2018 IHUM Final Evaluation Report

Iowa's Information Technology, Healthcare, Utilities, and Manufacturing Network
Statewide Consortium

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Prepared by

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Iowa's Information Technology, Healthcare, Utilities, and Manufacturing

Network Statewide Consortium

2018 IHUM Evaluation Report

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List of Abbreviations of Iowa Community College Names

Table 1.
Abbreviations for Iowa Community Colleges

Community College Name	Abbreviation
Des Moines Area Community College	DMACC
Eastern Iowa Community Colleges	EICC
Hawkeye Community College	HCC
Iowa Central Community College	ICCC
Indian Hills Community College	IHCC
Iowa Lakes Community College	ILCC
Iowa Valley Community College District	IVCCD
Iowa Western Community College	IWCC
Kirkwood Community College	KCC
North Iowa Area Community College	NIACC
Northeast Iowa Community College	NICC
Northwest Iowa Community College	NCC
Southeastern Community College	SCC
Southwestern Community College	SWCC
Western Iowa Tech Community College	WITCC

EXECUTIVE SUMMARY

TAACCCT Program Description & Activities

The Iowa's Information Technology, Healthcare, Utilities, and Manufacturing (IHUM) Network Consortium (i.e., IHUM Project), comprised of the 15 Iowa community colleges, was formed in response to a documented shortage of skilled workers in Iowa's Information Technology, Healthcare, Utilities, and Manufacturing sectors. The formation of the Consortium allowed participating community colleges the opportunity to collaborate on building the training capacity required to meet the state's industry demand for highly qualified workers while providing training to Iowans with skills needed to engage in Iowa's workforce.

The grant has provided the IHUM Project with the opportunity to respond to employer demands for skilled workers by developing/expanding the number and types of credentials (e.g., credit/non-credit certificate, diploma, Associate's degree) offered within four sectors: Information Technology, Healthcare, Utilities, and Manufacturing to students interested in expanding their education and skill set. As part of the IHUM Project, there are 105 programs of study.

Implementation of the IHUM Project helped enhance student services (e.g., career navigation, third party certifications/boards, Credit for Prior Learning), increased visibility of the program through statewide and regional marketing efforts, and increased the number of students participating in the various signature programs.

Evaluation Design Summary

A comprehensive evaluation of the IHUM Project required by the U.S. Department of Labor (DOL) Trade Adjustment Assistance Community College Career Training (TAACCCT) Grant Program, consisting of an implementation evaluation and an outcomes evaluation, was led by the Research Institute for Studies in Education (RISE) at Iowa State University. A program-oriented evaluation approach was utilized for the implementation evaluation of the IHUM Project. This evaluation approach guided how the following key evaluation questions required by the U.S. DOL TAACCCT Program were organized:

- How was the particular curriculum selected, used, or created?

- How were programs and program design improved or expanded using grant funds?

- Are in-depth assessments of participants' abilities, skills, and interests conducted to select or enroll participants into the program being evaluated?

- What contributions did each of the partners and other key stakeholders (employers, workforce system, other training provided and educators, philanthropic organizations, and other as applicable) make in terms of: 1) program design, 2) curriculum development, 3) recruitment, 4) training, 5) placement, 6) program management, 7) leveraging of resources, and 8) commitment to program sustainability?

This approach examines inputs (actions and activities designed to achieve specific goals), intermediate outcomes (immediate and short-term effects), and ultimate outcomes (long-term effects or changes). In assessing the operational strengths and challenges of the Project during and following implementation, not only did we consider overall effectiveness, but we also considered broader impacts, contextual effects related to the organization and project environment, and unexpected results. In particular, we examined and evaluated implementation activities, key stakeholders' perceptions regarding the IHUM Project, and tracked milestone completion by participating community colleges. Surveys were developed to assess implementation activities and key stakeholders' perceptions while the tracking of milestone completion was completed by examining project records (e.g., quarterly reports).

To determine the impact of the IHUM Project, the examination of participant outcomes utilized a quasi-experimental research design approach which included the comparison of two cohorts (a treatment group and a control group). For the purpose of this analysis, several treatment and control groups were used to determine the exact effect the IHUM Project had on students. Educational and wage data came from two sources: the Iowa Department of Education which provided National Student Clearinghouse data along with other student educational data and Iowa Workforce Development. Descriptive, inferential, and probability statistics were conducted on the treatment and control groups.

Outcomes research questions included the following:

- Do students who enroll in IHUM programs differ from students who enroll in non-IHUM programs with regard to demographic characteristics (e.g., gender, age, ethnicity) and/or previous work experience (e.g., overall and within-industry quarterly wage/increases, job placement)?

- Do demographic factors, previous work experiences, and post-program intentions predict successful program completion among IHUM students?

- Do factors related to program completion differ between IHUM and non-IHUM students?

- Do students in IHUM programs experience general increases in job placement rates and wages relative to non-IHUM students?

- Do IHUM students experience industry-specific increases in job placement and wage trajectories relative to non-IHUM students?

- Do factors (e.g., prior industry experience) amplify successful outcomes following IHUM program exposure that could be promoted/fostered among new incoming IHUM students?

- Are there potential factors that diminish successful outcomes following IHUM program exposure to target for future program improvement?

Implementation Findings

Stakeholder surveys were developed and progress in completing milestones was tracked in order to evaluate the implementation of the IHUM Project across all 15 Iowa community colleges. Stakeholders included students, a Project Lead at each community college, Employer Partners, and Faculty. Overall findings of the implementation evaluation were:

- *Overall Program Implementation.*

  The IHUM Project implemented all of the goals of the grant with fidelity with all milestones and deliverables completed or met by the end of the grant. Targeted signature programs across the 15 Iowa community colleges were clustered into four sectors: Information Technology (3 community colleges), Healthcare (8 community colleges), Utilities (2 community colleges), and Manufacturing (2 community colleges). Across the 15 Iowa community colleges, 105 programs of study were offered as part of the IHUM Project. The community colleges indicated that they regularly update their curriculum. Additionally, in conjunction with state agencies and local industry, work-based learning experiences were expanded/enhanced through a variety of ways that included setting up internships/ apprenticeships, increasing job shadowing events, using mobile lab equipment, and expanding available simulation to help students prepare for the workforce. With the exception of the milestones that continued through the end of the Project, all participating community colleges completed all milestones, strategies, and priorities by the end of Fiscal Year 4, Quarter 2 (March 31, 2018).

- *Availability of Online and Blended Courses Increased*

  Each of the participating community colleges increased their capacity to offer online and/or blended courses to students. Availability ranged from offering some aspects of IHUM courses completely online to offering students the ability to earn IHUM certificates, diplomas, and degrees online.

- *Simulation Labs Provide Real-World Learning Experiences*

  Simulation learning experiences for were expanded/enhanced to provide IHUM community college students with real-world education. Simulation labs were installed with simulation training equipment purchased with funds and curriculum, course/training content, handbooks, and syllabi were updated to incorporate simulation activities. These expansion efforts are considered to be major accomplishments of the grant by community college Project Leads.

- *The Iowa Community College Simulation Network (ICCSN)*

  The ICCSN was established to connect Iowa community colleges offering health care programs in sharing of ideas, lessons learned, and best practices related to simulation. The establishment of the network, with participants meeting regularly, is an unexpected outcome of the grant and is to continue after the grants ends.

- *Economic Modeling Specialist International (EMSI) Career Coach*

  The EMSI Career Coach, an online advising tool designed to help students explore career options, workforce trends, training pathways, and salary data, is provided to students at each of the IHUM community colleges.

- *Student Satisfaction*

  Students surveyed were satisfied with their overall educational experience and the academic program. They were satisfied with the quality of instruction and courses offered, interactions with other students in their field of study, availability/accessibility of faculty, access to labs, and preparation for employment in their field of study.

  While IHUM afforded community colleges the opportunity to expand their programs, demand for certain IHUM programs (e.g., Healthcare), continues to be high necessitating the use/creation of wait lists.

- *Employer Partners*

  Employer Partners were important to the success of the IHUM Project. Their contributions (e.g., internships/clinicals, facility tours, resume review, mock interviews) and participation (e.g., taking part in career fairs/advisory boards/sector boards) helped to enhance students' learning experiences and job preparedness.

- *Marketing/Outreach*

  IHUM community colleges increased the visibility of their respective IHUM programs at both the regional and statewide levels through active marketing practices afforded by the grant. Marketing activities allowed community colleges to reach potential students that would not have otherwise been reached.

- *Program Challenges*

  The majority of the community colleges experienced some challenges (e.g., finding qualified staff, problems with equipment, delays in renovations, lack of business partners' support for apprenticeships) in the implementation of the IHUM. However, the majority of challenges were overcome by the end of the grant period (September 30, 2018).

- *Program Strengths*

  Collaborative efforts between HCC Project Leads and participating community colleges along with the support of college leadership helped to ensure the successful implementation of the program.

- *Sustainability*

  IHUM programs expanded and/or implemented through the grant were largely sustainable after the grant ended on September 30, 2018. However, funding to pay advisors and simulation coordinators may no longer be available and will necessitate

community colleges to change and/or reconfiguration these positions in order to maintain continuity.

In general, participating community colleges will continue to revise their curriculum to remain up-to-date with standards and those community colleges offering healthcare programs will revise and realign their curriculum to meet Iowa State Board requirements and standards.

Participant Outcomes

Outcomes Measures for the IHUM Project as of June 30, 2018

Participant Outcome	Goal	Actual Outcomes	% of Goal Met
1. Unique participants served/enrollees	7,030	7,210	102.6
2. Total number of participants who have completed a grant-funded program of study	4,747	3,366	70.9
2a. Total number of grant-funded program of study completers who are incumbent workers	--	2,523	--
3. Total number still retained in grant funded programs of study	3,011	2,454	81.5
4. Total number retained in other education programs	--	69	--
5. Total number of credit hours completed	--	121,897	--
5a. Total number of students completing credit hours	6,659	5,208	78.2
6. Total number of earned credentials (aggregate across all enrollees)	4,835	3,941	81.5
6a. Total number of students earning certificates-less than one year	--	1,109	--
6b. Total number of students earning certificates-more than one year	--	1,310	--
6c. Total number of students earning degrees	--	1,522	--
7. Total number pursuing further education after program of study completion	1,561	1,379	88.3
8. Total number employed after program of study completion	2,621	453	17.3
9. Total number retained in employment after program of study completion	2,040	267	13.1
10. Total number of those employed at enrollment who receive a wage increase post-enrollment	3,113	3,426	110.1

A total of 7,030 unique participants enrolled in IHUM programs between 2014 and 2018 reflecting 102.6% of the projected number of participants. Approximately 71.6% of the total unique participants were female, 3.8% were veterans, 78.9% were White, 0.8% were eligible for TAA (Trade Adjustment Assistance), and 72.2% were enrolled as credit students.

A total of 5,208 participants completed 121,897 credit hours in IHUM programs. While the number of participants earning credit hours reflect 78.2% of the projected goal, the number of

credit hours completed is impressive. A total of 4,066 college-issued credentials were awarded to participants, of which, 3,450 college-issued credentials were awarded to Iowa residents.

Impact of IHUM Program

To determine the impact of the IHUM Project on participant outcomes among multiple student groups, a quasi-experimental research design comparing cohorts of treatment group and control group participants was utilized. For the purposes of this analysis, the treatment group consisted of students enrolled in IHUM programs while the control group consisted of students in similar programs that were not part of the IHUM program.

- *Comparing IHUM and Non-IHUM Students.* In general, IHUM and non-IHUM students did not vary greatly in terms of demographics, intentions for pursuing credentials, and overall credential completion. In terms of demographic characteristics, students in the treatment group were more likely to be female, less likely to be white, and less likely to have enrolled in a developmental math course. Students in the treatment group were more likely to report their intent to transfer to a 4-year institution of higher learning and were less likely to be undecided in their intention for pursuing credentials.

- *Assessing Differential Completion among IHUM Students.* In general, rates of degree/credential completion did not vary significantly as a function of students' demographic characteristics. Depending on the specific IHUM program, differential rates of degree completion were tied to at least one intention for pursing credentials (e.g., meeting certificate/licensure requirements, preparing for a career change, preparing to transfer, preparing to enter job market, pursuing their degrees for personal reasons).

- *Employment and Earnings Impacts among IHUM Students.* In general, the proportions of students employed prior to enrollment were very similar between groups who would eventually complete or not complete their degrees. However, employment rates demonstrated an approximate increase that ranged between 8% to 20% in the six months after the end of the program among students who completed their degrees. For example, students that completed their Associate's degree were significantly more likely than those who did not complete their degrees to be employed six months later.

  Consistent with the higher likelihood of employment following degree completion, students that earned degrees also earned more income, on average, than did students who did not differ in average income three months prior to program enrollment. In general, those students who completed degrees were already earning moderately more than their peers only three months after their program and significantly more than their peers within six months.

This report highlights survey results, project accomplishments and challenges, deliverables, and findings of the outcomes evaluation. An IHUM Final Evaluation Supplemental Report available on the Skills Commons website: *https://www.skillscommons.org/handle/taaccct/18472*

INTRODUCTION

The Iowa's Information Technology, Healthcare, Utilities, and Manufacturing (IHUM) Network Consortium, comprised of the 15 Iowa community colleges, was formed in response to a documented shortage of skilled workers in Iowa's Information Technology, Healthcare, Utilities, and Manufacturing sectors. The formation of the consortium afforded community colleges the opportunity to collaborate on building training capacity required to meet the state's industry demand for highly qualified workers while providing training to Iowans with skills needed to engage in Iowa's workforce. With input from local employer partners, community colleges selected the four sectors as the most pertinent in addressing the workforce shortages.

The state of Iowa has been impacted by foreign trade since 2007. Over 8,500 Trade Adjustment Assistance (TAA) certified jobs have been lost within the state because of foreign competition and jobs moving outside of the United States (TAA Database provided by Public Citizen, 2016). In particular, the manufacturing sector in Iowa has borne the brunt of the impact, accounting for 73% (~6,200 jobs) of these job losses.

In 2012, the Iowa Workforce Development (IWD) reported discrepancies between the number of jobs available in Iowa and the worker skill sets of the workforce (Iowa Workforce Development, 2012). IWD found that while half (50%) of all jobs in Iowa were classified as middle skill jobs (i.e., jobs that require workers to have education beyond a high school degree [e.g., certificate or Associate's Degree] but less than a four-year degree) only 33% of the workforce was qualified for those middle skill jobs. In contrast, 18% of jobs available in Iowa were classified as low-skilled while 38% of the workforce were considered to be low-skilled (Iowa Workforce Development, 2012).

