summative Evaluation

Summative Outcome 1: Students will demonstrate the problem-solving process in their courses through graded learning assignments/assessments.

Target: 75% of students will demonstrate the problem-solving process through graded learning assignments/assessments by Spring 2030.

- **Direct Assessment Measures (Graded Learning Assignments/Assessments):**

  While all faculty will be required to participate in the problem-solving process modules and will be encouraged to develop opportunities for students to learn and implement problem-solving skills in all their courses, direct assessment of student learning of the problem-solving process will occur in the courses used for direct assessment for the college's Problem-Solving General Education Core Competency. The recommended General Education courses for assessing Problem-Solving include ACA 122, MAT 110, MAT 143, MAT 152, MAT 171, HUM 115, PSY 118, and PSY 150. The vast majority of programs at Wake Tech require at least one of these courses. The programs that do not require at least one of these courses will be required to assess students' learning of the problem-solving process in a program-specific course. AAS programs that will use program-specific courses for direct assessment include: Advertising and Graphic Design, Cloud Infrastructure, Computer Programming & Information Sciences, Cybersecurity, Data Science and Programming Support Services, IT Services and Support, Health Care Administration, Medical Billing and Coding, Medical Office Professional, Networking Technology, Office Administration Professional, Simulation and Game Development Art & Modeling, Web & UX Design, and Web Developer. For the list of these programs and their program codes, refer to Appendix I.

  Concurrent to the work the QEP Steering Committee completed on the problem-solving topic in Fall 2023 and Spring 2024, a General Education Competency Team, charged with reviewing and revising Wake Tech's General Education Assessment Plan, developed standards for each of the four competencies (Written Communication, Oral Communication, Quantitative Literacy and Problem-Solving). The QEP Assessment Team and General Education Assessment Team collaborated to ensure alignment between the Problem-Solving Standard and the QEP's problem-solving process (see Problem-Solving Standard, Appendix G). This standard includes a problem-solving definition, categories for the problem-solving process, and criteria for meeting a level of mastery in the problem-solving process for General Education. While all programs will have the option to create their own

program-specific levels of mastery for the problem-solving process, programs that do not require the specific General Education courses used to assess problem-solving will be required to do so.

Assessment of problem-solving in the General Education and relevant program-specific courses will begin in Fall 2025, providing Academic Year 2025-2026 as the baseline for this direct assessment of student learning of the problem-solving process. This baseline data will be used to inform development of appropriate targets to achieve following implementation of the QEP. At present, Wake Tech's ITS is developing technological solutions for disaggregating learning outcome data by student demographics. Once a solution is implemented, the data will be disaggregated by race-ethnicity to determine the college's progress toward closing racial-ethnic gaps in students' demonstration of problem-solving skills.

Summative Outcome 2: Students' problem-solving skills will improve as a result of their education at Wake Tech.

Target: 75% of students will indicate that their level of proficiency in problem-solving strongly improved by Spring 2030.

- **Indirect Assessment Measures (Wake Tech Graduate Survey):**

  The Wake Tech Graduate Survey is a continuously open survey listed as a requirement for Wake Tech students to take when they apply to graduate. A section of the survey asks students to indicate whether they believe their level of proficiency with the college's competencies "Strongly Improved," "Moderately Improved," or "Did Not Improve" as a result of their Wake Tech education. Baseline data for problem-solving is provided in Figure 5 and will be used to determine whether or not there is improvement of student perceptions of whether their problem-solving skills have improved as a result of their Wake Tech education.

Summative Outcome 3: Employers will indicate that Wake Tech students are able to implement problem-solving skills in jobs and careers.

