

An NSF/ATE Regional Center

DUE 1304036

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**EVALUATION REPORT**

Year 3: May 1, 2015 to April 30, 2016

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| WORKFORCE DEVELOPMENT ◈ WORKPLACE EFFECTIVENESS | Prepared by The Allison GroupSeattle, Washington206-525-7175 tbailey@theallisongroup.com |
|  | Date: April 2016 |

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| **EXECUTIVE SUMMARY** |

The CARCAM Regional Center is funded by the National Science Foundation (NSF) to address the skilled technician workforce needs of the continually growing automotive manufacturing industry in Alabama. The most recent Center award is entitled *AMP It Up! Advanced Manufacturing Partnerships: Education and Industry Working Together To Develop Highly Skilled 21st Century Technicians*. CARCAM and its partner colleges continue to provide a comprehensive approach to meeting this industry’s technician employment needs through enhanced technology education and career awareness, state-of-the practice curriculum and instruction, ongoing faculty development, articulation between secondary and postsecondary education programs and student engagement and recruitment activities.

The CARCAM Center, its partners and programs continue to respond well to the growing and changing needs of Alabama’s automotive industry and have expanded their work to include additional colleges and to serve greater numbers of students. The Center has multiple, highly-engaged stakeholders including business and industry, workforce development organizations, the State of Alabama Department of Education, and secondary and post-secondary partners. In year three, CARCAM successfully continued to support and enhance their relationships and their efforts, leading to the following outcomes:

* Industry and state agency partnerships are continuing to grow and increase opportunities to build the sustainability of CARCAM efforts and initiatives.
* The Center continues to be acknowledged as a widely recognized, well-respected and valued resource in meeting the state’s technician workforce needs.
* The coordination and cooperation of multiple stakeholders provided employment, collaborative programs and outreach activities, multiple professional development activities, apprenticeships, cooperative education, internships, working scholarships, and school-to-work programs.
* Student engagement activities continue to grow and remain a strength of CARCAM partner efforts, including STEM Camps, BEST Robotics competitions, Skills USA, career fairs, tours of manufacturing facilities, Career Coaches, and similar outreach activities that promote enrollment growth.

The PI and her team remain highly engaged, the partnerships have grown, the colleges and their students report they have had an excellent experience, and the industry partners are advocates and supporters of the program at all levels.

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| **INTRODUCTION** |

### Project Description / Goals & Objectives

The Consortium for Alabama Regional Center for Automotive Manufacturing (CARCAM) was initially funded in 2005 and began operation in 2006. CARCAM received its first renewal grant in 2010, plus a year of no-cost extension ending in August 2014. In 2013, the Center received a new three-year renewal award with a no-cost extension that ends on May 31, 2017.

CARCAM is a regional center whose focus is automotive and automated manufacturing technologies. Gadsden State Community College is CARCAM’s fiscal agent and its thirteen regional education partners include:

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| Bevill State Community CollegeCalhoun Community CollegeCentral Alabama Community CollegeDrake State Technical CollegeFaulkner State Community CollegeGadsden State Community CollegeJefferson State Community College | Lawson State Community CollegeNortheast Alabama Community CollegeShelton State Community CollegeSouthern Union State Community CollegeTrenholm State Community CollegeWallace State Community College |

In addition, CARCAM continued to work with its four-year university partners in Alabama, which included Auburn University, the University of Alabama, and the University of Alabama-Huntsville. CARCAM engaged key faculty resources at these universities to discuss statewide economic and employment trends, curriculum and program articulation possibilities, and student success pathways.

The Center develops and implements leading edge curriculum based on input from industry partners. In year three, CARCAM had a strong outreach component that started in secondary education schools and worked with economic development agencies to attract, enroll and graduate a diverse population of students in automotive manufacturing careers. The Center also provided professional development to secondary and post-secondary instructors so their classrooms cover current and emerging technologies.

CARCAM has four stated goals with associated objectives.

**Mission:** *CARCAM responds to rapid advanced manufacturing sector growth by establishing and implementing innovative methods to develop a highly-skilled, diverse technician workforce and provide state-of-the-art professional development.*

**Goal 1:** Advance CARCAM’s mission as the Regional ATE Center for comprehensive, industry-recognized workforce development and STEM learning.