Overall, the job outlook for each of the four IHUM sectors is promising. The projected annual percent of industry employment for 2016 to 2026 is expected to increase by 0.2% in Information Technology (IT); 1.9% in Healthcare; and 0.1% in Utilities; decrease by 0.6% in Manufacturing. In contrast, the overall annual percent change in industry employment is 0.7%. However, while projections for two (IT and Utilities) for the four sectors are lower than the annual overall percent change, overall wages in these areas are expected to increases (U.S. Department of Labor, Bureau of Labor Statistics, 2018).

In September 2014, the IHUM Consortium was awarded a four-year grant totaling $15,000,000 from the U.S. Department of Labor (DOL) Trade Adjustment Assistance Community College Career Training (TAACCCT) Grant Program. The mission of TAACCCT is to provide community colleges and other eligible institutions of higher education with funds to develop, expand, and improve education and career training programs in order to prepare program participants for employment at high wage and high skill occupations.

The grant provided the IHUM Consortium with the opportunity to respond the employer demands for skilled workers by developing/expanding the number and types of credentials (e.g., credit/non-credit certificate, diploma, Associate's degree) offered within four sectors: Information Technology, Healthcare, Utilities, and Manufacturing to students interested in

expanding their education and skill set. As part of the IHUM Project, there were 105 programs of study.

Formation of the IHUM Consortium also led to the development/expansion of employer partner relationships with places such as the Iowa Workforce Development Agency (IWD), which administers the TAA programs for the state. These partnerships have led to joint marketing efforts, engagement of employers to support career pathways (e.g., serving on regional manufacturing sector boards) as well as life-long learning opportunities.

Implementation of the IHUM Project helped enhance student services (e.g., intensive/intrusive advising, career navigation, third party certifications/boards, Credit for Prior Learning), increased visibility of the program through statewide and regional marketing efforts, and increased the number of students participating in the various IHUM programs.

This report highlights survey results, project accomplishments and challenges, deliverables, and findings of the outcomes evaluation. An IHUM Final Evaluation Supplemental Report available on the Skills Commons website: *https://www.skillscommons.org/handle/taaccct/18472*

IHUM CONSORTIUM EFFORTS

Collaborative Efforts

A key to the success of the IHUM Consortium in the development and expansion of its signature programs can be attributed to the collaborative efforts between the Project leaders at Hawkeye Community College (HCC, lead institution) and each Project Lead at each participating community college. A Microsoft SharePoint site, a browser-based application, was created for the purpose of sharing documents (e.g., quarterly reports, meeting notes, calendars, and policies), resources, as well as providing a secure portal for uploading and maintaining participant data. Their combined efforts resulted in the successful identification, development, and implementation of grant goals, priorities, strategies, and objectives within the required time. Overall, these collaborative efforts led to positive outcomes for students, community colleges, Employer Partners, and other key stakeholders in the state.

Marketing Efforts

A statewide "Enhance Iowa" marketing campaign was developed to increase awareness of and enrollment in IHUM signature programs. The purpose of the campaign was to promote education and training opportunities available through these programs. Each community college was allocated funds for the purpose of conducting regional marketing of their respective programs. The Project Lead marketing team met regularly with community college marketing coordinators to provide guidance on how to spend allocated funds, target audience (e.g., TAA-eligible workers, veterans, unemployed, etc.), use of social media, proper signage, and other marketing requirements of the grant. The lead team also facilitated conversations on marketing strategies, commitments, and troubleshooting issues related to marketing of the program. Types of marketing at both the statewide and regional levels included television commercials, radio and

newspaper ads, videos, and a social media presence that included Facebook, Twitter, and YouTube.

Iowa Community College Simulation Network

The Iowa Community College Simulation Network (ICCSN) was created in response to the incorporation and expansion of simulation technology in IHUM signature programs. Members of the ICCSN include simulation coordinators from the eight IHUM Healthcare community colleges and simulation coordinators from the remaining community colleges that have healthcare programs but are not participating in the IHUM healthcare sector program. The ICCSN met regularly to share and discuss best practices in simulation and issues related to the incorporation of simulation in healthcare programs. Participation in the ICCSN has been successful with several member reporting that their community colleges had implemented some of the suggestions offered by other members (see Simulation Coordinator Surveys in [Supplemental Appendices DD and EE](#)).

EMSI Career Coach

An EMSI Career Coach license was purchased for use by all the community colleges for the purpose of connecting students, colleges, and workforce development. It is an online advising tool designed to help students explore career options, workforce trends, training pathways, and salary data provided to students at each of the IHUM community colleges. Students and potential applicants accessed either a customized EMSI Career Coach on their respective community college's website or accessed the EMSI Career Coach on the Enhance Iowa website. Each community college developed an individualized plan for the use and marketing of the EMSI Career Coach for their students.

Future Ready Iowa

Future Ready Iowa is an initiative to build Iowa's talent pipeline funded through a National Governors Association grant in 2016. Goals related to Future Ready Iowa are aligned with the goals and priorities of the IHUM grant; specifically, as they relate to increasing the percentage adult learners who earn postsecondary degrees, certificates, or credentials. The IHUM Consortium partnered with Future Ready Iowa to provide Iowa residents with resources regarding career and education opportunities. The EMSI Career Coach was customized for Future Ready Iowa into Iowa's Career Coach and IHUM programs were included as educational opportunities for students interested in developing their talent and skills.

Partners include the Iowa Department of Education (IDoE), Iowa Economic Development, Iowa College Aid, and Iowa Workforce Development (IWD). IHUM community colleges as well as other Iowa institutions of higher learning are also partnering with Future Ready Iowa to meet its goal of having 70% of Iowa's workforce to have education and/or training beyond high school by 2025 (Future Ready Iowa, 2018).

IHUM SIGNATURE PROGRAMS

Targeted signature programs across the 15 community colleges were clustered into four sectors: Information Technology (3 community colleges), Healthcare (8 community colleges), Utilities (2 community colleges), and Manufacturing (2 community colleges). The following is a description of the signature programs offered by participating IHUM consortium community colleges.

Information Technology

The Information Technology cluster represented the second largest sector offered by the community colleges. While the primary focus of this sector varies somewhat across three community colleges, there was commonality between signature program offerings such as programming languages, opportunities to develop software, and bootcamps. Students were being trained in web development, system administration, networking, and programming to fill a gap in Information Technology jobs in Iowa. A key feature of the Information Technology signature programs was expected to be the range of apprenticeship opportunities made available to students with local industry. However, difficulties arose with getting employer partners to accept the apprenticeships.

Participants. By March 31, 2018 (Fiscal Year 4, Quarter 2), a total of 917 unique participants had taken part in an Information Technology signature program. Of these, 841 participants resided in Iowa (see Figure 1).
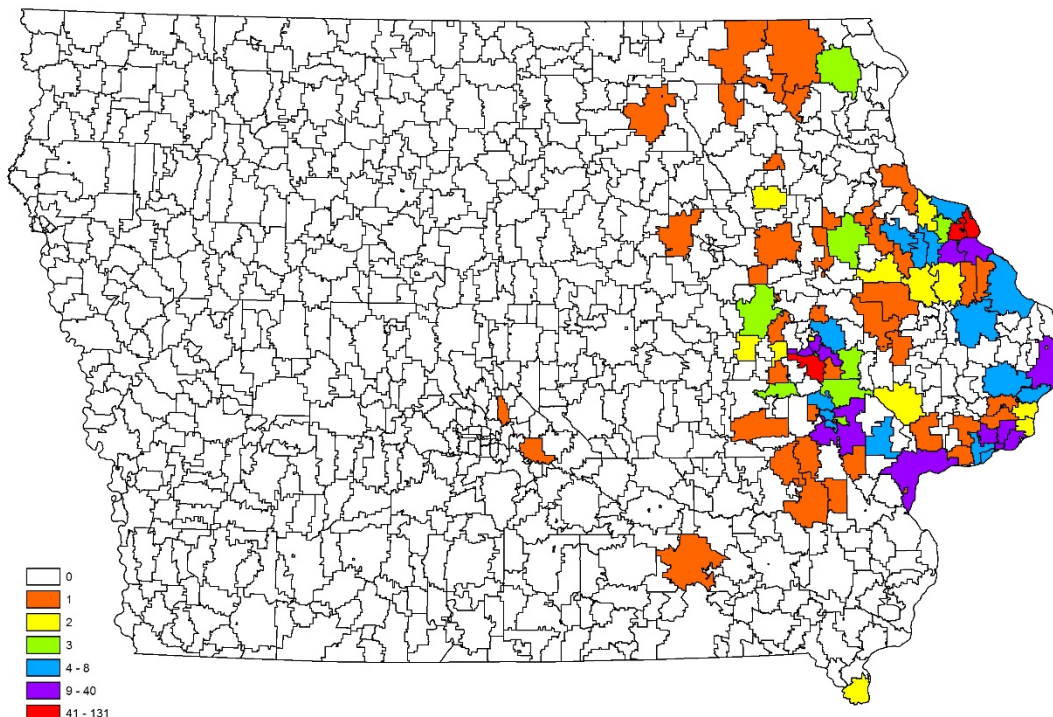

Figure 1. Participants of the Information Technology Sector by Iowa Zip Code

Awards and Degrees. The specific signature programs and the types of awards and degrees offered for each program vary by the three community colleges (see Tables 2, 3, and 4). By March 31, 2018 (Fiscal Year 4, Quarter 2), 589 college-issued credentials were earned in the Information Technology programs. Of these, 544 were earned by Iowa residents.

Table 2. *EICC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma
• Database Concentration • Games and Simulations Concentration • Hardware/Help Desk Concentration • Networking Concentration • Programming Concentration • Security and Forensics Concentration • Server Administration Concentration • Web Development Concentration	• Programming • Basic Networking

Table 3. *KCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Certificate	Non-Credit Certificate
• Apprenticeship Program • Computer Software Development • Computer Support Specialist • Experiential/ Internship Opportunity	• Apprenticeship Program • Desktop Support • Experiential/ Internship Opportunity • Voiceover IP	• Administrative Professional/ Customer Service Professional/IT Bridge (PACE) • Apprenticeship Program • CIW (Certified Internet Web Professional) • Database Technology • Desktop Support • Health Information Technology • Java • Mobile Apps • .NET • CompTIA Network+ • PC Technician	• Administrative Professional/ Customer Service Professional/IT Bridge (PACE) • Apprenticeship Program • CompTIA Network+

Table 4. *NICC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Certificate	Non-Credit Certificate
• Computer Analyst – Business & Web Programming • Computer Analyst – Networking Administration & Tech Support	• Mobile Applications Certificate • Storage Area Network Technician Certificate	• Administering System Center 2012 Configuration Manager • Bridging Communication to the IT Customer • Comp TIA A+ • Comp TIA Network + • Comp TIA Security + • Crystal Reports 2013 Level I • Deploying System Center 2012 Configuration Manager • IT Project Management • ITIL • ITIL Foundations • Java • Linux Security Administration • ProE • Programming • Server Administration • SharePoint 2013 Bootcamp • Solid Works • Unix/Intel • VMWare vSphere 6.0 Bootcamp

Healthcare

The Healthcare cluster represented the largest sector offered by the community colleges. The shortage of skilled healthcare workers presented a challenge for the healthcare industry in Iowa. To address this shortage, grant funds were used to develop new programs or to increase the capacity of existing healthcare programs to recruit and retain students. Students were being trained in nursing, medical coding, physical therapy, dental hygiene, and others to fill the job gaps in the Healthcare sector in Iowa.

A key component of community college signature programs within the IHUM Healthcare sector was the simulation laboratory/center. Grant funds were used to update/enhance or develop simulation laboratories/centers at each of these community colleges allowing students to learn using state-of-the-art equipment while gaining real world/hands-on experiences. Simulations were used in many of the healthcare programs including practical nursing, Associate's degree in nursing, physical therapy, and emergency medicine. Funds were also used by community colleges to purchase mannequins for students to practice with.

Participants. By March 31, 2018 (Fiscal Year 4, Quarter 2), a total of 5,651 unique participants had taken part in a Healthcare signature program. Of these, 4,508 participants resided in Iowa (see Figure 2).

Awards and Degrees. The specific signature programs and the types of awards and degrees offered for each program vary by the eight community colleges within the Healthcare sector (see Tables 5-12). By March 31, 2018 (Fiscal Year 4, Quarter 2), 3,189 college-issued credentials were earned in the Healthcare programs. Of these, 2,627 were earned by Iowa residents.
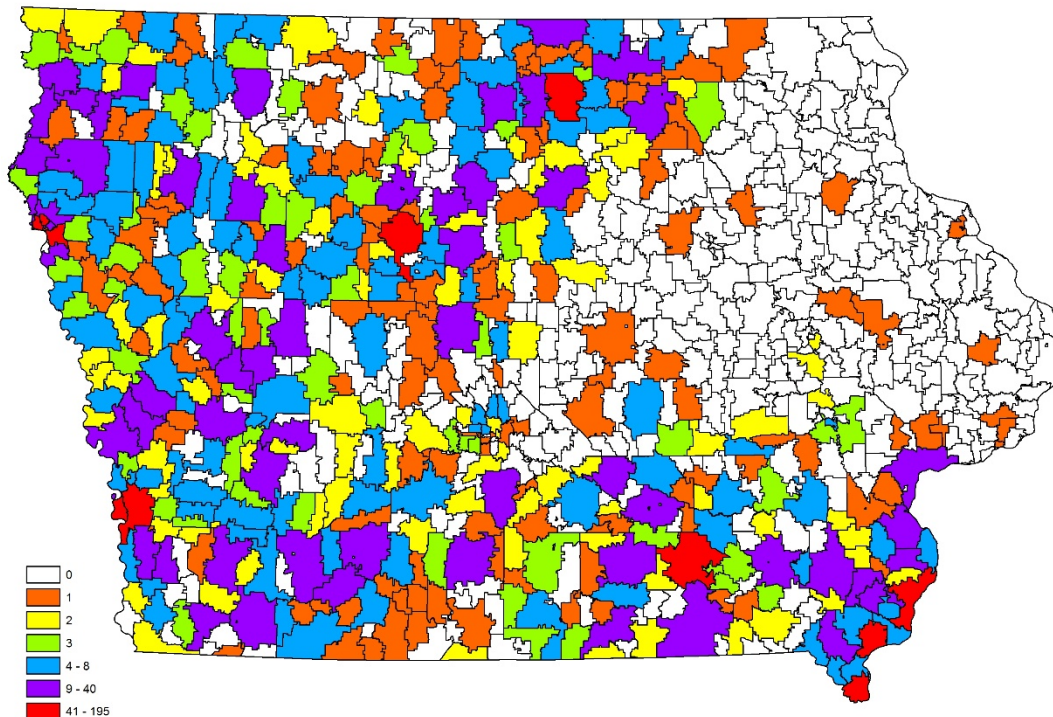
Figure 2. Participants of the Healthcare Sector by Iowa Zip Code

Table 5. *ICCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Certificate
• EMS – Paramedic • Nursing- Associate Degree RN	• Nursing – Practical Nursing	• EMR • EMS-EMT

Table 6. *IHCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma
• Dental Hygiene, AAS • Nursing: Associates Degree Nursing	• Nursing: Practical Nursing

Table 7. *IWCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Certificate	Non-Credit Certificate
• Biology • Physical Therapist Assistant • Registered Nurse	• Practical Nurse	• Nurse Assistant	• Nurse Assistant

Table 8. *NCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Certificate
• Associate Degree Nursing • Health Information Technology • Radiologic Technician	• Medical Coding • Practical Nursing • Pharmacy Technician	• Pharmacy Technician

Table 9. *NIACC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Non-Credit Certificate
• Associate Degree Nursing • Medical Administrative Assistant Degree	• Medical Administrative Assistant Diploma • Practical Nursing	• Neonatal Resuscitation Program

Table 10. *SCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Certificate
• EMS Program • Nursing, A.D.N. • Respiratory Care	• Medical Assistant • Medical Coding and Billing • Nursing, Practical Nurse	• EMT course • Nursing Assistant • Paramedic course

Table 11. *SWCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma
• Associate of Science in Nursing	• Licensed Practical Nursing

Table 12. *WITCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Certificate	Non-Credit Certificate
• Associate Degree in Nursing (ADN) • Physical Therapist Assistant (PT) • Surgical Technology	• Medical Assistant • Medical Coding • Pharmacy Technician • Practical Nursing • Surgical Technology	• Certified Nursing Assistant (CNA) • Pharmacy Technician	• Certified Nursing Assistant (CNA)

Utilities

The Utilities cluster represented one of two of the smallest IHUM sectors and was offered by two community colleges. At ILCC and IVCCD, students enrolled in programs offered through this sector were prepared for jobs with companies that were engaged in producing and/or delivering electric power, natural gas, water, and other utility services such as wind and cooled air.