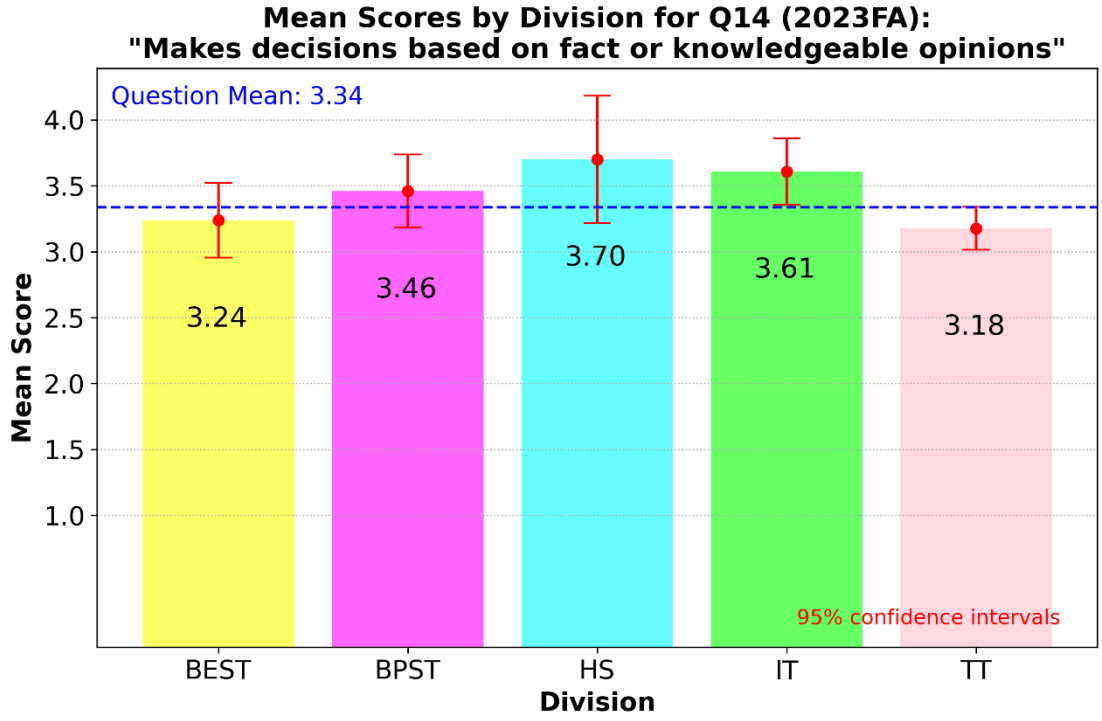
Target: 3.75 overall mean (between Very Good and Outstanding) for items in the Problem-Solving and Decision-making category as indicated by employers of Wake Tech by Spring 2030.

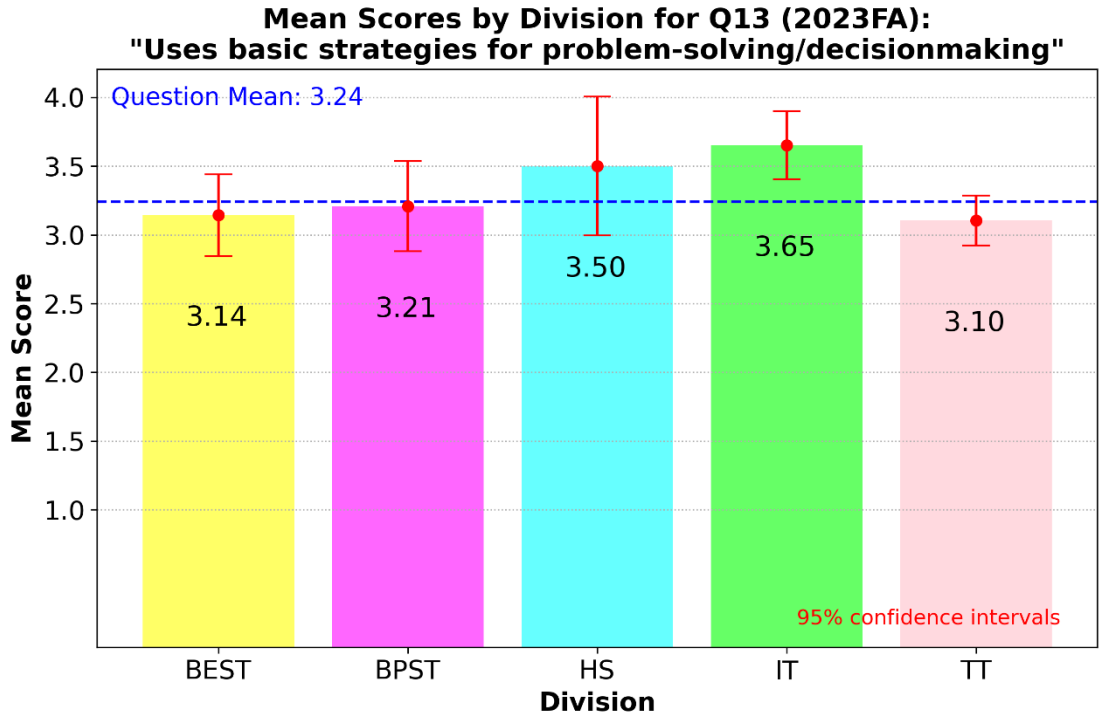
- **Indirect Assessment Measures (Work-Based Learning Survey):**