Objective 1.1: Facilitate a joint statewide initiative for increased student and faculty credentialing

Objective 1.2: Host and co-sponsor industry-specific employment and career fairs (in clean energy, advanced manufacturing, automotive, aerospace/aviation) and target underserved populations, specifically veterans, women, and minorities

Objective 1.3: Foster and host real-time communication among industry employers, state agencies, students, and faculty using social media and conventional formats to expand information/knowledge sharing and CARCAM branding on a regional and national level

Objective 1.4: Promote student scholarships and other opportunities by partnering with industry and community organizations to recruit students into advanced technical careers

**Goal 2:** Establish CARCAM as the industry liaison with the Alabama Department of Education and the Alabama Community College System promoting a seamless career pathway model encompassing a modern, statewide, holistic approach to skills and knowledge development.

Objective 2.1: Strengthen relationships between industry and education at the secondary and postsecondary levels with continual support for workforce and STEM initiatives in K-College that lead to the enhanced education of highly skilled technicians

Objective 2.2: Increase STEM initiatives to promote awareness of STEM education to strengthen the highly-skilled workforce pipeline

Objective 2.3: Innovate and partner with secondary and postsecondary schools to advance the statewide Career Coach initiative

Objective 2.4: Develop and disseminate branding and marketing strategies and materials to promote and support manufacturing and technology careers; STEM learning; advanced technology education; and career pathway information for students and faculty

**Goal 3:** Enrich multi-system technician education levels with an innovative and flexible approach to stackable credentialing to meet evolving industry sector and economic needs.

Objective 3.1: Utilize CARCAM’s curriculum gap analysis (CGA) model to analyze and implement improvements to existing multi-system manufacturing models and curriculum, to adapt to the region’s evolving and emerging industries, technologies, and workforce needs

Objective 3.2: Survey Human Resource and/or Training Managers to evaluate CARCAM technicians’ skill levels, with an emphasis on knowledge of problem-solving, and adapting to new technologies and new skills

Objective 3.3: Expand strategic, university-level partnership with Clemson University’s CA2VES ATE grant, and use their online course development models and website expertise to continue advancing regional innovations and communications

Objective 3.4: Explore clean energy, aviation/aerospace, and workplace ethics course offerings in the region, with a focus on collaborative opportunities to share knowledge, curriculum, and promising practices per industry needs

**Goal 4:** Deliver faculty and staff professional development workshops/academies that address emerging technologies, advanced manufacturing and current workforce trends.

Objective 4.1 Use financial and personnel resources of strong partnerships with training agencies (ATN, AIDT), and automotive manufacturing associations (AAMA, MAMA, TAMA), to provide annual regional professional development offerings that build strong connections between industry and education at all levels

Objective 4.2 Provide informative workshops/academies for faculty focused on specific needs of underrepresented audiences and strategies for promoting career development in high-demand advanced manufacturing fields

Objective 4.3 Design and establish a “Teacher-in-the-Workplace” program to highlight the reality of skills required in today’s advanced manufacturing environments

**Evaluation**

This report covers the third year of the project, May 1, 2015 to April 30, 2016. A summary of the approach to evaluation is found in Appendix 1.

This is the third year that the project worked with the Allison Group as the external evaluator. The transition has been successful with a strong collaborative relationship that supports shared information and transparency from the project leadership. In collaboration with the evaluator, a logic model, evaluation plan and core evaluation questions were developed. In year three, the evaluator worked with the CARCAM leadership to develop an updated three year evaluation plan as suggested by the National Visiting Committee. The team was able to provide data from multiple sources, including the STEM Camp, professional development, institutional data, industry meetings, their NVC, and a career pathway survey. Additionally, a new survey was developed for the first time to better understand the overall impact of the Center: the Annual Impact Survey. A pilot of the survey was conducted to gather initial observations about impact in March 2016.

Additional sources of information included a review of all CARCAM activities, scholarships, and leadership questionnaires and regular meetings for discussion with the Center about their progress toward goals and future plans. Finally, the CARCAM staff tightened the definitions of categories of data collected from the institutional data offices of its college partners. This impacted the continuity of data and made visible the possible over-reporting of tours and high school visits from prior years. The staff is confident that current reporting is more accurate.

The evaluation process ran smoothly; there was clear communication about execution of the evaluation plan in a timely manner.