Participants. By March 31, 2018 (Fiscal Year 4, Quarter 2), a total of 226 unique participants had taken part in a Utilities signature program. Of these, 197 participants resided in Iowa (see Figure 3).

Awards and Degrees. The specific signature programs and the types of awards and degrees offered for each program vary by the two community colleges within the Utilities sector (see Tables 13 and 14). By March 31, 2018 (Fiscal Year 4, Quarter 2), 90 college-issued credentials were earned in the Utilities programs. Of these, 83 were earned by Iowa residents.

Figure 3. Participants of the Utilities Sector by Iowa Zip Code

Table 13. *ILCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Non-Credit Certificate
• Electrical Technology • Engineering Technology • Heating, Ventilation & Air Conditioning • Water Quality & Sustainable Aquatic Resources • Wind	• Water Quality & Sustainable Aquatic Resources • Wind	• Blood-Borne Pathogens • CPR/AED & First Aid • Electrical Apprenticeship Course • Hydraulic Torque Certification • Industrial Electrical Safety • Industrial Hand Tool Safety • Industrial Multimeter Certification • Industrial Torque Electrical Certification • Industrial Torque Mechanical Certification • Industrial Torque Theory • NATE Authorized Tower Climber with Rescue Awareness • OSHA 10-Hour Industrial Safety • Tools at Height: Supporting a Zero Drop Philosophy • Working at Height & Rescue for the Wind Industry • Working at Height Global Wind Organization Certification

Table 14. *IVCCD IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma
• Natural Gas Technician • Powerline Technician	• Utility Technician

Manufacturing

The Manufacturing cluster represented the other smallest IHUM sector offered by two community colleges. At DMACC and HCC, students enrolled in programs offered through this sector were prepared for jobs with companies/factories/plants that engaged in mechanical, physical, or chemical transformations of materials, substances, or components into new products. In general, these companies utilized power-driven machines and material-handling equipment in these transformations (U.S. Department of Labor, Bureau of Labor Statistics, 2017).

Participants. By March 31, 2018 (Fiscal Year 4, Quarter 2), a total of 417 unique participants had taken part in a Manufacturing signature program. Of these, 407 participants resided in Iowa (see Figure 4).

Awards and Degrees. The specific signature programs and the types of awards and degrees offered for each program vary by the two community colleges within the Manufacturing sector (see Tables 15 and 16). By March 31, 2018 (Fiscal Year 4, Quarter 2), 198 college-issued credentials were earned in the Manufacturing programs. Of these, 196 were earned by Iowa residents.
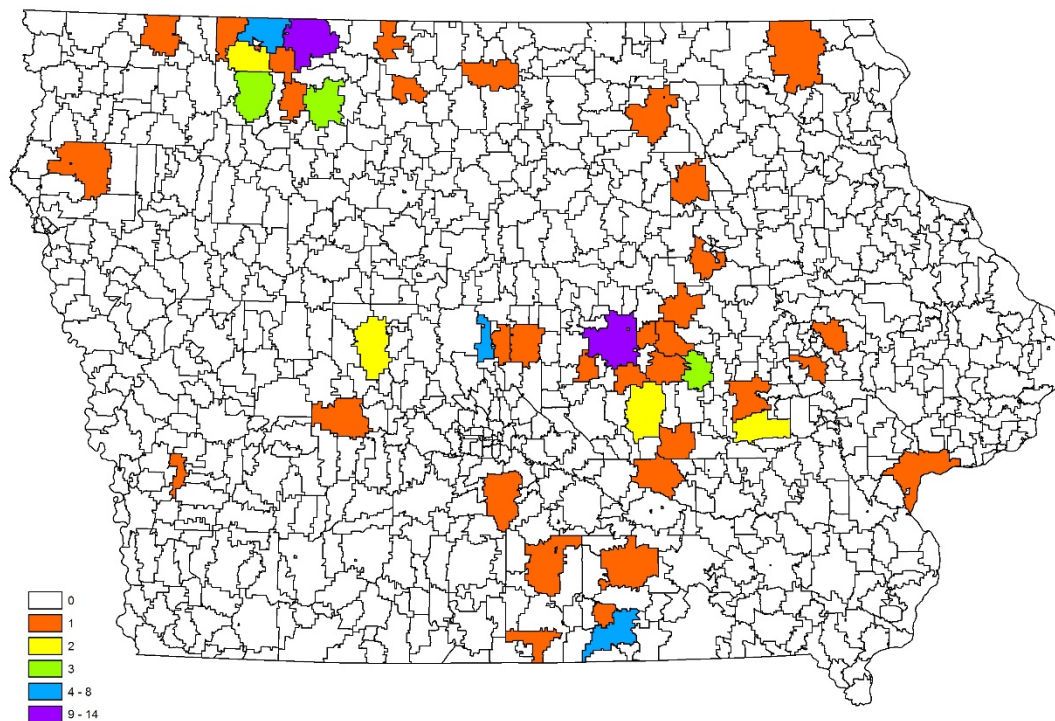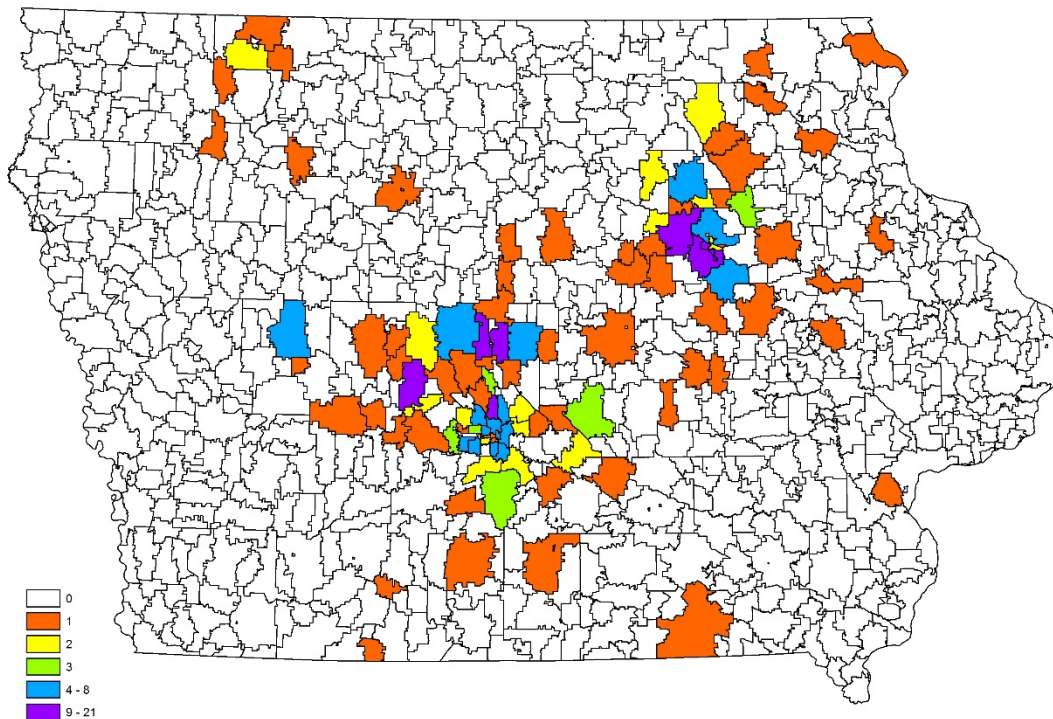

Figure 4. Participants of the Manufacturing Sector by Iowa Zip Code

Table 15. *DMACC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Certificate	Non-Credit Certificate
• Robotics and Control Systems Engineering Technology • Tool and Diemaking	• Diemaking • Machinist Technology	• Computer Numerical Control (CNC) Operator • Robotic Welding	• Computer Numerical Control (CNC) Operator • Robotic Welding

Table 16.*HCC IHUM Program Awards Offered as of Fiscal Year 4.*

Associates'	Diploma	Non-Credit Certificate
• Industrial Automation Technology	• Industrial Automation Technology	• Industrial Automation Technology

THIRD PARTY EVALUATOR

A comprehensive evaluation of the IHUM Project required by the U.S. Department of Labor (DOL), consisting of an implementation evaluation and an outcomes evaluation, was led by the *Research Institute for Studies in Education (RISE)*. Established in 1974, RISE is the research unit of the School of Education (Iowa State University's College of Human Sciences) and serves the research and evaluation needs in the field of education. RISE evaluates inputs (abilities, actions, and activities designed to achieve the outcomes), intermediate outcomes (processes and immediate or short-term effects) and ultimate outcomes (long-term effects or changes). RISE staff provide expert services and consultation in quantitative and qualitative research design and methodology, survey development, sample selection, data entry, and statistical data analysis, program and project evaluation and publications results. The RISE evaluation team has extensive experience conducting evaluations of cross-sectional and longitudinal projects, data collection, analyzing data using advanced statistical and qualitative analysis, and reporting, as well as experience examining organizational processes, achievement of goals, and stakeholder contributions.

The RISE evaluation team was responsible for conducting both the implementation and the outcomes evaluation of the IHUM Project. The implementation evaluation describes the program environment and its processes, describes and measures various program operations, identifies those factors that may have an impact on the implementation of the program and its outcomes, and offers recommendations that the project team members and leadership can use to strengthen the program. The outcomes evaluation measures change and impact on students as a result of their participation. For example, determining the extent with which program participation predicts employment and change in wage earnings. The following sections summarizes the overall implementation and outcomes evaluation plan.

Program Implementation Evaluation Plan

The IHUM Project sought to build training capacity at Iowa's community colleges to meet the needs of the state's Information Technology, Healthcare, Utilities, and Manufacturing industries for high skilled workers – both those who are incumbents and those who have suffered job loss related to the Trade Adjustment Act (TAA) or other circumstances. The IHUM Project evaluation studied and reported how effectively the Project met this goal with a focus on the program implementation process.

Evaluation Approach

A program oriented evaluation approach framed by *a-e-I-o-u Approach to Program Evaluation* (Kemis & Walker, 2000) was utilized for the implementation evaluation of the IHUM Project. This evaluation approach provides a framework for organizing key evaluation questions and allows various methods of data collection to be used. This approach examines inputs (actions and activities designed to achieve specific goals), intermediate outcomes (immediate or short-term effects), and ultimate outcomes (long-term effects or changes). Evaluation questions are organized into five areas:

- (a)ccountability: Did the project team do what they said they would do?

- (e)ffectiveness: How well did they do it?

- (I)mpact: What changed as a result of those actions?

- (o)organizational or environmental factors: What factors enhanced or limited goal achievement?

- (u)nanticipated outcomes: What happened that was not expected?

These evaluation areas provide the framework for the developed plan and the conducted comprehensive evaluation of the IHUM Project which includes sections that focused on curriculum and delivery methods, student assessment, and participant support and career services. In assessing the operational **strengths** and **challenges** of the Project during and following implementation, not only did we consider overall effectiveness, but we also considered broader impacts, contextual effects related to the organization and project environment, and unexpected results.

Evaluation Activities

Evaluation methods for program implementation are both qualitative and quantitative in nature and address the following four DOL TAACCCT required questions:

- How was the particular curriculum selected, used, or created?

- How were programs and program design improved or expanded using grant funds?

- Are in-depth assessments of participants' abilities, skills, and interests conducted to select or enroll participants into the program being evaluated?

- What contributions did each of the partners and other key stakeholders (employers, workforce system, other training providers and educators, philanthropic organizations, and others as applicable) make in terms of: 1) program design, 2) curriculum development, 3) recruitment, 4) training, 5) placement, 6) program management, 7) leveraging of resources, and 8) commitment to program sustainability?

Table 17 provides detailed information about the methodology and data sources used to answer these questions. Table 18 contains the timeline of implementation evaluation activities for years 2-4. While Table 17 indicates focus groups were to be done, focus groups were not done due to budget constraints and feasibility of getting groups together at each community college.

Table 17.
Evaluation Questions and Key Areas of Interest Guiding Implementation Analysis

Evaluation Questions and Key Areas of Interest	Methodology	Data Sources
1. How was the particular curriculum selected, used, or created?	• Document analysis • Focus groups • Surveys	• Project records • Project Team • Project Leads • Faculty • College Leadership • Committees

2. How were programs and program design improved or expanded using grant funds?
• *What types of delivery methods are offered?*
  o Are wireless coverage and capacity sufficient on campus for online classes?
  o Are faculty satisfied with online classes?
  o Are students satisfied with online classes/able to make the transition from lecture/lab style classes to online classes (It is part of the grant to expand the online capabilities)?
 	
• *Program administrative structure*
  o Fidelity of Implementation: is the IHUM Network on target to meet its goals and objectives?
  o On average, how many students are enrolled in class?
  o What is the faculty/student ratio?
  o How often are meetings held to discuss progress in implementation of IHUM Network?
  o Communication between administration/faculty/students
  o What is the process for sharing information with students?
 	
• *Support services and other services offered*
  o What is the role of the Pathway Navigator/Success Coach?
  o What does the Intrusive Advisor add to student experience?
  o What is the Intrusive Advisor/Student ratio?
  o What type of support is available for students that primarily attend in the evening?
  o What supplemental learning courses are provided?
  o Is tutoring available?
  o Other services?
	• Document analysis
	• Focus groups
	• Surveys
		• Project records
		• Project Team
		• Faculty
		• Advising staff
		• Student participants
		• College Leadership
		• Project Leads

Table 17.