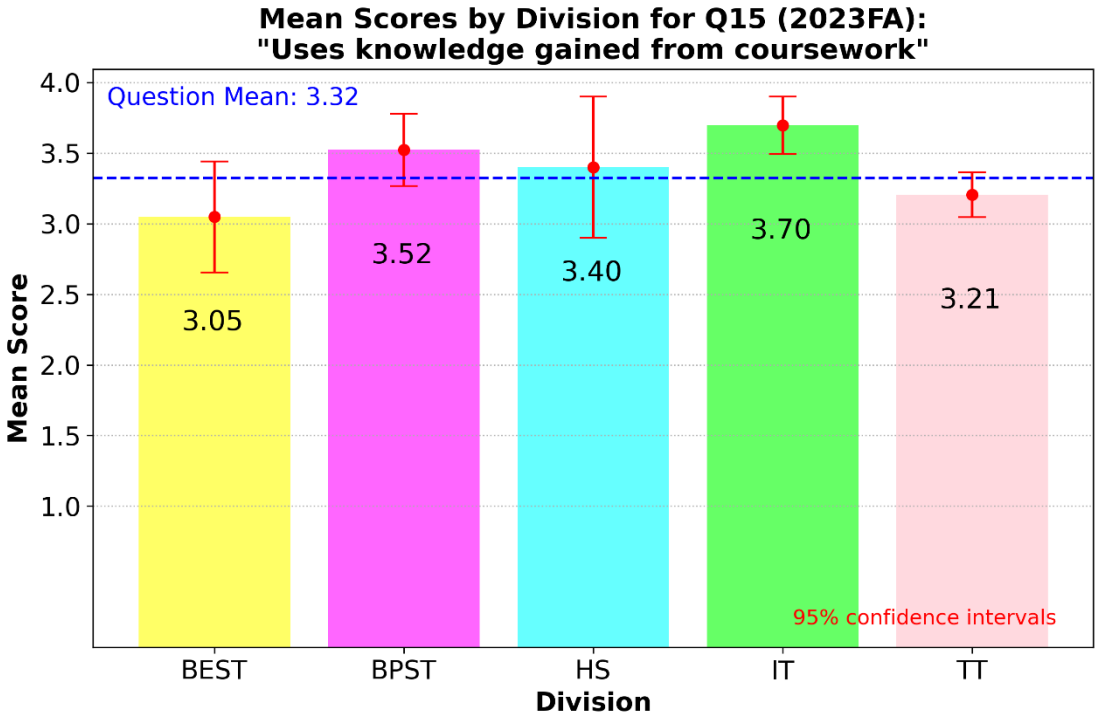
  The Work-Based Learning (WBL) Employer Survey is conducted at the end of each semester (Fall, Spring, Summer) among employers of students engaged in Work-Based Learning who are enrolled in in the following five divisions at Wake Tech: Building, Engineering, and Skilled Technologies (BEST), Business and Public Services Technologies (BPST), Health Sciences (HS), Information Technologies (IT), and Transportation Technologies (TT). The WBL surveys asked employers to rate student workers for each of 17 performance items (questions) on a scale from 1 to 4: 1 - Below Average, 2 - Average, 3 - Very Good, 4 - Outstanding. Respondents could also mark 0 for Not Applicable.