### Core Evaluation Questions

Evaluation questions were developed by the external evaluator in accordance with NSF Evalua|t|e Center recommendations and were used to evaluate the project goals and implementation. Following are the core evaluation questions for CARCAM:

1. To what extent has CARCAM reached its intended audience?
2. What are users’ perceptions of CARCAM’s quality and utility?
3. To what extent are CARCAM materials being used?
4. To what degree was the region’s manufacturing education and workforce development capacity expanded, improved, enhanced, and sustained?

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| **OVERALL CENTER MANAGEMENT AND IMPLEMENTATION** |

**Project Management and Administration**

The Center staff consists of a small but highly productive and experienced team represented by PI Beverly Hilderbrand, Assistant Director George Booker (an experienced industry professional), Clerk Diana Teague, and Linda Morris, (paid through a Department of Labor (DOL) TAACCCT grant). Ms. Morris provides support to the Center in the integration of DOL activities in the CARCAM mission, data tracking, and event planning for students’ activities. Finally, a part-time Communication Specialist maintains the website to serve students, educators, and industry.

The team is also supported by an internal evaluator, a Curriculum Specialist, and representatives of the partner colleges and universities mentioned above. The CARCAM internal evaluator utilizes a digitized data gathering tool to successfully gather the enrollment and outreach data from Center education partners.



### Project Partners

The relationships among the stakeholders evolved and expanded over the three years. In addition to the original eleven partner colleges, two more have been added: Faulkner State Community College and Northeast Alabama Community College. The addition of these two colleges broadens the reach and impact of CARCAM into the southernmost part of the state.

In addition the Center expanded its work with three universities in Alabama that include:

* Auburn University
* University of Alabama
* University of Alabama-Huntsville

The faculty from these universities provide a broader view and understanding of statewide economic and employment trends, curriculum and program articulation possibilities, research development, and student career pathways.

CARCAM also expanded their partnerships for 2015-2016 to reach other NSF-funded projects and centers. CARCAM is beginning a new collaborative opportunity with FLATE and USF to participate in the development of a survey instrument that measures the pathways, career goals, and school-to-work-life balance of individuals completing AS/AAS degrees in engineering technology and related programs at community colleges nationwide. This will involve six other ATE Centers for 2016-2017. This is another indication of center growth from 2014-2015 when the Center reported initial collaborations with three NSF-funded centers, including AMTEC, FLATE and CA2VES. In one year they doubled their Center partnerships.

### Project Deliverables

For the Year 2015 -2016, the number of programs, courses, students, and institutions impacted are as follows:

|  |  |
| --- | --- |
| * Number of students enrolled in AUT courses:
 | 501 |
| * Number of instructors teaching CARCAM courses
 | 124 |
| * Total number of pre-college students who participated in STEM/Robotics classes
 | 336 |
| * Estimated non-NSF funding/in-kind resources for CARCAM programs
 | $9,470,071 |
| * Number of students currently in a CARCAM Co-op or internship/apprenticeship
 | 189 |
| * Total number of ATE grant-funded programs developed and/or offered
 | 71 |

The data provided from the Center indicates that multiple efforts are reaching a wide range of stakeholders and benefitting instructors, college students, businesses, and students enrolled in secondary education.

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| **QUESTION 1: To what extent has CARCAM reached its intended audience?** |

While there are many stakeholders for automotive and automated manufacturing education and workforce development, in order to target a manageable audience, CARCAM narrowed the larger audience to its *intended audience*, which includes individuals associated Career Technical Education and employers in the automotive industry. Specifically, the intended audience includes K-12 teachers, career coaches and administrators; two-year college instructors and administrators; university professors and administrators and employers automotive industry.

To gather evidence of impact, CARCAM launched a new survey in 2015-2016 called the Annual Impact Survey. The survey was sent out electronically to 108 individuals and received 34 responses for a response rate of 31%, which is excellent compared to other ATE Center surveys. Responses to date include the following and respondents correspond directly to the Center’s intended audience.

* 78.8% identified themselves as a college educator or administrator
* 21.2% representing business or industry

The respondents also had an option to report *Do Not Use / Never Used.*  A further exploration of those responses provides opportunities for the Center to review the marketing strategies for the resources to better disseminate them would strengthen the impact of the available resources.