Evaluation Questions and Key Areas of Interest Guiding Implementation Analysis

Evaluation Questions and Key Areas of Interest	Methodology	Data Sources

2. How were programs and program design improved or expanded using grant funds? (cont.).
 	
• *Marketing/Recruitment*
   o Have recruitment efforts changed?
   o What marketing techniques are used to recruit or communicate with potential students?
 	
• *Students*
   o Why did students enroll in the IHUM signature program at their community college?
   o How did student find out about the program?
   o What were students' educational/career goals at time of enrollment?
   o Satisfaction with advising.
   o Satisfaction with courses taken
   o Satisfaction with software offered
   o Level of student engagement (e.g., club/event participation)
   o Class attendance
   o Satisfaction with resources available to students.
   o Lessons learned
   o How can program be improved?
 	
• *Sustainability*
   o How is the institution expanding their capacity to deliver the proposed activities?
   o How will the institution sustain the proposed activities beyond the grant period?
	• Document analysis
	• Focus groups
	• Surveys
		• Project records
		• Project Team
		• Faculty
		• Advising staff
		• Student participants
		• College Leadership
		• Project Leads

Table 17.
Evaluation Questions and Key Areas of Interest Guiding Implementation Analysis

Evaluation Questions and Key Areas of Interest	Methodology	Data Sources

3. Are in-depth assessments of participants' abilities, skills, and interests conducted to select or enroll participants into the program being evaluated?
• *Assessment tools and processes*
   o Which assessment are used to evaluate participants' abilities (e.g., NCRC)
• *Persons conducting assessment*
• *Use of assessment results*
   o How are assessments used to evaluate participants?
   o Can assessment data be used in comparative analysis when evaluating program outcomes?
• *Usefulness of assessment results for determining program and course sequence for participants*
• *Career guidance*
   o What type of career guidance is provided for students?
   o How are assessment data used when providing career guidance?
	• Document analysis
	• Comparative statistical analysis of assessment data relative to program outcomes
	• Focus groups
	• Surveys
		• Project records
		• Participants' assessment scores
		• Project Team
		• Faculty
		• Advising staff
		• Student participants
		• College Leadership
		• Project Leads

4. What contributions did each of the partners and other key stakeholders (employers, workforce system, other training providers and educators, philanthropic organizations, and others as applicable) make in terms of: 1) program design, 2) curriculum development, 3) recruitment, 4) training, 5) placement, 6) program management, 7) leveraging of resources, and 8) commitment to program sustainability? • *Factors contributing to involvement or lack thereof in program* • *Partner contributions deemed most critical to program success* • *Partner contributions deemed important, but less impactful*	• Surveys • Focus groups	• Project Team • Partners • College Leadership • Project Leads

Table 18.

IHUM Network Implementation Evaluation Timeline

EVALUATION QUESTIONS	Year 1 10/1/2014-9/30/2015 Apr-June Q3	July-Sept Q4	Year 2 10/1/2015 – 09/30/2016 Oct-Dec Q1	Jan-Mar Q2	Apr-June Q3	July-Sept Q4	Year 3 10/1/2016 – 09/30/2017 Oct-Dec Q1	Jan-Mar Q2	Apr-June Q3	July-Sept Q4	Year 4 10/1/2017 – 09/30/2018 Oct-Dec Q1	Jan-Mar Q2	Apr-June Q3	July-Sept Q4
1. **How was the particular curriculum selected, used, or created?**		R(D)	PT(I)	R(D) IL(S)	F(S)	R(D)	PT(I)	R(D) IL(S)	F(S)	R(D)	PT(I)	F(S) R(D) IL(S)		
2. **How were programs/program designs improved or expanded using grant funds?**	Q(D)	Q(D)	Q(D) PT(I)	Q(D)	Q(D)	Q(D)	Q(D) PT(I)	Q(D)	Q(D)	Q(D)	Q(D) PT(I)	Q(D)		
• Delivery Methods		C(S)			F(S)	C(S)			F(S)	C(S)		F(S) C(S)		
• Program Administrative Structure				IL(S)	F(S)			IL(S)	F(S)			F(S) IL(S)		
• Support Services and Other Services		C(S)		IL(S)		C(S)		IL(S)		C(S)		C(S) IL(S)		
• Marketing/Recruitment		C(S) R(D)	M(S)			C(S) R(D)	M(S)			C(S) R(D)	M(S)	C(S) R(D)		
• Students			S(S)	S(S)	S(S) SE(S)	S(S) SE(S)	S(S) SE(S)	S(S) SE(S)	S(S) SE(S)	S(S) SE(S)	S(S) SE(S)	S(S) SE(S)		
• Sustainability				IL(S)	F(S)		L(S)	IL(S)	F(S)		L(S)	F(S) IL(S)		

*Note: *Data Sources*: S=Students, SE=Student Exit, F=Faculty, IL=IHUM Leads, L=College Leadership, M=Marketing, C=Committees, P=Employer Partners, R=Project Records (e.g., websites), Q=Quarterly Reports, PT=Project Team at HCC

Method: (I)=Interview, (S)=Survey, (D)=Data Analysis

Table 18.
IHUM Network Implementation Evaluation Timeline

EVALUATION QUESTIONS	Year 1 10/1/2014-9/30/2015 Apr-June Q3	July-Sept Q4	Year 2 10/1/2015 – 09/30/2016 Oct-Dec Q1	Jan-Mar Q2	Apr-June Q3	July-Sept Q4	Year 3 10/1/2016 – 09/30/2017 Oct-Dec Q1	Jan-Mar Q2	Apr-June Q3	July-Sept Q4	Year 4 10/1/2017 – 09/30/2018 Oct-Dec Q1	Jan-Mar Q2	Apr-June Q3	July-Sept Q4
3. **Are in-depth assessment of participants' abilities, skills, and interests conducted to select or enroll participants into the program being evaluated?**			PT(I)				PT(I)				PT(I)			
• Assessment tools and processes		C(S) R(D)				C(S) R(D)				C(S) R(D)		C(S) R(D)		
• Use of Assessment Results		C(S)			F(S)	C(S)			F(S)	C(S)		C(S) F(S)		
• Usefulness of assessment results for determining program/course sequence of participants				IL(S)		C(S)		IL(S)		C(S)		IL(S) C(S)		
• Career Guidance		C(S)				C(S)				C(S)		C(S)		
4. **What contributions did each of the partners and other key stakeholders (employers, workforce system, other training providers and educators, philanthropic organizations, and others as applicable) make in terms of: 1) program design, 2) curriculum development, 3) recruitment, 4) training, 5) placement, 6) program management, 7) leveraging of resources, and 8) commitment to program sustainability?**			PT(I)				PT(I)				PT(I)			
• Contributions by Partners								P(S) IL(S)				P(S) IL(S)		
• Level of Partner Involvement								P(S) IL(S)			L(S)	P(S) IL(S)		

Note: *Data Sources*: S=Students, SE=Student Exit, F=Faculty, IL=IHUM Leads, L=College Leadership, M=Marketing, C=Committees, P=Employer Partners, R=Project Records (e.g., websites), Q=Quarterly Reports, PT=Project Team at HCC

Method: (I)=Interview, (S)=Survey, (D)=Data Analysis

Outcomes Evaluation Plan

To determine the impact of the IHUM Project on participant outcomes among multiple student groups, a quasi-experimental research design comparing cohorts of treatment group and control group participants was utilized. For the purposes of this analysis, the treatment group consisted of students enrolled in IHUM programs while the control group consisted of students in similar programs that were not part of the IHUM program.

Using data obtained from the Iowa Department of Education (IDoE) and Iowa Workforce Development (IWD), analyses were conducted to determine whether significant differences between the two groups existed in the following areas: Differential Enrollment, Prediction of Completion, and IHUM Program Efficacy. Data Sources and data elements requested and provided by IDoE and IWD are described in detail in the Supplemental Appendices Report (pages 16-24).

IMPLEMENTATION EVALUATION: RESULTS

The following section presents a summary of implementation evaluation results for all four years of the grant. The summary includes results for completion of required milestones, answers to the DOL TAACCCT required questions, and all surveys. Complete and detailed results can be found in Supplemental Appendices A through FF.

Status of Program Milestones and Deliverables Completion

Participating community colleges submitted quarterly reports that specified the status of the implementation of their signature programs. Review of quarterly reports submitted in the first two years of the Project, revealed that while each community college continued to make overall progress throughout the grant, it was not always clear what specifically had been accomplished. To that end, changes were made to the quarterly report format that allowed for clearer milestone reporting. The following is a summary of the milestones completed. See Supplemental Appendix A for a detailed report on Milestones and Deliverables completed by IHUM community colleges.

With the exception of a few milestones that were ongoing throughout the grant, all participating community colleges completed all milestones, strategies, and priorities by the end of Fiscal Year 4, Quarter 2 (March 31, 2018).

Priority 1: Expand and Enhance Sector-Driven Career Pathways

Align curricula with relevant national standards and industry/employer recognized credentials. This milestone was completed by all of the community colleges by December 31, 2017. The community colleges indicated that they regularly update their curriculum. Community colleges that offer healthcare programming that they continually update and realign their curriculum to meet Iowa State Boards requirements.

Align non-credit offerings with credit courses. This milestone was completed by all of the community colleges by December 31, 2017. The milestone was met as community colleges updated and/or completed articulation agreements between credit and non-credit at their community colleges. Initially, five community colleges indicated that they were not going to include non-credit offerings, however, by the conclusion of the grant (September 30, 2018), all of community colleges were offering some sort of non-credit award to IHUM students.

Expand and enhance work-based learning experiences. The majority of community colleges completed this milestone by September 30, 2017 and the final three community colleges completed this milestone by the end of the second quarter of Fiscal Year 4 (March 31, 2018). In conjunction with state agencies and local industry, work-based learning experiences were expanded/enhanced through a variety of ways that included setting up internships/ apprenticeships, increasing job shadowing events, using mobile lab equipment, and expanding available simulation to help students prepare for the workforce.

Align Information Technology cluster pathways with apprenticeships (EICC, KCC, NICC). Completion of this milestone was required by the three community colleges in the Information

Technology sector. However, leads from these community colleges noted that they experienced several challenges in completing this milestone including securing employer buy-in, employer participation, and issues related to student availability. Pilot testing of apprenticeship programs begun by the end of Fiscal Year 2 by two community colleges and all work was completed by the end of Fiscal Year 3 (September 30, 2017).

Strengthen Prior Learning Assessment Initiative. The Strengthen Prior Learning Assessment initiative is a continuation of the Credit for Prior Learning Strategy that was implemented among the 15 community colleges participating in the DOL TAACCCT Iowa Advanced Manufacturing (I-AM) Project between October 1, 2012 and September 30, 2016. Continuation of this milestone between Projects (i.e., IHUM and I-AM) allowed each of the community colleges to apply information learned/implemented in the I-AM Project to the IHUM Project. While much progress was made in terms of Credit for Prior Learning and Prior Learning Assessments during I-AM, expansion of the strategy provided opportunities for community colleges to improve upon available options for students at all community colleges. By the end of Fiscal Year 3, 13 community colleges had completed work on this milestone and the remaining two completed work in Fiscal Year 4.

Priority 2: Advance Online and Technology-Enabled Learning

Enhance and expand simulation into courses and trainings. This milestone was completed by the end of Fiscal Year 4 (December 31, 2017). Activities included the creation of a student and faculty handbooks for simulation, updating course contents and syllabi that included simulation, incorporation of simulation into course curriculum, the purchase of simulation equipment, set up and implementation of simulation centers, and simulation center open houses.

Expand online and blended course offerings. All of the community colleges developed and/or expanded online or blended courses offered. Online offerings ranged from: (1) select set of courses from IHUM programs were offered, (2) select IHUM programs that were offered completely online, and (3) all courses required for completion of certificates, diplomas, and degrees were offered online.

Create and distribute Open Educational Resources. The majority of work needed to complete this milestone took place primarily in the final year of the grant. Open education resources were created by community colleges that could be uploaded and available for other higher education institutions to use in their curriculum. This milestone was completed for all community colleges at the end of Fiscal Year 4 (September 30, 2018).

Priority 3: Create Expanded and Individualized Student Support Services

Implement specialized recruitment and retention efforts. All specialized recruitment and retention efforts by the community colleges continued through the end of the grant (September 30, 2018). Efforts included:

- Community college advisors going into classrooms to help students register
- Hiring lab assistants to assist students outside of class time
- Hiring tutors to assist students outside of class time

- Discussion of remediation strategies with instructors/advisors
- Increased marketing of respective IHUM sector by community colleges

Improve student career planning. Student career planning efforts were completed by the second quarter of Fiscal Year 4 (March 31, 2018). Efforts included:

- Increased use of the EMSI Career Coach
- Hosting sector specific career fairs
- Working with the students on their long-term career and educational goals

Implement accelerated and/or contextualized remediation programs. Remediation efforts were completed by September 30, 2017 (end of Fiscal Year 3). Efforts included:

- Implementing bootcamps (e.g., quick remediation courses)
- Hiring lab assistants and tutors to help students prepare for class and work on homework
- Implementing tutoring programs

Priority 4: Create and Improve Alignment with Industry and State Agencies

Develop IHUM Sector Strategy Committee consisting of members from IWD, IEDA, Iowa DE, and four consortium members (representing each of the industries). The IHUM Consortium set up an IHUM Sector Strategy Committee to include partners and community colleges in the discussion of the IHUM Project. This milestone was completed for all the community colleges by June 30, 2016.

Create or strengthen regional industry advisory committees. Efforts to create/strengthen regional industry advisory committees were completed by the end of Fiscal Year 3 (September 30, 2017). For the most part, community colleges already had regional industry advisory committees or sector boards in place at the start of the IHUM Project (October 1, 2014) for their respective IHUM sectors. Efforts included expansion of the number of employer partners on the committee to strengthen the employer partner contribution to their IHUM signature programs and/or adding more meeting times for their committees.

Create joint marketing and outreach efforts with state agencies. All of the community colleges continued to work on this milestone through the end of the grant (September 30, 2018). The community colleges created joint marketing and outreach efforts that included working with the following state agencies:

- Iowa Workforce Development (IWD)
- Iow@Works
- County level agencies (e.g., Extension, Emergency Medical Services)

Collaborate with state agencies on a participant referral process. Community colleges collaborated with state agencies to expand/develop a participant referral process (efforts were completed by the end of the grant, September 30, 2018). Collaborators that refer their students to their local community college included:

- Iowa Workforce Development (IWD)
- Workforce Innovation and Opportunity Act (WIOA) – a coordinated effort between the U.S. Department of Labor and the U.S. Department of Education
- Pathways for Academic Career and Employment (PACE) – Advisors referred students
- Government Assistance Program (GAP) – Advisors referred students

Partner with industry and state agencies on job fairs and mission-based events. The community colleges partnered with industry and state agencies to develop and implement job fairs and mission-based events. Examples of activities completed by the end of the grant (September 30, 2018) include:

- Hosting of sector specific conferences and career fairs in collaboration with industry
- Open houses and demonstrations of simulation equipment
- Industry presentations provided by employers
- Tours of industry facilities

The detailed Milestone Completion Report is available in [Supplemental Appendix A](#).