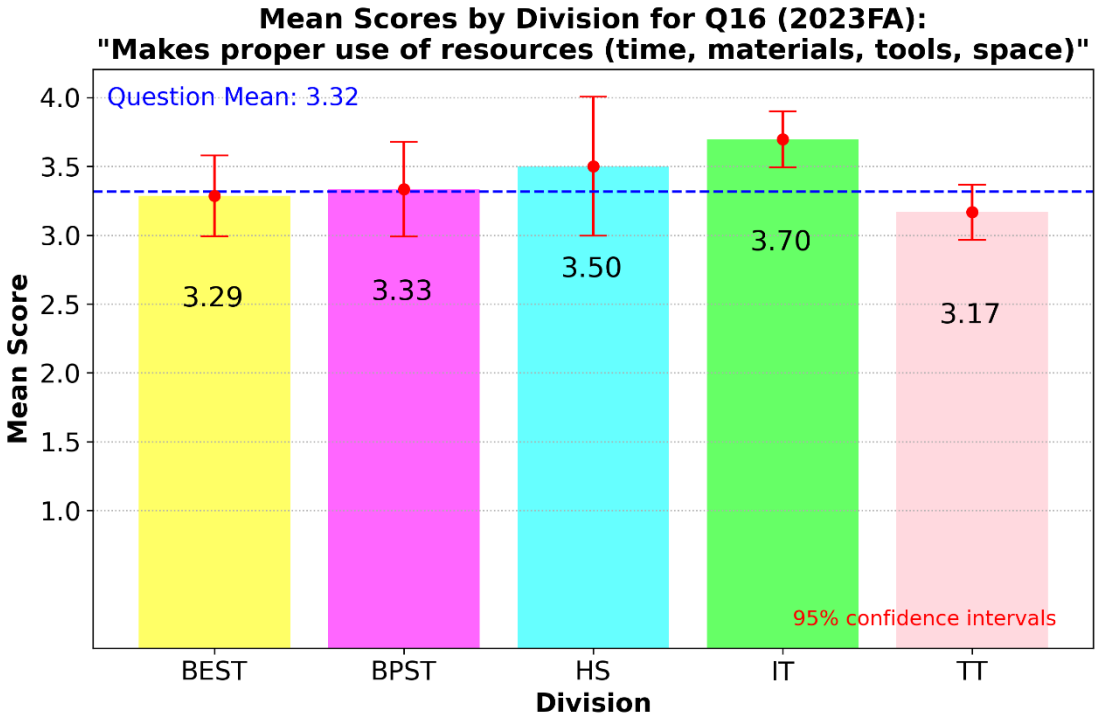
  In Fall 2023, the overall mean for items in the Problem-Solving and Decision-making category was 3.33. The following charts show the means for each item within the Problem-Solving and Decision-Making category by academic division, which will be used as baseline data.