Perhaps this user summarized it best: *As a fairly new instructor in the technical program here I have had contact with CARCAM for scholarships for my students and funding for STEM camp for local children. I would be interested in learning more about the other things that CARCAM promotes but have not yet had the opportunity.*

**Industry**

Industry participation in the Industry Advisory Committee was effectively sustained and expanded to include leaders from education, transforming the committee to become the Industry and Education Leadership (IEL). The September 2015 and March 2016 Industry and Education Leadership meetings included 38 and 37 attendees respectively, representing national companies such as Honda, Toyota Motor Mfg., and BLG Logistics and representing the State Department of Education and college and university partners in CARCAM among others. Industry provides strong and valuable support and guidance that helps CARCAM achieve its goals and position itself for future directions. IEL efforts this past year included professional development for CARCAM faculty and staff, advising on programmatic elements, and marketing to the broader community through multiple media opportunities. In addition, the industry partnerships strengthen the growth in innovative apprenticeships, cooperative education, internships, working scholarships and school-to-work programs. The group continued to meet bi-annually.

CARCAM brought increased focus in 2015-16 to staying on top of the emerging technology changes in manufacturing.

### Outreach to Students

According to the 26 education and business respondents that completed the Annual Impact Survey, 3593 students and/or co-op interns were impacted by the resources obtained from CARCAM in the past twelve months. In CARCAM’s activity report, they reached 4288 students through their outreach and marketing efforts. In order to understand their students better, CARCAM developed a survey called the Career Path Survey. Of the 576 respondents to the survey, 8.3% were female and almost 30% were non-White.

Among the respondents, all of whom were currently in a technology program, 40% had previously worked in manufacturing, 23% are still working in the industry (incumbent workers), 40% had been in an apprenticeship program with 14% currently in such programs. Perhaps more interesting for the CARCAM program and the state itself is the fact that 54% of the respondents had not attended any technology-centered events in high school prior to enrolling in their current technology program. This indicates the importance of CARCAM’s continued outreach in Alabama to build the automotive technology pipeline from secondary education to the workforce.

To expand the pipeline in 2015-2016, CARCAM reached over 4288 youth through 43 events which included industry tours, visits to secondary schools, , career fairs, sponsorship of youth leadership events and presentations at conferences. CARCAM sponsored industry tours provided students with information relevant to career opportunities. In 2015-2016 this effort yielded 29 tours reaching 607 students a decrease of 46% -- however this is one of the data points affected by the clarification of data definitions mentioned earlier in this report.

 The number of secondary school visits was similarly impacted. In 2013 CARCAM provided 303 secondary school visits in 2014 that number was 405 and in 2016 the number was 114, down 62%. This may also be impacted by the increased activity of the career advisors in the state.

Still, the Center’s combined efforts provided students with information about STEM learning or career pathways to 16,570 students, creating awareness related to STEM including automated technology technicians..

One of CARCAM’s signature programs is their STEM Camps, a four day summer camp primarily serving secondary students with the goal of introducing them to opportunities in science, technology, engineering, and mathematics (STEM) and manufacturing areas related to STEM. In 2016, 336 students participated in STEM/Robotics Camps held in six locations, representing a 49% increase over the prior year. . 38% of the participants were female (48% identified as minority .

###  Student Enrollment

Aided by the addition of two new partner colleges, overall enrollment for CARCAM programs increased over the previous year, despite continuing pressures from the improved job market. The students’ demographic data for 2015-2016 enrollees can be broken down as shown in the table below. Diversity measures improved in every category except for females and nearly doubled for Hispanic/Latino students, with significant results in American Indian or Alaska Native, Asian and Multiracial categories.

|  |  |  |  |
| --- | --- | --- | --- |
| **Demographic** | **Number** | **% of total** | **% change from 2015** |
| Male | 5006 | 93% | +6.2% |
| Female | 393 | 7% | -7.4% |
| **TOTAL** | **5399** | **100%** | **+5.2%** |
| Hispanic/Latino | 179 | 3.3% | +92.3% |
| American Indian or Alaska Native | 59 | 1.1% | +37.2% |
| Asian | 50 | 0.93% | +42.9% |
| Black or African American | 1150 | 21% | -6.0% |
| Native Hawaiian or other Pacific Islander | 2 | 0.04% | 0% |
| Multiracial | 77 | 1.4% | +42.6% |
| White (Non-Hispanic/Latino) | 3711 | 69% | +10.2% |
| Unknown | 142 | 2.6% | +27.9% |
| **TOTAL** | **6447** | **100%** | **+26.3%** |
| Students requesting accommodation under the Americans with Disabilities Act | 41 | 6.3% | +51.5% |
| Incumbent workers (i.e., individuals who were employed as technicians while enrolled in courses | 240 | 1.5% | +16.0% |

As evidenced in the trend data below, overall enrollment in CARCAM programs grew in year three, and the Center has maintained positive growth in enrollment over the years, despite economic factors that impact all programs.