DOL TAACCCT Required Research Questions

The four-year evaluation of the implementation of the IHUM Project addressed all four of the DOL TAACCCT required questions.

1. ***How was the particular curriculum selected, used or created?***

- The specific curriculum selected, used, or created varied by community college and/or by sector. Certain sectors (e.g., Healthcare) are required to meet the standards and practices set by state boards (e.g., nursing, dental hygiene) as well as the standards for accreditation in their specific field. As such, much of the work in curriculum development involved the continuation of aligning changes in the curriculum to current boards and standards. Each of the community colleges indicated that aligning of the curriculum to meet state required standards is an ongoing process and expected to continue long after the grant ends on September 30, 2018.

- Each community college worked with their local advisory boards to determine how to align/update/expand their curriculum to meet the employer needs.

- Community college faculty reported that they participated in the creation, modification, and update of the IHUM Project curriculum at their respective community colleges.

- Community colleges within the Information Technology, Utilities, and Manufacturing worked with employer partners to identify local needs and added industry certifications into their programs.

- Several community colleges introduced new degrees, diplomas, or certificates for their IHUM programs. This allowed the community colleges to expand their course offerings for the IHUM programs and allowed them to increase their capacity to meet the needs of students (e.g., reducing waiting lists) and the needs of the local industry.

- Community colleges offered various training options providing students with stackable credentials and to some extent, offered flexible delivery of coursework to students to accommodate the non-traditional learner in the IHUM programs.

- Community colleges aligned their non-credit courses with their credit courses, obtaining approval from their respective curriculum committees.

- At the start of the grant, five community colleges indicated they were not completing non-credit course offerings for the IHUM Project. However, by the end of the grant, every community college, including those five, had non-credit course offerings as part of their IHUM Project.

2. *How were programs and program design improved or expanded using grant funds?*

- *EMSI Career Coach*. A hallmark of the IHUM Project was the EMSI Career Coach; grant funds were used to purchase a subscription to EMSI Career Coach to be used by each community college. The tool provides career analytics designed to help advisors/students search/find information related to local data on wages, expected job growth and opportunities, education/training needed to enter a chosen career/job, and links to community colleges providing the education and training.

- *Enhance Iowa*. Enhance Iowa was a workforce solution funded by the IHUM DOL TAACCCT grant. It was developed by the IHUM Project to facilitate adults' return to school leading to employment in one of four sectors: Information Technology, Healthcare, Utilities, and Manufacturing. Enhance Iowa helped to promote each of the 15 Iowa community colleges, embedded the EMSI Career Coach on its website to provide opportunities to search job openings by region, provided information on how to obtain necessary funding to attend school, and provided information that aimed at Veterans, TAA eligible students, and displaced workers.

- *Joint Marketing and Outreach Efforts*. Community colleges joined efforts with Iowa Workforce Development (IWD), Iow@Works, and various local area agencies (e.g., Extension, Emergency Medical Services, Hospitals) to promote the program and the community college and to increase participant referrals.

- *Simulation Centers and Equipment*. Grant funds were used to update, enhance and/or develop simulation centers at community colleges allowing students to learn using state-of-the-art equipment while gaining real world, hands-on experiences. In particular, many of the healthcare programs

- Each community college incorporated simulation into their IHUM programs in some way. Simulation was incorporated into many of the healthcare programs that include

practical nursing, Nursing (ADN), physical therapy, and emergency medicine. Grant funds were used to purchase new equipment and/or update equipment including the purchase of mannequins for students to practice. Simulation was also incorporated into Information Technology programs to teach students how to troubleshoot a computer system, hardware failure, and other information technology functions.

- *Iowa Community College Simulation Network (ICCSN)*. The Iowa Community College Simulation Network (ICCSN) was created to provide networking opportunities to discuss simulation and best practices between community colleges offering healthcare programs. Community colleges found their participation in the network to be helpful and many noted that they implemented best practices shared by others at their respective campuses. The group meets on a regular basis and is expected to continue meeting after the grant ends.

- *Work Based Experiences*. IHUM programs were improved and expanded with the addition of work-based experiences such as internships, apprenticeships, mobile lab equipment, mobile simulation equipment, and job shadowing events. While apprenticeships were planned for select IHUM Information Technology signature programs, developing these opportunities proved challenging in implementing.

- *Strengthening Prior Learning Assessment*. Community colleges continued work initiated in the DOL TAACCCT Iowa Advanced Manufacturing (I-AM) Project (Round 2). Continuation of these efforts allowed each of the community colleges to apply information learned and/or implemented in the I-AM Project to the IHUM Project. Expansion of the strategy provided opportunities for community colleges to improve upon their available options for students.

- *Expansion of Online and Blended Course Offerings*. Each participating community college worked to expand or develop online or blended courses. Level of implementation varied by community colleges, some already had some IHUM courses online and required only updating/expanding; some worked to offer the entire portions of their IHUM program online; and others offered all of the courses needed to obtain certificates, diplomas, and degrees online.

- *Student Support Services*. Community colleges engaged in expanding and improving student support services in the following areas:

  o *Recruitment and Retention Efforts*. Recruitment and retention of students is an ongoing effort. Level of effort varied by community college and included: advisors going into classrooms to help students register for classes, lab assistants and tutors hired to provide tutoring and help outside of the classroom time, and increased marketing of the respective IHUM sector by community colleges.

  o *Accelerated/Contextualized Remediation Programs*. In addition to the student services described in the previous section, community colleges implemented bootcamps to help students with remediation, tutoring programs, and purchased a

subscription to ALEKS (Assessment, LEarning, in Knowledge Spaces), a program that assess each student individually.

- o *Student Career Planning*. Efforts to expand and improve student career planning included the increased use of the EMSI Career Coach in advising, introductory, and career courses, hosting sector specific career fairs, and advisors working with students on their long-term career and educational goals.

3. ***Are in-depth assessments of participants' abilities, skills, and interests conducted to select or enroll participants into the program being evaluated?***

- *EMSI Career Coach*. The EMSI Career Coach tool was purchased with IHUM Project funds to help students find careers that match their strength. For example, students took a career assessment that provided information about the types of courses or program needed and generated information about where the program of interest was offered. Each community college housed the EMSI Career Coach on their respective websites. How the tool was used varied across community colleges.

- *Strengthening Prior Learning Assessment*. Expansion of the strategy provided opportunities for community colleges to improve upon their available options for students. The expanded options allowed for the faculty and staff to be able to properly assess a student's abilities in a particular sector if the student had previous experience within the sector.

- *Accelerated/Contextualized Remediation Programs*. The remediation programs allowed for the faculty and staff to assess students and provide the remediation needed to be successful in specific programs. This was accomplished through a variety of methods including bootcamps, pre-requisites, and ALEKS.

- *Clinicals*. Students in the Healthcare sector participated in clinicals for selected programs including practical nursing and Associate's degree in Nursing. The students were assessed on their abilities to perform under pressure as well as in their ability to perform the functions they would need to on a daily basis as part of being a nurse.

- *Wait Lists*. While the IHUM Project helped several community colleges expand their programs, limited capacities continued to exist requiring the need for program wait lists. While on the wait list, students were assessed to determine whether they met the qualifications to be accepted into the program. Assessments varied by community college and by program.

4. ***What contributions did each of the partners and other key stakeholders (employers, workforce system, other training provided and educators, philanthropic organizations, and others as applicable) make in terms of: 1) program design, 2) curriculum development, 3) recruitment, 4) training, 5) placement, 6) program management, 7) leveraging of resources, and 8) commitment to program sustainability?***

- *Employer Partners*. Employer Partners played a vital role in the success of the IHUM Project. Participation included sitting on advisory boards; conducting tours; assisting IHUM students with internships, resume review, and mock interviews; taking part in career fairs; and providing feedback regarding skills needed for employment. Employer Partners helped community colleges by providing equipment, meeting space, and other resources. Employer Partners often hired IHUM students prior to their completion of the program and often referred their own employees or unsuccessful job applicants to IHUM programs for training.

- *Industry*. In addition to the Employer Partners, local industry also played a vital role in the success of the IHUM Project. Industry provided opportunities to students that included tours, internships, and placement for completion of clinicals.

- *Sustainability*. Employer Partners were committed to the sustainability of the IHUM Programs at their local community colleges. With providing continuous feedback on curriculum and employer needs, the Employer Partners continue to have a vital say in the progress of these community college programs.

- *Marketing*. Employer Partners, local industry, state agencies, and local agencies participated in the marketing of the IHUM programs at each of the community colleges. Career fairs were hosted at various venues including at local industry or at an agency. Industry sent their employees to the community colleges to be trained in the IHUM programs and state agencies referred students to the IHUM programs for training.

IHUM Project Evaluation Survey Results

Student Experiences

Student Intake (surveys distributed November 2015 – May 2018)

Enrollment. Over one-fourth (26.4%) of the students responding they were familiar with the program because they had heard about the program from a school counselor or advisor, 26.0% had previously taken classes at the community college, 22.5% heard about the program from a friend, and 14.9% heard about the program from a family member. Most respondents (93.6%) indicated that they were not familiar with Enhance Iowa (see Figure 5). However, students that were familiar with Enhance Iowa reported that they had heard about it through a flyer/brochure (32.4%), social media (20.3%), website ad (16.2%), or by some other means (27.0%).

When students were asked why they enrolled at their community college *at this time*, approximately half (46.0%) indicated that it was because it felt right/it was the right time, 41.0% enrolled due to the possibility of a better job with completion of program, 33.7% enrolled because it sounded like a good program, and 18.6% enrolled due to the possibility of a wage increase with the completion of the program.
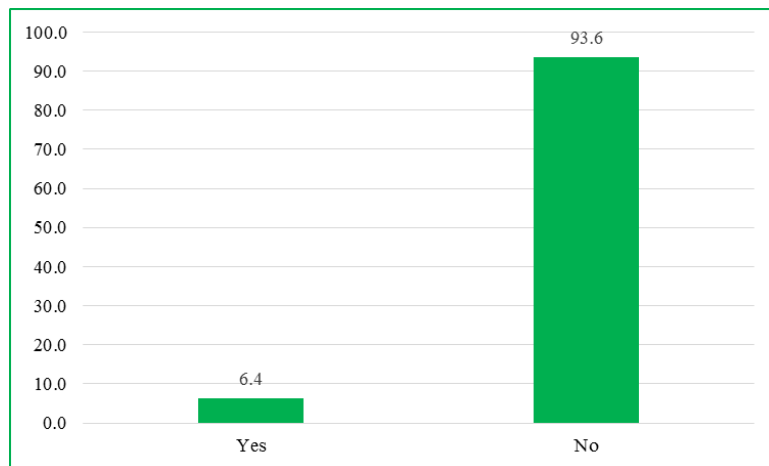
Figure 5. Students Familiar with Enhance Iowa

When asked why they enrolled at their particular community college, over half (62.2%) indicated they enrolled because it was close to home, 50.4% indicated that it was more affordable than other options, and 22.9% indicated they had taken classes at their community college in the past. In general, students selected their current focus because they were interested in that particular program of study (71.1%), 65.4% indicated that they wanted to work in their study area, and 35.8% indicated that they wanted to strengthen their skills in their program of study.

Advising. Over three-fourths (78.7%) of students indicated they had met with an advisor (see Figure 6) with the majority (77.8% to 87.3%) of these students reporting positive interactions. Overall, students indicated that their advisor was able to accurately answer their questions, was readily available to meet with them, was knowledgeable about program requirements, and that they were satisfied with the experience they had with their advisor.

Students who had not met with an advisor reported that it was because they did not arrange a time to meet with their advisor (28.6%), 38.8% did not feel as though they needed to meet with their advisor, and 23.3% did not know who their advisor was. About one half (44.6%) of the students reported that they did not know what Credit for Prior Learning (CPL) was. Only 22.3% of the students responding to the survey indicated that someone had discussed Credit for Prior Learning (CPL) with them and 6.7% indicated that they were already familiar with CPL (see Figure 7).
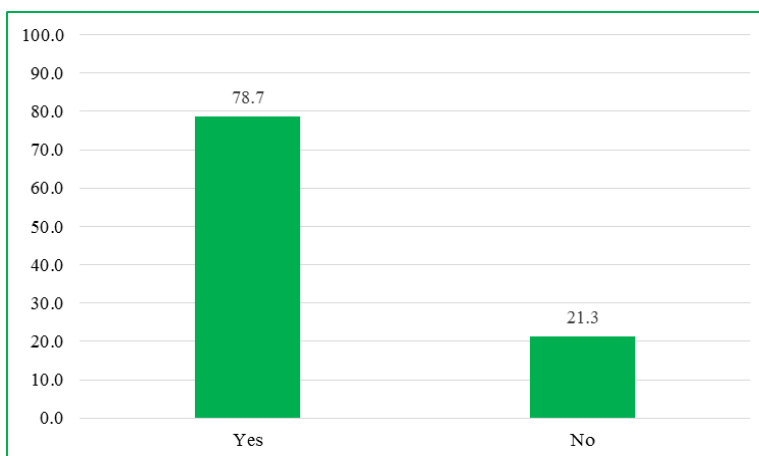
Figure 6. Students Who Met with an Advisor

Student Demographics. Almost half (48.9%) of students responding to the survey indicated that they had completed 1-3 years of college/technical schools, 39.1% were high school graduates or had a high school equivalency/GED, and 11.4% had completed 4 or more years of college. About half (52.6%) indicated that their goal was to complete an AA/AS degree, 17.0% planned to transfer to a 4-year college, and 12.7% wanted to obtain a diploma (see Figure 8).
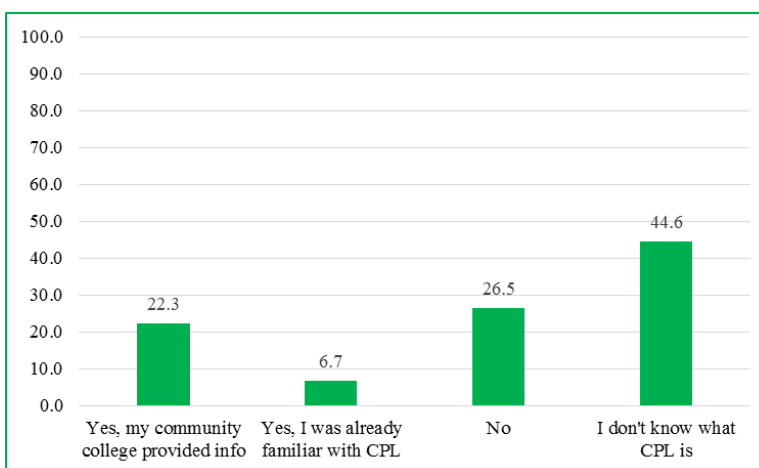
Figure 7. Students' Familiarity with Credit for Prior Learning (CPL)

Over half (57.8%) of the students reported that they worked on a part-time basis, 14.9% reported that they worked full-time, and 27.4% reported that they were not employed at time of completing the survey. Over half (64.0%) of the students wanted to get a job in their field of study, 18.1% wanted to get a better job within the same field of study as their current job, and 8.4% wanted to get a promotion and/or get an increase in pay at their current job.