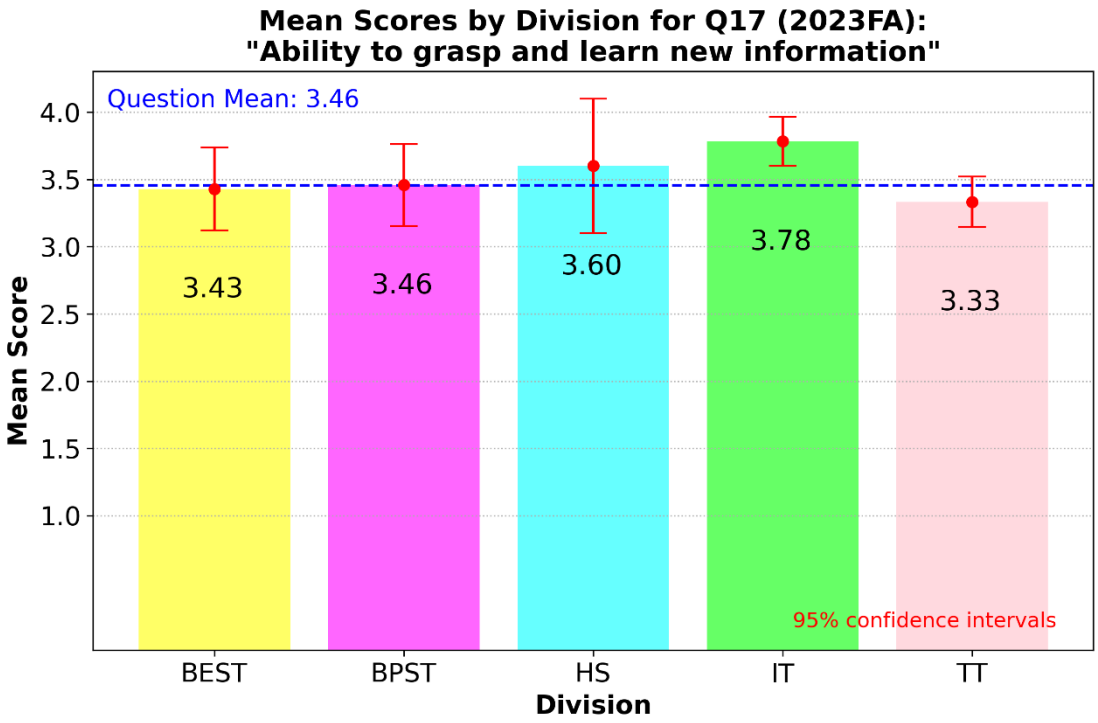
Figure 12. Mean Scores for Problem-Solving/Decision-Making by Division






Mean Scores by Division for Q15 (2023FA):
"Uses knowledge gained from coursework"
Question Mean: 3.32
Mean Score
4.0
3.5
3.0
2.5
2.0
1.5
1.0
3.05
3.52
3.40
3.70
3.21
95% confidence intervals
BEST
BPST
HS
IT
TT
Division


Mean Scores by Division for Q16 (2023FA):
"Makes proper use of resources (time, materials, tools, space)"
Question Mean: 3.32
Mean Score
4.0
3.5
3.0
2.5
2.0
1.5
1.0
3.29
3.33
3.50
3.70
3.17
95% confidence intervals
BEST
BPST
HS
IT
TT
Division



- ***Indirect Measures: Wake Tech Advisory Committee Survey***

  Wake Tech's Advisory Committee Survey will also be distributed among external program advisors to ask for their perspectives on the extent to which Wake Tech's degree students achieve the college's core competencies, including Problem-Solving. Due to the college's reorganization of advisory committees beginning in 2022, this survey has not been administered since the 2021-2022 academic year and will be revised to align with the items in the Problem-Solving and Decision-Making category in the Work-Based Learning Employer Survey. The Assessment Team will recommend that the revised Advisory Committee Survey is administered at the end of Academic Year 2024-2025 to utilize results for a baseline and to inform development of appropriate targets for improvement following implementation of the QEP.

Implementation Checks

In addition to conducting summative assessment, the assessment team will complete implementation check-ins each semester, which will be included in the annual reports to the steering committee. See Table 12 for the timeline of implementation check-ins.