### Professional Development

CARCAM hosted the following 21 professional development (PD) activities in 2015-2016 reaching 138 staff & education personnel. PD was offered both through webinars and face to face meetings.

|  |  |
| --- | --- |
| Manufacturing Day WebinarSiemens PLC for EducatorsSecret to Successful Recruitment of Women WebinarAGP -Advanced MGF. 3D DemoCWI Certification (Brent Jacobs Certification)Getting Involved in Manuf. Day High School Instructors WorkshopUsing Labor Marker Intelligence to Engage Industry PartnersOSHA 501 (OTI 501) Outreach Trainer ClassOSHA 501 (OTI 501) Outreach Trainer ClassAgriscience Instructors WorkshopDeveloping Compelling Grant Application, by GRECATE Conference Orientation | Effective Outreach and Recruitment Special PopulationsCAAT -Technology of Automated and Connected VehiclesAdvanced Manufacturing Economy Panel and WorkshopNIDA Certification Training (Michael Carter)Intro to Contrologixn and TroubleshootingAlabama Community College System Conf.Siemens Mechatronics System Certification ProgramSiemens/Allen-Bradley Workshop |

While the opportunities for PD were many and varied, the attendance was often low with 71.4% of the events yielding 3 or fewer attendees and 47.6% with only one attendee. Understanding the reasons behind this low turnout would be helpful for improving CARCAM’s reach. CARCAM may want to consider whether professional development for such small numbers has a sufficient return on investment.

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| **QUESTION 2: What are users’ perceptions of CARCAM’s quality?** |

**Quality**

A number of surveys were conducted throughout the year to collect data on stakeholder’s perceptions of the quality of CARCAM programs.

Of the 21 professional development offerings, only four had evaluative surveys with participants. Thirty seven respondents reported their level of agreement with a series of statements, using a five-point Likert scale. Ratings were assigned a numerical value as follows:

* Excellent = 5
* Good =4
* Average =3
* Poor =2
* Unsure=1

The mean ratings were calculated for each statement as shown in the table below.

|  |
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| **Professional Development Excellent/Good Responses Ranked High to Low** |
| The presenter’s knowledge regarding subject matter | 4.95 |
| The presenter’s responsiveness to participant needs | 4.84 |
| Relevance and practicality of content | 4.81 |
| The organization of the session content  | 4.76 |
| The presenter’s use of visual aids and demonstrations  | 4.76 |
| The pace of the session  | 4.59 |

The respondents consistently ranked their experiences as either excellent or good and across the four sessions, the professional development experience was high quality.

For the STEM Camps, a pre and post camp survey was administered, although the two had different questions and two camps did not conduct the surveys. Colleges reported that 172 students attended the camps of which 121 students completed the pre-camp survey for a response rate of 70.3%; up to 108 completed the post camp survey(not all students answered all questions.) This is the first year that these quality questions were asked, so comparison to prior years is not available. Participants ranked the quality of the program at the end of the experience as follows:

* Excellent = 4
* Good = 3
* Fair = 2
* Poor =1

The mean ratings were calculated for each statement as shown in the table below. The average rating across all elements was high at 3.61 out of a possible 4.00.

|  |  |
| --- | --- |
|  | Mean |
| The quality of interactions with staff and volunteers. | 3.63 |
| The quality of the camp sessions. | 3.64 |
| Opportunities to learn about real world applications of STEM. | 3.69 |
| Opportunities to build your skills in problem solving and creativity. | 3.63 |
| Opportunities to build your skills in team work. | 3.50 |
| Opportunities to learn about STEM fields. | 3.72 |
| The quality of the food. | 3.43 |
| The quality of the classrooms. | 3.56 |
| The quality of teachers. | 3.71 |

In the Center Annual Impact Survey, quality was rated on the following Likert Scale:

* Excellent = 4
* Good = 3
* Fair = 2
* Poor = 1

Overall, users within the target audience perceived the quality of CARCAM’s resources as high. When asked to rate the overall quality of the CARCAM resource that they had accessed in the past 12 months, 85.7% of responses were good or excellent.