The number of classes students planned to take per term varied among those surveyed. Less than half (36.0%) of the students indicated that they planned to take 4 classes per term, 21.5%

planned on taking 1-2 classes per term, 23.4% reported that they planned on taking 3 classes per term, and 19.1% indicated that they were planning on taking 5 or more classes per term.

Approximately half (46.5%) of the students had completed between 1-2 terms, and 19.5% had completed between 3-4 terms. Approximately 8% of the students were in their final term, 22.7% of the students indicated that they expected to completed 1-2 more terms, 47.2% expected to complete 3-4 more terms, and the remaining expected to complete 5 or more terms.

Students identified various challenges and barriers that impacted their ability to complete their programs. The challenge cited by slightly less than half (44.0%) of the students involved finances. Other challenges included illness, child care issues, transportation, not able to get off work, and academic related issues. The majority (62.6%) of students responding to the survey were female and 35.9% were male (see Figure 9).

The detailed appendices are available in Supplemental Appendices B through K.
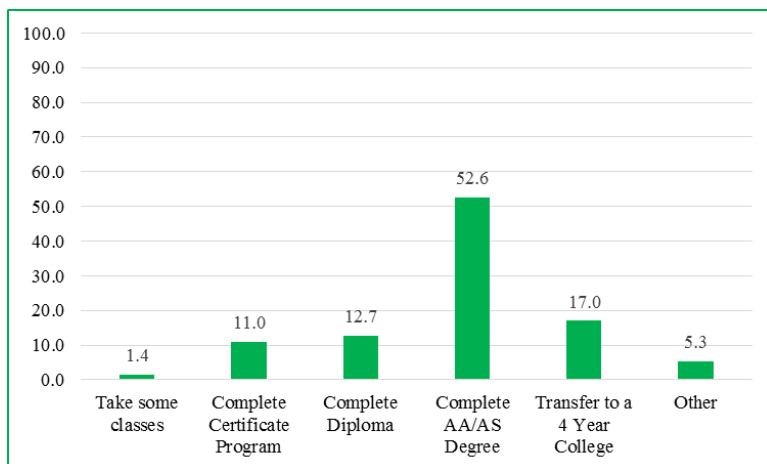
Figure 8. Students' Educational Goals
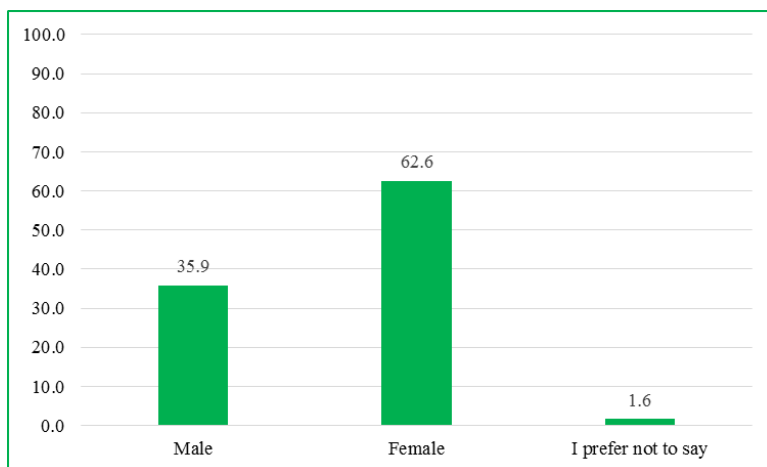
Figure 9. Student's Reported Gender

Student Completion (surveys distributed April 2016 – May 2018)

Goals. Over half (56.4%) of the students responding to the survey indicated they were currently working to complete a degree, 39.8% indicated they were completing a diploma, and 2.6% indicated a credit certificate (see Figure 10). Almost half (43.9%) of the students indicated their current educational goal was to complete an AA/AS degree, 23.1% indicated their goal was to complete a diploma, and 17.7% indicated their goal was to transfer to a four-year college.
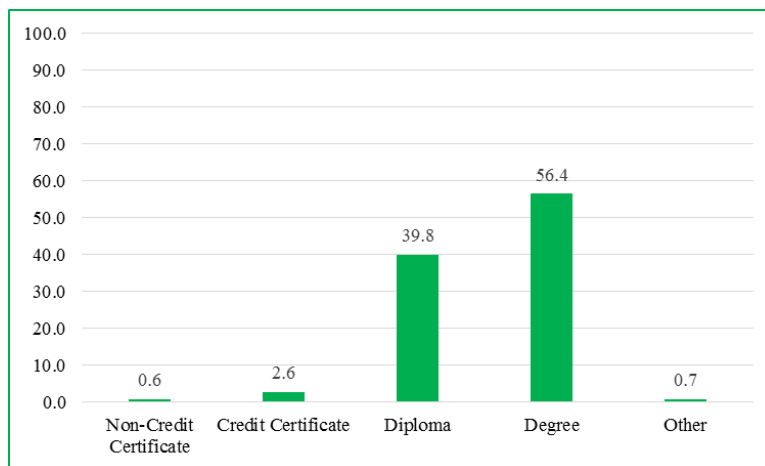
Figure 10. Percentage of Student Awards Completed by Type

Students were asked about their current career goal. Over half (59.4%) of the students indicated their current career goal was to get a job within their field of study, 18.0% indicated their goal was to get a better job within their field of study than the one they currently hold, and 9.4% indicated their goal was to get a promotion and/or increase in salary/wages at their current job. Over half (59.1%) of the students were employed part-time at the time they completed the survey and 17.7% of the students were employed full-time.

Students were asked about their expectations of working in their field of study after completing their program. One-quarter (26.7%) of the students indicated they already had a job in their field of study, 16.7% indicated they had secured a job in their field of study, but had not yet started, 19.3% indicated they were currently interviewing for jobs in their field of study, and 20.2% indicated they were continuing their education at this time.

Students' Satisfaction with Their Program of Study. Students were asked to rate their level of satisfaction with various components of their IHUM signature program. Almost all (89.3%) of the students indicated they were satisfied or very satisfied with the overall quality of their educational experience (see Figure 11).
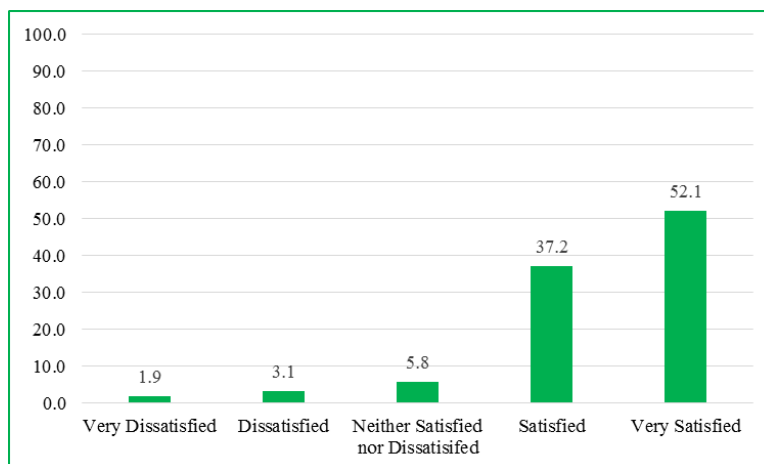
Figure 11. Students' Satisfaction with Overall Quality of Educational Experience

In general, 65.7%-91.0% of students indicated they were satisfied or very satisfied with the academic program overall, with the quality of courses offered, the overall quality of instruction, their interactions with other students in their field of study, the availability of faculty members, the office hours maintained by faculty, access to labs, study areas, student lounges, their preparation for employment in their field of study, and their preparation for their third party certifications/board exams.

Advising/Registration and Tutoring. The majority (89.3%) of students reported that they were not familiar with Enhance Iowa. Students that were familiar with Enhance Iowa reported that they heard about it through various outlets such as social media, flyers/brochures, website ads, or television.

The majority (74.8%) of students responding to survey reported that they had met with an advisor/career coach/pathway navigator/success coach (see Figure 12). Students who had not met with an advisor, indicated that they did not meet with an advisor because they did not feel as though they needed to, they had not arranged a time to meet with their advisor, or they had met with another faculty member or administrator to get their academic advising.
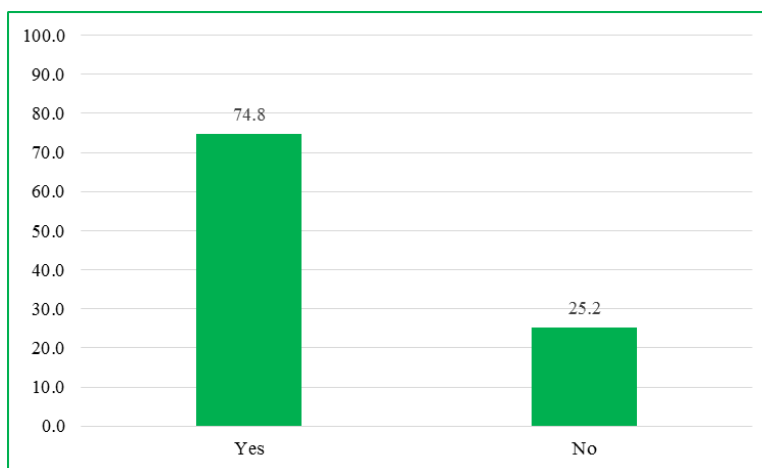
Figure 12. Percentage of Students that Met with Advisor

The majority (67.2%) of students that did meet with an advisor, reported that they met with their advisors at least once per semester, 12.7% of students indicated that they met with their advisor on a monthly basis, while 12.2% indicated they had not met with an advisor in the past year.

Overall, 74.3%-87.5% of students that met with their advisors, rated their advisors favorably. For example, students reported that their advisor was friendly, helpful, knowledgeable about program requirements, able to accurately answer the questions, and that they felt comfortable talking with their advisor.

Students were also asked to rate the helpfulness of various student services provided by their community college. The majority of students (73.9%-89.4%) that used student services rated the services favorably. For example, students indicated assistance with communication skills development, time management skills, study skills instruction, licensure exam preparation, and basic skills instruction were all fairly to very helpful.

Clinicals/Internships/Apprenticeships. Most (85.8%) of the students responding to the survey indicated that they had completed their clinicals, an internship, or an apprenticeship (e.g., a placement; see Figure 13).

Overall, 90.1%-93.0% of the students responded favorably to their placement. For example, students indicated that they learned something new on a weekly basis while at their placement, the placement improved their skills, improved communication, thought that their placement would help them in any future job, and that the placement was meaningful and had a positive impact on them.
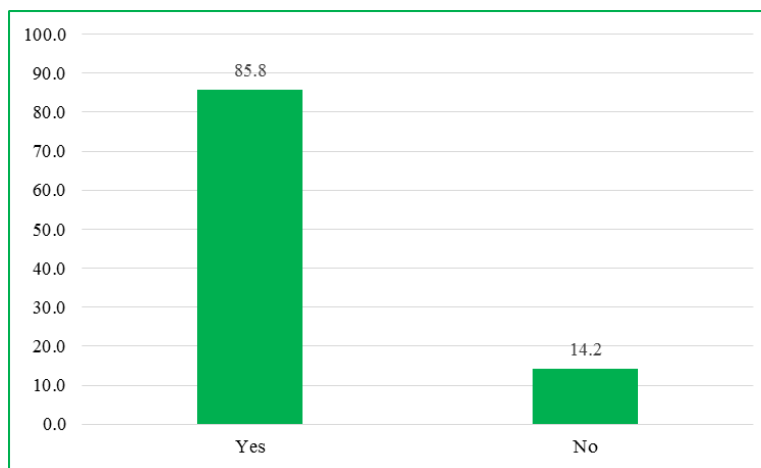
Figure 13. Percentage of Students Completing Clinicals, Internships, or Apprenticeships

EMSI Career Coach. Very few (4.4%) students used the EMSI Career Coach at their community college (see Figure 14). The students that did use the EMSI Career Coach indicated that they searched job board postings, looked at local earnings for their chosen field of study and explored what, if any, certifications were needed in their field of study.
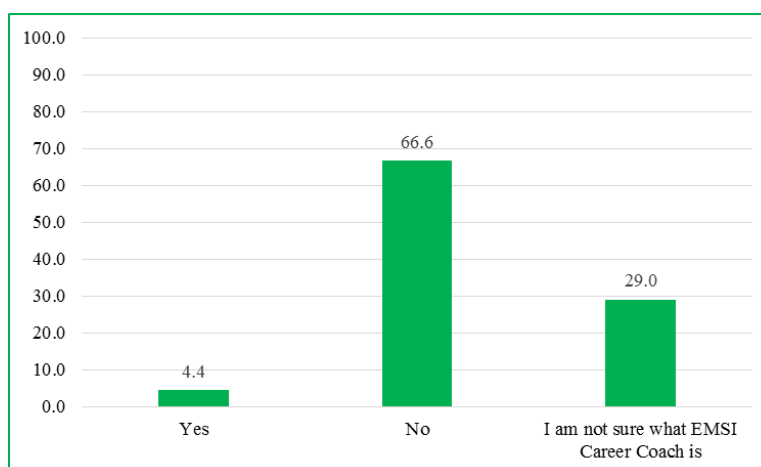
Figure 14. Percentage of Students Using EMSI Career Coach

Student Engagement. When asked to rate their class attendance, almost half (42.9%) of the students indicated they were rarely absent, 43.6% indicated they never missed class, and 12.2% indicated they had some absences. Students identified challenges that they had in completing their program of study. Over one-third (37.2%) indicated family obligations, 26.3% indicated financial obligations, 24.2% indicated personal illness, and 28.9% indicated that they did not have any challenges.

In response to asking if the students had access to everything they need in order to learn, almost all (96.5%) indicated they did. Only a few of the students indicated that they had issues with the library hours, the lack of respect to students, and the need for a better practice lab presented limitations in their ability to learn/complete their studies.

Students were also asked if they had participated in opportunities provided by local employers. One-third (38.2%) indicated they had participated in a resume review, 30.1% indicated they had participated in networking opportunities, and 28.3% indicated they had participated in internships.