Table 12. Annual Implementation Check-ins for Modules and Digital Badges

	Spring 2025	Summer 2025	Fall 2025	Spring 2026	Fall 2026	Spring 2027	Fall 2027	Spring 2028	Fall 2028
Module 1	Was the module created?		Was the module offered?			Have all faculty completed the module?	Have all staff completed the module?		
Module 2	Was the module created? Has a policy been developed for all supervisors to complete module?	Have all supervisors completed the module?	Was the module offered to faculty?				Have all faculty completed the module?		
Module 3	Was the module created?		Was the module offered?	How many faculty completed the trainings for assessment report?		How many faculty completed the trainings for assessment report?		How many faculty completed the trainings for assessment report?	
Digital Badge						Was the digital badging platform launched?		How many students earned digital badges?	
Problem-Solving Process Course Certifi-cation					Was the certifi-cation process devel-oped?	Was certifi-cation offered?		How many certifica-tions were completed?	

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APPENDIX A

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    - Lauren LaMay – Liberal Arts
    - Tom Riley – Liberal Arts
    - Tamara Wilcox – Information Technology
    - Estelle Alston – Health Sciences
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APPENDIX B

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    - Wanda Johnson–Mammography-Health Science
    - Jacqueline Popp–Sociology
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APPENDIX C

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APPENDIX D

The following colleagues contributed to the feedback, review, writing and revision of the QEP:

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Nicole Reaves – EVP & Chief Programs Officer

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- Albert Brewer – Dean, Engineering and Trades

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- Traci Ashley, Executive Director of Communications and Marketing
- Matt Burns, Digital Content Manager
- Gabriela Truelove, Brand Identity and Design Manager

QEP Writing and Revisions Team

The following individuals were responsible for the writing and revision of the QEP document:

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- Jacqueline Popp, Professor, Sociology
- Dr. Carrie Bartek, Executive Director, Institutional Effectiveness and Research
- Dr. Marcia Toms, Editor
- Beverly House, Coordinator of College Initiatives

APPENDIX E

Work-Based Learning: Employer's Evaluation Survey

WAKE TECH COMMUNITY COLLEGE

Employer's Evaluation of Student Work-Based Learning

Student Name _____ Wake Tech ID _____

The supervisor should evaluate the student objectively at the end of the work experience.

COMMUNICATION	NA	Below Average	Average	Very Good	Outstanding
Written communication is clear & concise	☐	☐	☐	☐	☐
Ask questions for clarification regarding work tasks	☐	☐	☐	☐	☐
Respects co-workers' opinions even if they disagree	☐	☐	☐	☐	☐
Demonstrates proper attitude / interest when communicating	☐	☐	☐	☐	☐
Uses proper etiquette in electronic communication	☐	☐	☐	☐	☐
INTERPERSONAL SKILLS & TEAMWORK	☐	☐	☐	☐	☐
Accepts consequences of his/her own actions	☐	☐	☐	☐	☐
Maintains confidential records / proprietary information	☐	☐	☐	☐	☐
Punctuality / Dependability	☐	☐	☐	☐	☐
Dressed appropriately for work site	☐	☐	☐	☐	☐
Ability to handle the workload	☐	☐	☐	☐	☐
Ability to work with others as a team	☐	☐	☐	☐	☐
Ability to work independently	☐	☐	☐	☐	☐
PROBLEM-SOLVING & DECISION MAKING	☐	☐	☐	☐	☐
Uses basic strategies for problem solving / decision making	☐	☐	☐	☐	☐
Makes decisions based on fact or knowledgeable opinions	☐	☐	☐	☐	☐
Uses knowledge gained from coursework	☐	☐	☐	☐	☐
Makes proper use of resources (time, materials, tools, space)	☐	☐	☐	☐	☐
Ability to grasp & learn new information	☐	☐	☐	☐	☐

Employer: Choose a percentage rating for each Measurable Learning Objective attempted/completed by the student during the semester. (If no MLOs, please use the below comment box to address the details of the job description.)

MLO #1 (0-100%) _____ **MLO #2** (0-100%) _____ **MLO #3** (0-100%) _____

Please rate your overall satisfaction with your Student's performance

Not Very Satisfied ☐ 1 ☐ 2 ☐ 3 ☐ 4 ☐ 5 **Highly Satisfied**

Employer Comments:

Site Supervisor Signature _____ Site Supervisor Name (Printed) _____ Date _____

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APPENDIX F

Work-Based Learning: Survey Analysis Report

Work-Based Learning: What are the main areas of weakness for our students?