Finally, when stakeholders were asked to rate their overall experience of working with CARCAM, 100% said excellent or good!

**Utility**

Consistent with the CARCAM logic model, it is theorized that an outcome of their work is an increase in knowledge and understanding of automotive and automated manufacturing careers, education and workforce development.

The Annual Impact Survey provided specifics related to the utility of the resources for educators. As indicated below, educators found the resources provided to be useful for multiple purposes.

**Professional Development**

Participant perceptions of the utility of the workshops were surveyed at the completion

Respondents reported their level of agreement with a series of statements, using a five-point Likert scale. Ratings were assigned a numerical value as follows:

Strongly Agree = 5

Agree = 4

Neutral = 3

Disagree = 2

Strongly Disagree =1

The respondents’ ratings are shown in the chart below and indicate that participants found the information provided in the professional development workshops to be highly useful.

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| **QUESTION 3:** **To what extent are CARCAM materials being used?** |

CARCAM has grown in relevance well beyond its roots in the Southern automotive industry and is now helping to prepare technicians who can respond to the burgeoning employment needs due to the growth trend of the automated manufacturing in the South.

CARCAM continued development of materials and resources in the area of automated technologies through the grant, including the following:

* Current, relevant, topical information available through CARCAM’s website, twitter feed, and newsletter
* Professional development workshops and webinars
* The AUT degree, scholarships, internships, and other cooperative learning opportunities that have been recognized as innovative by the National Visiting Committee.
* Career awareness materials, STEM Camps and participation in career fairs, manufacturing days, and other programs to increase student awareness and enrollment

**Website**

A review of website analytics indicates a significant increase in usage and users. Between 2014-2015 and 2015-2016 the website experienced an increase in users of 107%. There was also an increase in sessions during that time of 97% and pages viewed by 34%. And while the average session time decreased, this may simply be indicative in the shift of users and the time required for differing populations.



Here again, like many organizations CARCAM must continually address the challenge of driving traffic to the on-line resources to cultivate full usage. For instance, 18.2% did not access the CARCAM website during the last year and 39.4% have not viewed the newsletter. Finding ways to encourage views and increases users will be important for dissemination and long term sustainability.

The top webpages accessed were:

1. Industry Scholarships
2. Contact Us
3. Employment Opportunities
4. CARCAM News
5. Welcome to CARCAM
6. AUT Degree

**Frequency of Use**

It is useful to make a distinction between reach (which was addressed in Question 1) and use (the current question). Reach refers to the extent to which CARCAM has touched their intended audience. However, frequency of use refers to how often the materials are being used.

Across the board, educators and businesses use the materials developed by CARCAM to benefit the stakeholders and their communities.

The respondents also had an option to report *Do Not Use / Never Used*. This option highlights opportunities for the Center to reach additional stakeholders by reviewing the marketing strategies for the resources to better disseminate them and strengthen the impact of the available resources.

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| **QUESTION 4:** **To what degree was the region’s manufacturing education and workforce development capacity expanded, improved, enhanced, and sustained?**  |

CARCAM developed, state, regional, and national capacity and sustainability in a number of ways:

First, CARCAM continued to have a strong impact on curriculum development. As mentioned above, CARCAM colleges created 52 new or revised modules for existing courses. Thirty-nine courses were revised through the insertion of new modules, and seven new degrees or certificates were offered as a result of the new modules. 5420 students directly benefitted from these or other courses funded through the ATE grant by taking one or more courses.

The access to CARCAM resources demonstrated the value of the Center to the education community. These resources also provided value in their ability to be adapted, customized, and repurposed to serve the broader needs of faculty in their community. The table below highlights this added value.

Second, the resources provided by CARCAM were believed to have an according to 72% of the respondents in the Annual Impact Survey. 43.8% of those same respondents believed that the resources increased exposure to automated technologies and increased awareness of automated technician careers.

Third, the grant funded eleven colleges or businesses throughout the region to provide programs. As CARCAM continues to broaden its reach, they are finding ways to make sure every partner college and business is benefitting from their partnership through ATE. This will support the broadest dissemination.

Fourth, CARCAM built expanded the regional capacity by providing more instructors while maintaining professional development engagement.