Student Demographics. Approximately 17.9% of the students indicated that they had completed 4 or more years of college, 13.5% had completed high school or completed a GED, and 68.1% had completed 1-3 years of college/technical school.

A third (37.3%) of the students reported that they had completed third party certifications/board exams, 30.6% reported they would be completing them within the next month, and the remaining 32.2% had not yet completed any.

Almost all (81.7%) of the students reported that they would recommend their program, 14.9% indicated they might recommend the program, and 3.4% reported that they would not (see Figure 15). The students unwilling to recommend their program included reasons such as the program was unorganized and unprofessional, lack of communication, and issues with the instructors.

Approximately 2.1% of the students reported that they were Veterans and 1.6% reported that they were disabled. The majority (81.0%) of students responding were female and 16.6% were male.

The detailed reports are available in Supplemental Appendices L through T.
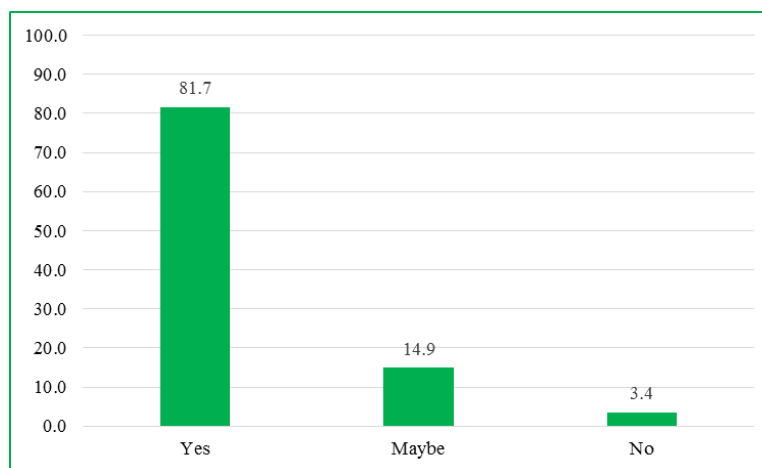
Figure 15. Percentage of Students that would Recommend Program

Project Lead Experiences

Project Lead Experiences (March 2016)

Students. Respondents were asked to indicate whether their community college offered specific student and educational services to IHUM participants. The student services offered by most community colleges were: guided registration and enrollment (93.3%), guided financial aid assistance (86.7%), financial assistance (73.3%), assistance obtaining public benefits (71.4%), and financial literacy instruction (69.2%). The educational services offered by most community colleges included: advising (93.3%), tutoring (86.7%), English as a Second Language (85.7%), and intense advising (80.0%).

Almost all (86.7%) of the community colleges offered IHUM participants stackable credentials. The remaining community colleges did not offer stackable credentials and they indicated that they had no plans of doing so. Three-fifths (60.0%) of the community colleges offered flexible delivery of coursework to accommodate non-traditional learner schedules. Approximately one-fourth (26.7%) had no intention of offering flexible delivery.

One of main components of the IHUM Project was the implementation of the EMSI Career Coach at each community college. The Project Leads were asked to describe the ways in which the EMSI Career Coach was currently being implemented at their community college. Almost three-fourths (71.4%) indicated the EMSI Career Coach was available on the home page or on a main page in their overall website, 42.9% indicated their Career Services use it, and 35.7% indicated the EMSI Career Coach was used in the introductory career courses.

Communication. Respondents were asked to rate the effectiveness of communication between themselves and others. Almost all (86.7%) rated the effectiveness of communication between themselves and IHUM faculty members, support staff, and IHUM Project Team (HCC personnel) as effective or very effective. Four-fifths (80.0%) indicated the communication was effective between themselves and the college leadership and advisors.

Project Leads were asked to indicate their agreement about overall communication with various groups at their community college. Overall, faculty (80.0%), college leadership (93.4%), support staff (93.3%), and advisors (86.6%) were on board with the IHUM Project. Approximately three-fourths (73.4%) indicated they had the information they needed to do their job effectively.

Project Leads were asked about the sharing of best practices. Almost all (93.4%) indicated the sharing of best practices helped their community college think about ways to improve their IHUM signature programs and 80.0% of the Project Leads indicated the sharing of success stories at IHUM quarterly meetings helped their community college think about ways to improve their IHUM signature programs.

Strengths/Challenges. Approximately half (46.7%) of the community colleges had experienced an issue in the implementation of the IHUM Project. Issues included: finding qualified staff, problems with equipment, not having enough funds, delays, businesses not being supportive of the apprenticeships, delays in remodeling, and the overall understanding/time commitment.

When asked to describe the strengths/accomplishments of the IHUM signature programs at their community college, almost half (42.9%) of the Project Leads indicated simulation had been greatly enhanced or it had been a great addition, 28.6% indicated the recruitment efforts had been effective, 21.4% indicated equipment, and 21.4% indicated the expansion of the programs had been a major accomplishment.

Project Leads were asked to describe any challenges their community college had experienced in implementing the IHUM signature programs. Each community college identified different challenges including: accreditation taking a long time, concerns about the sustainability of the simulation, getting EMSI Career Coach implemented, poor communication from HCC leadership, staffing, and struggling to get participants.

The detailed report is available in Supplemental Appendix U.

Project Leads Experiences (February 2017)

Communication. One-third (33.3%) of respondents indicated they communicated with others in their cluster/sector once a month and another third (33.3%) communicated once a quarter. One-third (33.3%) also referred to others in their cluster/sector once a month and one-third (33.3%) received requests from others in their cluster/sector to participate in brainstorming once a quarter.

The clusters/sectors worked on a variety of topics including apprenticeships, Credit for Prior Learning/Prior Learning Assessment, EMSI Career coach, grant requirements, and simulation. Overall, the discussions of these topics were deemed fairly helpful or very helpful.

Over three-fourths (80.0%) of the respondents agreed that the sharing of best practices had helped their community college to think about ways to improve their programs. Over half (53.3%) of the respondents agreed that their community college had implemented or would be implementing an activity related to best practices shared by another IHUM community college.

Overall, the communication between the Project Leads and various groups at their respective community colleges had been effective. Over three-fourths (80.0%) of the respondents indicated the communication between them and the faculty members had been effective, 73.4% for college leadership, 80.0% for advisors/navigators/career coaches/success coaches, 86.7% for community college project team members, and 93.3% for the IHUM Project Team.

One Project Lead indicated the communication with the college leadership had been ineffective and had resulted in milestones being delayed. One Project Lead indicated the communication with the IHUM Project Team had been ineffective and had resulted in confusion, frustration, and major delays in meeting deliverables.

Community College Milestones. For Priority 1 (expand and enhance sector-driven career pathways), all (100.0%) of the Project Leads indicated their community college had completed or was in the process of completing the "align curricula with relevant national standards and industry/employer recognized credentials," 93.3% had completed or was in the process of completing "align non-credit offerings with credit courses," 100.0% had completed or was in the

process of completing "expand and enhance work-based learning experiences," and 100.0% had completed or was in the process of completing "strengthen Prior Learning Assessment Initiative."

The three community colleges in the Information Technology sector indicated that they had completed or were in the process of completing their sector specific milestone – "align information technology cluster pathways with apprenticeships."

For Priority 2 (advance online and technology enabled learning), 93.3% of the Project Leads indicated their community college had completed or was in the process of completing the "enhance and expand simulation into courses and trainings" milestone, 93.3% had completed or was in the process of completing the "expand online and blended course offerings" milestone, and 93.3% had completed or was in the process of completing the "create and distribute Open Educational Resources" milestone.

For Priority 3 (create expanded and individualized student support services), 100.0% of the Project Leads indicated their community college had completed or was in the process of completing the "implement specialized recruitment and retention efforts" milestone, 100.0% had completed or was in the process of completing the "improve student career planning" milestone, and 100.0% had completed or was in the process of completing the "implement accelerated and/or contextualized remediation programs" milestone.

Respondents were also asked about the EMSI Career Coach implementation at their community college. All (100.0%) of the respondents indicated their community college had implemented the EMSI Career Coach. Almost all (86.7%) of the respondents indicated the EMSI Career Coach was somewhat useful or very useful for students.

For Priority 4 (create and improve alignment with industry and state agencies), 100.0% of the Project Leads indicated the "develop IHUM Sector Strategy Committee consisting of members from IWD, IEDA, Iowa DE, and four consortium members (representing each of the industries)" milestone was complete, 100.0% had completed or were in the process of completing the "create or strengthen regional industry advisory committees" milestone, 93.3% had completed or were in the process of completing the "create joint marketing and outreach efforts with state agencies" milestone, 100.0% had completed or were in the process of completing the "collaborate with state agencies on a participant referral process" milestone, and 86.7% had completed or were in the process of completing the "partner with industry and state agencies on job fairs and mission-based events" milestone.

The detailed report is available in Supplemental Appendix V.

Project Leads Experiences (January 2018)

Milestones and Goals/Deliverables. Respondents were asked about the IHUM strategies. All (100.0%) of the respondents agreed that their department/program developed strong relationships or enhanced their existing relationships. Almost all (93.3%) agreed that more technology-enabled learning activities were incorporated into classrooms, 86.7% agreed

aligning curricula with relevant national standards/industry recognized credentials strengthened their program, and 86.7% agreed that most students were adequately prepared to learn.

Respondents were asked about the impact each grant priority had on their community college. For Priority 1, the impacts included: development of new programs and awards (21.4%), career pathways aligned with industry standards (14.3%), and students benefited from clinicals (14.3%). For Priority 2, the impacts included: increase in online course offerings (35.7%), increased simulation and/or manikin usage (35.7%), and updated technology/technology devices (35.7%). For Priority 3, the impacts included: the advisor was responsible for advising and registering (23.1%), individual tutoring services (23.1%), and Career Coach had been a great asset (15.4%). For Priority 4, the impacts included: expanded relationships with industry (35.7%), increased alignment with sector (28.6%), and increased awareness to state agencies (28.6%).

All (100.0%) of the respondents indicated they expanded their efforts to market to the community and relationships with industry/employer partners had strengthened and 93.3% indicated students had received enhanced technology enabled learning.

Credit for Prior Learning (CPL). One of the milestones for the IHUM Project was Credit for Prior Learning. Approximately one-fourth (26.7%) of the community colleges indicated moderate changes were made and 26.7% indicated no changes were made because the policies were up to date. The changes the community colleges made to the CPL included: mapping non-credit to credit (28.6%), establishing a fee and process/procedure (14.3%), and developing a PLA portfolio creation class (14.3%).

Enhance Iowa Marketing Campaign. Over three-fourths (80.0%) of the respondents indicated that the Enhance Iowa Marketing Campaign had a positive impact on the awareness of the IHUM programs (see Figure 16) and 78.6% indicated an overall positive impact from Enhance Iowa. Over three-fourths (80.0%) indicated that they were satisfied with the Enhance Iowa marketing efforts and website.
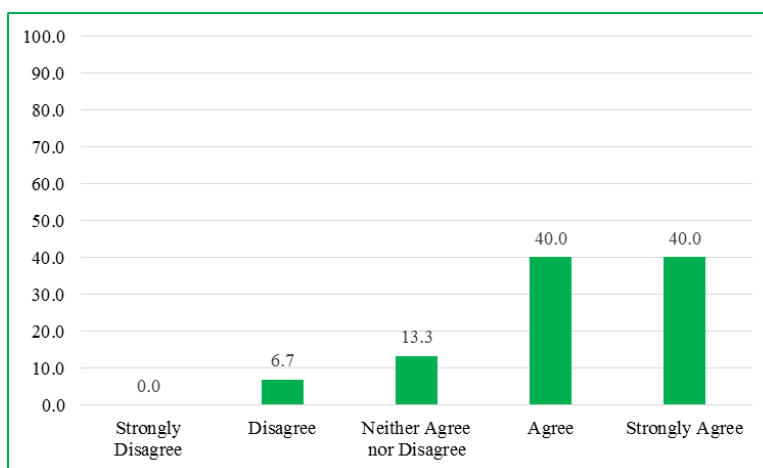
Figure 16. Perception of Enhance Iowa Impact on Increasing Awareness of IHUM Programs

When asked how applicable Enhance Iowa was to the target groups, 86.6% indicated it was applicable to the unemployed and 80% indicated it was applicable to the underemployed and adult workers in need of training. In terms of the effectiveness, 73.3% indicated Enhance Iowa was effective in marketing to adult workers in need of training and 66.7% indicated it was effective for the unemployed.

In the future, the respondents would change the statewide marketing effort by having direct links to high school counselors (16.7%), finding a better way to reach target groups (16.7%), and focusing on one sector, not having multiple sectors (16.7%).

Community College's Regional IHUM Marketing Campaign. Over half (53.3%) of the respondents indicated their community college was very active in their marketing, 26.7% were moderately active, and 20.0% were somewhat active (see Figure 17). Almost half (40.0%) of the respondents indicated their community college very likely would continue to market their IHUM programs after the grant ends, 33.3% indicated likely, and 6.7% indicated undecided.
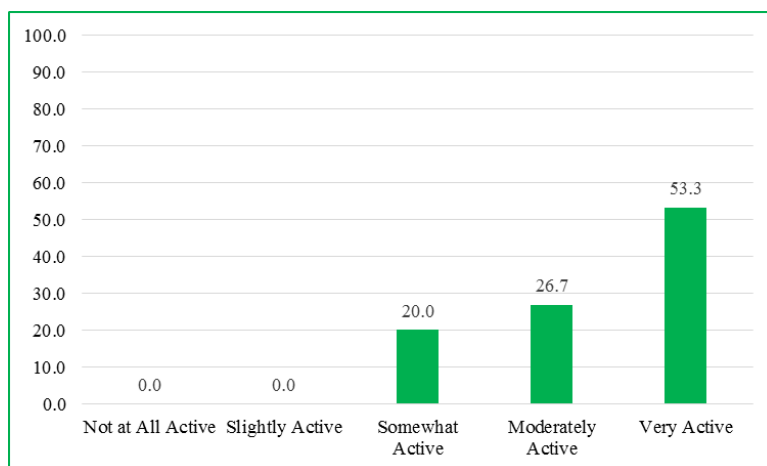
Figure 17. Level of IHUM Marketing Activity Reported by Community Colleges

The community colleges used a variety of mediums to market the IHUM programs including: flyer/brochures (100.0%), social media (93.3%), radio (92.3%), and other mediums (87.5%). The target groups most focused on were the underemployed (80.0%), unemployed (66.7%), adult workers in need of training (66.7%), and underrepresented populations (60.0%).

The respondents agreed that their marketing campaigns had a positive impact on the recruitment and enrollment efforts for the students overall (93.3%), the unemployed (86.7%), and the adult workers in need of training (80.0%). The respondents agreed that their marketing campaigns had a positive impact on the retention efforts for the underemployed (60.0%), the unemployed (60.0%), the adult workers in need of training (60.0%), and the students overall (60.0%).