This is a report on the results of Work-Based Learning employer surveys from Fall 2022 through Summer 2023, covering the Divisions BEST, BPST, BTECH, HS, IT, and TT. Overall performance is discussed first, followed by sections for each question area (Communication, Interpersonal Skills, and Problem-Solving). For any questions, please contact John R. Smith (jrsmith29@waketech.edu).

As an overview, the following main points stick out:

- **TT** falls **significantly below** the overall mean for almost every question on the survey. It is the only division to perform like this.
- **BEST** typically falls **below** the overall mean for each question as well, though the gap is much narrower and within the reasonable possible range of values for the true average score.
- The scores for **BTECH** are very **inconsistent**, sometimes falling above the overall average score for a question and sometimes falling below it. As noted above, this is likely a result of their only being responses for one term for BTECH, whereas the other divisions each also had Fall and Spring terms. We would need more data before drawing more confident conclusions about the performance of BTECH as compared to the other divisions here. We should bear this in mind when viewing the figures in this report considering BTECH's newness.
- **BPST**, **HS**, and **IT** all **outperform** the overall average for each survey question in every case (reaching statistical significance in several cases). These divisions are consistently high performers across all survey areas.
- **Problem-solving strategies** and **written communication skills** stand out as clear **areas of weakness** across all divisions. These and the other **Problem-Solving questions** are a clear **starting point** for future improvement.

***BEST** = Building – Engineering – Skilled Technologies

***BPST** = Business – Public Service Technology

***BTECH** = Bio Technologies

***HS** = Health Science

***IT** = Information Technology

***TT** = Transportation Technology

APPENDIX G

General Education Problem-Solving Standard

The Eagle Essentials competency standards were developed by teams of faculty experts representing departments from across the college through a process that examined many existing general education competencies, rubrics, and related documents from sources both internal and external to Wake Technical Community College. The standards articulate fundamental learning outcomes for each Eagle Essential competency with descriptions demonstrating a general education level of mastery for each outcome. The standards are intended for institution-level use in evaluating and discussing student learning, not for grading. The core expectations laid out in all four Eagle Essentials standards can and should be used as a tool for faculty to test the validity of an assignment as a measure for a competency. Course committees will use the standard to show a direct path from assignment learning outcomes to competency outcomes. Students must demonstrate mastery in all outcomes to show mastery in the Eagle Essential competency. All outcomes may be assessed in one assignment or divided over multiple assignments as the course committees see fit. Thus, creating a strong rationale for how a given assignment(s) is a good measure of the Eagle Essentials competency. Faculty and course committees may choose to adopt language from Eagle Essentials standards into assignments or course learning outcomes to help show a clear path from assignment to Eagle Essentials competency.

Definition

Problem-solving is the cognitive process of addressing challenges or obstacles by systematically and sequentially analyzing, evaluating, and implementing strategies to achieve desired outcomes considering relevant contextual factors and diverse perspectives. *The chart below includes the official outcome title (in bold) and the student-centered language (in parentheses).*

Title	Definition	General Education Level of Mastery
Define the problem (Step 1: Define)	Clearly and succinctly state the problem while taking the contextual factors into consideration.	The problem is precisely defined after making observations, understanding the context of the problem, and identifying its key components.
Research and investigate (Step 2: Learn)	Thoroughly investigate and gather relevant information from credible sources to gain a comprehensive understanding of the problem.	The problem is investigated using credible sources in a manner that considers multiple root causes, background & history of the problem, and how the problem is distinguished from its symptoms.