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| **Measure** | **2014-15** | **2015-16** | **% change** |
| Number of instructors teaching CARCAM courses from your college | 117 | 124 | +6% |
| Number of instructors teaching CARCAM from your institution who attended a minimum of one program related development activity/workshop | 44 | 44 | 0% |

However, the participation of faculty in professional development activities and workshops declined as did the number of faculty reporting that they implemented practices or improvements as a result of the professional development. Understanding this shift downward will be an important area for review in the year ahead.

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure** | **2014-15** | **2015-16** | **% change** |
| Number of secondary/K-12 and post-secondary faculty, and incumbent workers participating in CARCAM professional development activities and best practices workshops (e.g. counselor workshops, teacher in workplace, etc.) | 243 | 94 | -61% |
| Number of faculty participating in CARCAM sponsored professional development activities who implemented practices or improved their program as a result of the activities. | 98 | 28 | -71% |

A fifth component for both expansion and sustainability is funding. Examples below highlight the success of CARCAM’s partner colleges in securing needed funding for their high quality AUT and related programs beyond the NSF ATE grant.

* **Jefferson State Community College** received a $200,000 NSF Grant Project Award - “Advancing Education in Production Technology.” CARCAM will be working in an advisory capacity as they begin this new project.
* **Calhoun Community College** received a $200,000 Regional Appalachian Grant with a focus on advanced manufacturing.
* **Lawson State** **Community College** received a $430,000 Mechatronics Grant from the state
* **Shelton State Community College** received an $368,266 ARC Grant to support automotive manufacturing.
* **Trenholm State Community College** was awarded a $2.1 million project. Its goal is to reduce the unemployment rate in Macon County with manufacturing career opportunities
* **Northeast Alabama Community College** (one of the new partner colleges) was named as the only AL community colleges eligible for $1 million in prize funds from the Aspen Prize for Community College Excellence.

For all stakeholders, CARCAM provided information and resources that will improve, enhance, and sustain capacity. Ten options were provided for respondents to the Annual Impact Survey to select to indicate perceived benefits by the respondents. The impact statements were rated on a Likert scale with the following five options:

1. Strongly Agree
2. Agree
3. Neither Agree or Disagree
4. Disagree
5. Strongly Agree

Across all statements, 88.1% of responses were strongly agree or agree.

Finally, the numbers and percentages in all rows in the table below indicates both the value and the quality of the AUT programs and closely related programs as indicated by the enrollment, retention, completion, graduation, and job placement increases since last year. This is perhaps the best indication of the region’s expanded manufacturing education and workforce development by CARCAM.

|  |  |  |  |
| --- | --- | --- | --- |
| **Measure** | **2014-15** | **2015-16** | **% change** |
| Number of companies with which co-ops and/or internship relationships have been established for students. | 56 | 106 | +89% |
| Number of CARCAM program students that are currently participating in co-op or intern/apprenticeship programs. | 188 | 189 | +5% |
| Number of AUT related program completers who received an industry certification or stackable certificate by year. | 283 | 473 | +67% |
| Number of students who graduated with an AUT related certificate or degree by year. | 574 | 881 | +53% |
| Estimated number of students who were hired in their field after graduation or completion of co-op and internship/apprenticeship programs. | 51 | 125 | +145% |

Perhaps the most important point for impact is the increase in the number of students hire, more than doubling that of the prior year. Employers who have hired technicians educated by CARCAM colleges have been overwhelmingly positive in reporting their experiences.

CARCAM has extensive evidence that they have the partnerships, products, resources, and skill to create a strong Center that benefits both the state of Alabama and the nation. However, like most successful Centers and programs that are funded by a large federal grant, the challenge will be to develop a plan that continues to build the Center’s capacity to sustain and even build its momentum. It seems that CARCAM is on the right track.

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| ***Participants’ Comments****CARCAM's best asset is the support and comradery among the team members. The shared resources are also a big benefit.**Thanks to CARCAM, I now have an additional Motor Trainer. The labs…are now safer and better because the student has more "hands on" time with his/her trainer.**CARCAM provides…leadership, vision, and appropriate action* |

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| **CONCLUSIONS AND RECOMMENDATIONS** |

**Conclusions**

CARCAM continues to generate very impressive results as evidenced both through the evaluation activities and as recognized by the May 2015 report of the National Visiting Committee. The strong collaboration among the Center’s faculty, staff, industry, education, workforce development, and community partners has allowed the Center to be fully responsive to the state’s workforce needs. In every case, CARCAM is meeting or exceeding its goals. While professional development opportunities are many and varied, attendance is too often very low (1 – 3 attendees) creating an opportunity for CARCAM to review and refine its efforts to increase the engagement of individuals across the state.

CARCAM’s efforts to expand its work throughout Alabama have been successful on all fronts. The Center has met or exceeded all of its goals. Their partnership with 6 NSF-funded Centers is commendable. Their engagement with three four-year institutions offers many new opportunities for research, increased student pathway programs, and improved cooperation among all the educational stakeholders leading to improved benefits for all students. Finally, the data shows that the Center has made a positive and lasting impact on the automotive and automated manufacturing technician workforce in Alabama.

**Recommendations**

As stated in last year’s report, the first recommendation is to continue the high quality work with the workforce and education systems. CARCAM has become a recognized brand known both throughout Alabama and increasingly throughout the nation. CARCAM remains a respected resource for policy and decision makers, and the Center should continue to leverage that in the years ahead.

Considerations of a regional center renewal are now a primary focus for the Center. The NVC offered several recommendations that are timely for a Center at this point of maturity. The evaluator would like to also recommend the following items for increased focus in future planning:

* Creating a greater understanding of how and why stakeholders are using (or not using) and valuing the current CARCAM resources and identifying ways to increase stakeholder’s access and usage or decreasing focus on less valued resources.
* Continuing to support partner colleges in obtaining ATE funding.
* Continuing to improve the enrollment of underrepresented students, including veterans, to promote growth and sustainability.
* Updating and standardizing evaluation protocols related to all programs, particularly professional development, to ensure larger data pools are collected for analysis.
* Developing research studies that measure such things as the degree to which CARCAM professional development improves student recruitment, academic choices, and career outcomes.
* Developing research that yields a deeper understanding of the experiences related to co-ops, apprenticeships, and internships that lead to improved program retention and employment outcomes.
* Identifying methods for expanding CARCAM funded programs to new community college education partners.
* Consider setting targets that will provide standards for evaluation.

CARCAM provides a high quality example of an NSF-funded center and is a recognized leader in technician education in Alabama an beyond. The team is to be commended for its commitment to automotive and automated manufacturing technician education, and to improving the workforce and education system in Alabama as a model for the nation.

APPENDIX 1

APPROACH TO EVALUATION

**Approach to Evaluation**

***Theoretical Foundation***

This evaluation is primarily based on adaption of the Context-Input-Process-Product evaluation model developed by the Evaluation Center at Western Michigan University, under the direction of Arlen Gulickson, PhD and Daniel Stufflebeam PhD.

The year’s activities were evaluated following Gullickson’s four essential elements:

1. The degree to which the project is achieving its goals.
2. The level of impact, and the degree to which the project is reaching intended individuals or groups.
3. The effectiveness of the products and services delivered to constituents.
4. Ways in which the project can be significantly improved.

The investigative approaches recommended by the Evaluation Center at Western Michigan University were utilized to produce a theoretically based, complete and comprehensive review of the Center:

* Objective Orientation: How closely the products and services meet the stated goals and objectives as stated in the grant proposal.
* Teaching/Learning Process Orientation: Based on the perspective of teachers, how the project activities are assisting or facilitating teaching and learning.
* Customer Orientation: From the perspective of students, how the project activities are improving learning, comprehension and retention.
* Faculty and Institutional Support: The degree to which the project efforts are integrated and accepted, and the positive changes resulting from the efforts.
* Business and Industry Support: The level of acceptance and support for the project efforts by business and industry, especially those which hire graduates and utilize the technician workforce.
* Management: The degree to which processes are in place or under development that leverage the effort with the goal of building on the project activities, products and services after the funding period comes to an end.

Each item in the evaluation plan was considered from one or more of the approaches listed above. The following methods were used to develop the data necessary to cover the topics in the evaluation plan:

* Interviews with Principal Investigator, project staff, partners and faculty.
* Determination of impacts and influences on technician level education.
* Analysis of documents.
* Analysis of applicable survey and other data gathered to date.

Project data-gathering activities and subsequent data analysis were guided by standards developed by the Joint committee on Educational Standards and Evaluation. All active and passive data gathering activities involving human subjects were approved by the appropriate institutions’ IRB (Institutional Review Board).

The evaluation covers findings and recommendations collected from surveys, document review, interviews, and data analysis.