Identify pathways to solve the problem (Step 3: Brainstorm!)	Determine multiple, specific pathways available for solving the problem.	Pathways identified include conventional and/or innovative pathways to a solution.
Examine the various pathways to solve the problem (Step 4: Plan)	Critically assess, analyze, and determine the degree to which a pathway would achieve its intended goal.	Pathways are evaluated for feasibility, effectiveness, potential intended or unintended consequences while taking the context of the problem and available resources into consideration.
Select & implement a solution (Step 5: Try it out)	Decide in favor of one solution pathway and apply it as appropriate.	The solution is selected after considering the results of the evaluation and is applied in a manner that is well-suited to the circumstances inherent to the problem, taking contextual factors into consideration.
Evaluate the solution (Step 6: Evaluate it)	Systematically examine how well the implemented solution worked to solve the problem.	Solution evaluation includes considering the effectiveness, real-world impact, outcomes, and/or performance of the solution.
Revise (Step 7: Reflect on it)	Make revisions or improvements to the solution based on the evaluation of the solution's effectiveness.	Revisions to the solution are deliberately made after synthesizing observations and conclusions from the evaluation.
Justify the solution (Step 8: Share it)	Present an argument as to why the selected solution is the most suitable approach.	The implemented solution is explained and justified using sound arguments, data, credible sources, and/or effective practices, and/or data that demonstrates why it is the most suitable approach.

APPENDIX H

Results of Spring 2024 Student Poll

How Can Wake Tech Showcase Students' Problem-Solving Skills

Introduction/Background:

Wake Technical Community College [WTCC] is dedicated to advancing the problem-solving capabilities of its students through the introduction of innovative educational strategies. This commitment is part of a broader initiative to enhance academic and career prospects by equipping students with essential skills that are highly valued in the workforce.

To understand student preferences for new methods of showcasing and developing problem-solving skills, a poll was conducted among WTCC's students. The total population eligible to receive the survey was 38,756, of which 798 started the survey, resulting in the completion of 463 responses. This represents a response rate of approximately 2% and a completion rate of 58% of those who started the survey. Data collection commenced on April 1st and concluded on April 15th.

This report details the results of the poll, which aimed to gather insights on student attitudes towards earning micro-credentials/digital badges, building portfolios of problem-solving skills, and the interest in discipline-specific problem-solving credentials.

Conclusion

The Wake Tech student poll on micro-credentials/digital badges and problem-solving skills development reveals strong student support for innovative educational strategies such as micro-credentials, digital badges, and discipline-specific credentials. This enthusiasm is consistent across various fields of study, particularly in predominant areas such as Information and Digital Technologies (N: 92), Health Care and Wellness (N: 82), Business (N: 73), and Communication, Social Sciences and Humanities (N: 53).

Students also show a high interest in building problem-solving portfolios and are motivated by earning micro-credentials through certificate programs. These findings underscore the importance of these strategies in meeting diverse educational and career aspirations, and they highlight their potential to engage students effectively in their educational journeys.

It is noteworthy that the percentage of support/interest for all four questions across all fields of study was higher than 50%, with the exception of 47% of students from the Construction and Maintenance field who believed in the efficacy of Micro-Credentials/Digital Badges. However, only 16% of students from this field did not support the efficacy of the initiative, while the remaining 37% were uncertain about it.

In light of these results, Wake Tech is well-advised to continue developing and implementing these tools to enhance students' problem-solving capabilities, thereby better preparing them for professional success. The positive feedback from the survey respondents provides a strong foundation for these educational initiatives to thrive and assist students in meeting the challenges of the modern workforce.

*A full version of the report will be provided upon request. Please contact the Director of College Initiatives' office.

APPENDIX I

AAS Programs That Will Use Program-Specific Courses for Direct Assessment for Outcome 5

Program Name	Program Code
Advertising and Graphic Design	A30100
Cloud Infrastructure	A25590CI
Computer Programming & Information Sciences	A25590CP
Cybersecurity	A25590CS
Data Science and Programming Support Services	A25590DS
IT Services and Support	A255901S
Healthcare Administration	A25310H
Medical Billing and Coding	A25310B
Medical Office Professional	A25310P
Networking Technology	A25590NM
Office Administration Professional	A25370P
Simulation and Game Development Art & Modeling	A25450A
Web & UX Design	A2559UX
Web Developer	A25590WD