Overall, the respondents agreed that the regional marketing campaign had a positive impact on their community college with 26.7% strongly agreeing and 60.0% agreeing (see Figure 18). Other ways their community college's marketing plan impacted their community college included: overall interest/awareness in program (37.5%), ability to experiment with marketing mediums (12.5%), and ability to launch multiple trainings (12.5%).
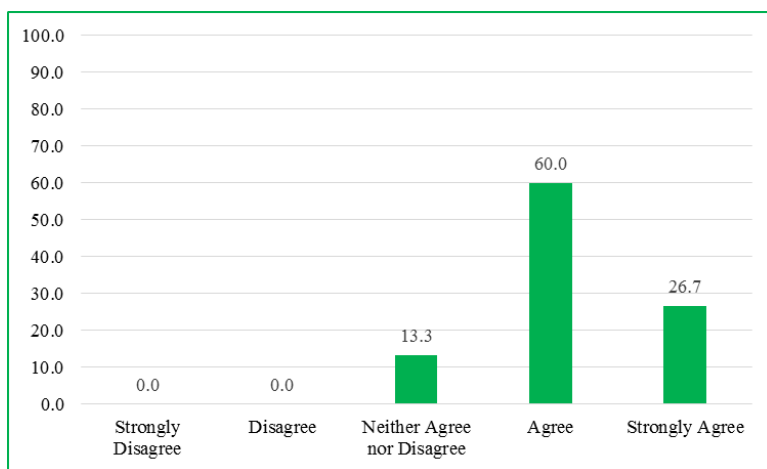
Figure 18. Perceived Impact of Regional Marketing Campaign on Community Colleges

Employer Partners. Respondents indicated employer partners had been involved with a variety of activities including: the identification of occupational needs (100.0%), the identification of potential program instructors and faculty (93.3%), they sent employees to the community college for specialized or incumbent training (93.3%), and their participation in the advisory board (92.9%). Employer partners also provided financial support for new building and equipment (33.3%), interviewed students and hired IHUM participants (33.3%), and provided adjunct instructors (33.3%).

Respondents also indicated that employer partners provided opportunities to IHUM students. Those opportunities included: hiring students prior to graduation (100.0%), providing flexibility to incumbent workers (100.0%), career fairs (100.0%), mock interviews (91.7%), tours (84.6%), and scholarships/tuition/tuition reimbursement (84.6%). According to the Project Leads, employer partner participation in marketing activities positively impacted their community college (73.4%; see Figure 19).
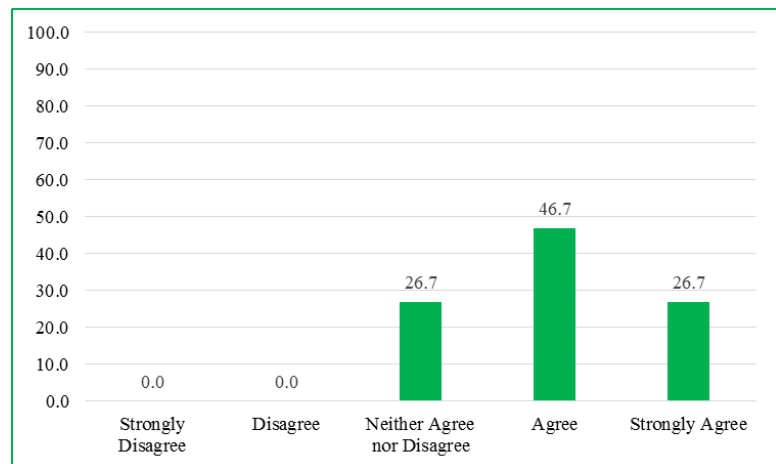
Figure 19. Perceived Impact of Employer Partner Participation in Marketing Activities on Community Colleges

Almost half (46.6%) of the respondents indicated that the coordination between their community college and the public workforce system/workforce development had a positive impact on IHUM students. All (100.0%) of the respondents indicated that their community college at least met expectations with regards to producing students that had the technical skills/abilities required to begin working with minimal training or guidance and producing students that had the soft skills required to begin working at a company.

Respondents indicated that their preparation of skilled workers had met industry needs/ expectations because the community college was able to serve multiple TAA individuals (16.7%), employers were telling the community college whether or not the community college was meeting the demand (16.7%), and the curriculum was based on employer input (16.7%).

Project Leads were asked which soft skills were the most valuable for students completing the IHUM program. The top soft skills were: critical thinking (80.0%), professionalism (73.3%), the ability to grasp and implement instructions quickly (46.7%), and complex problem solving (46.7%).

Respondents indicated that their departments/programs developed strong relationships or enhanced existing relationships with industry/employer partners (93.3%), workforce development (80.0%), and business associations (53.3%). In response to how were the relationships with employer partners strengthened, Project Leads indicated that valuable

connections were made (25.0%), sector boards bring everyone together (25.0%), and employers were more involved with students (16.7%).

Employer partners also benefited from the simulation, according to the Project Leads. All (100.0%) of the respondents indicated that the employer partners benefited from the mobile sim, the simulation centers, and the overall implementation of simulation into the IHUM program.

The respondents from the Information Technology sector were asked about their apprenticeship program. Their responses included: apprenticeships were very hard to implement (100.0%), the community college was moving forward with a different model (33.3%), they could not get employers to move forward with the apprenticeships (33.3%), and employers wanted someone with experience (33.3%).

Curriculum. All (100.0%) of the respondents indicated that simulation was included in the curriculum, 93.3% indicated stackable credentials and online course offerings and 92.9% indicated work based learning opportunities were included in the curriculum. All (100.0%) of the respondents indicated that the incorporation of technology, the update of training facilities, and the update of equipment had a positive impact on *students*. All (100.0%) of the respondents also indicated that the incorporation of technology, the update of training facilities, and the update of equipment has a positive impact on their *community college*.

All (100.0%) respondents indicated that faculty were kept informed regarding the IHUM implementation and their faculty were supportive of the IHUM efforts (see Figure 20). Almost all (85.7%) indicated that their faculty were willing to fully implement the IHUM Project. Three-fourths (75.0%) of the community colleges did not have any challenges to report regarding the development and posting of the OERs at the time of the survey.
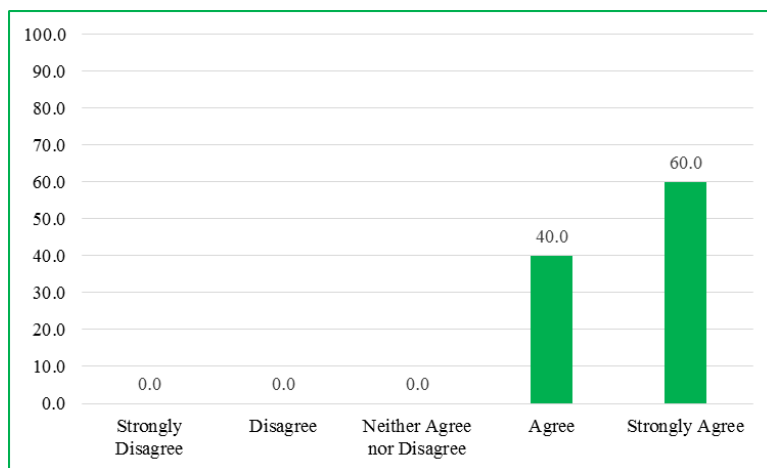
Figure 20. Perceived Support of IHUM Efforts by Faculty

Simulation. Two-thirds (66.7%) of the respondents indicated their community college used task trainers and computerized simulation and 40.0% used standardized patients and teaching associates and human patient simulation (see Figure 21). All (100.0%) respondents indicated the IHUM Project had afforded their community college the opportunity to participate in professional development opportunities, 91.7% indicated set up simulation facilities, 91.7% indicated upgrade simulation facilities, and 91.6% indicated purchase simulation equipment.

Almost all (93.4%) of the respondents indicated that the simulation experiences provided enhanced learning opportunities for students and simulation served as a bridge between classroom learning and real-world experiences. Over three-fourths (86.6%) indicated that the

simulation labs needed dedicated well-trained simulation coordinators to run well, community partners benefited from students participating in simulation, and community partners benefited from their access to the simulations.

Figure 21. Types of Simulation Used at Community Colleges

Almost all (93.3%) of the Project Leads indicated that the faculty were involved in the simulations, provided input on various simulation needs, and were involved in the development or alignment of the simulation curriculum. Almost all (93.3%) of the respondents indicated that the students enjoyed the simulation labs/experiences, benefitted from the simulation labs/experiences, and were better trained for future employment because of the simulations.

The community colleges faced several challenges incorporating simulation into the programs, including: technology/compatibility issues (25.0%), computer lab was not big enough (12.5%), they were not able to do a simulated hospital room due to budget constraints (12.5%), and the time it took to run a simulation (12.5%).

The community colleges benefited from the Iowa Community College Simulation Network (ICCSN) because of the networking (50.0%), the improved hands-on real-world learning (33.3%), and the sharing of ideas and areas of expertise (33.3%).

Advising and Student Services. One-third (33.3%) of the respondents indicated that they had an advisor as part of the IHUM budget, 33.3% indicated that the advisor provided services for all students (not exclusive to IHUM), and 26.7% indicated they had an advisor for IHUM students, but the advisor was not part of their IHUM budget.

Over three-fourths (85.7%) of the respondents indicated that the advisor had a positive impact on their community college and students and 78.6% indicated that the IHUM Project resulted in enhanced student support services (see Figure 22) and students benefited from their interactions with the advisors.

Figure 22. Percentage of Respondents Agreeing that Students have Received Enhanced Support

The majority of the respondents indicated that specific student services had already been implemented before the grant. Those student services included: advising (93.3%), tutoring (86.7%), English as a Second Language (73.3%), study groups (73.3%), and study skills instruction (73.3). Overall, the student services listed were considered useful. The majority (53.3%) of respondents indicated their community college had benefited from increased retention and 46.7% indicated increased recruitment.

EMSI Career Coach. One-third (33.3%) of the Project Leads indicated that the EMSI Career Coach was very useful to students and 53.3% indicated it was somewhat useful. Over one-fourth (26.7%) indicated the EMSI Career Coach was very helpful to students and 60.0% indicated it was somewhat helpful. Steps the community colleges took to familiarize students with the EMSI Career Coach included: students in introductory classes used it (38.5%), advisors/faculty used it (30.8%), and various departments used it (15.4%).

The majority (53.3%) of the Project Leads indicated that their community college advertised/ marketed the use of the EMSI Career Coach to their prospective students. The community college advertised/marketed the use of the EMSI Career Coach to prospective students by including it on the community college website (87.5%), through Enhance Iowa (12.5%), and sharing it with advisors, recruiters, and counselors (12.5%).

When asked how their community college planned to sustain the EMSI Career Coach after the grant ended, 33.3% indicated they didn't know or were unsure, 33.3% indicated it would not be kept, 25.0% indicated the conversation was ongoing, and 25.0% indicated that the decision had not been made.

Statewide Management of the IHUM Project. Over three-fourths (86.7%) of the respondents indicated the overall communication between them and the statewide administrative team was effective, 80.0% indicated the statewide administrative team in the overall management was effective, 80.0% indicated the IHUM statewide Project was effective, and 80.0% indicated the specific communication regarding student files was effective.

Sustainability. All (100.0%) of the respondents indicated that the courses revised for IHUM were sustainable or would continue after the grant ended. The majority indicated the courses developed (88.9%), awards updated/revised (81.8%), and awards developed for IHUM (83.3%) were sustainable or would continue after the grant ended.

The respondents indicated the sustainable aspects of their IHUM programs included: simulation coordinator/technicians or simulation in general (57.1%), curriculum (42.9%), updated and new equipment (28.6%), and advising/recruitment/retention efforts (14.3%). The respondents indicated the non-sustainable aspects of their IHUM programs included: EMSI Career Coach (25.0%), frequent update/replacement of equipment (25.0%), attendance at simulation conferences (12.5%), and funds for new materials and supplies (25.0%). To ensure that the IHUM programs remain viable, the respondents indicated their community college intended to continue to use employer partners (20.0%), budget for technician and simulation supplies (10.0%), continue to hold advisory committees and sector boards (10.0%), and provide training to employers for a fee (10.0%).

Strengths and Challenges. All (100.0%) of the respondents agreed that the IHUM Project afforded their community college the opportunity to purchase or update equipment and have up-to-date facilities with equipment representative of what was used in industry. Almost all (93.3%) agreed that the IHUM Project afforded their community college the opportunity to train existing instructors and provide professional development.

Over three-fourths of the Project Leads agreed that sharing best practices helped their community college think of ways to improve their programs and the majority (66.7%) agreed that their community college implemented an activity related to best practices shared by another community college.

All (100.0%) of the Project Leads agreed that the IHUM Project had a positive impact on their community college and on their students (see Figure 23). The majority (93.3%) indicated the IHUM Project adequately prepared students for jobs in their field.

When asked to describe what the implementation of the IHUM Project meant for their community college, responses included: curriculum current with industry standards (50.0%), additional support to students (41.7%), improved

Figure 23. Perceived Agreement on Whether IHUM Project has had a Positive Impact on Students.

simulation experiences (41.7%), and purchase of equipment and supplies (33.3%). When asked to describe what the implementation of the IHUM Project meant for their community, responses included: ability to meet industry needs (33.3%), reducing shortages (33.3%), increased the number of qualified applicants (25.0%), and increased capacity (16.7%).

When asked to describe the strengths and accomplishments of the IHUM Project, responses included: simulation implementation/expansion (61.5%), updated/revised curriculum (23.1%), better recruitment and retention strategies (15.4%), greater collaboration with state agencies (15.4%), more available credentials (15.4%), and added student support services (15.4%). When asked to describe the challenges of the IHUM Project, responses included: getting into the new space later than expected (18.2%), spending or need more money (18.2%), collaboration was difficult (9.1%), difficult to get faculty to report (9.1%), and implementing all the grant aspects (9.1%).

When asked to provide any thoughts or comments about lessons learned, the Project Leads' responses included: employer partnerships worked very well (33.3%), ever-changing curriculum to meet the needs (22.2%), changes/decreases in staff and budget created difficulties (11.1%), curriculum revision was bumpy (11.1%), and interaction with the other community colleges helped. Lastly, Project Leads were asked if there was anything else they would like to share

about their experiences as an IHUM Project Lead. Those responses included: as a first-time grant coordinator, the lead team was tremendous and supportive (25.0%), I would be more active in the beginning (25.0%), learned so much about the college/district (25.0%), and it was a rewarding experience (25.0%).

The detailed report is available in [Supplemental Appendix W](#).

IHUM Marketing Campaign

Marketing Survey (distributed March 2017)

Respondent Background. Almost half of the respondents (41.7%) indicated they were Directors of Marketing and one-third (33.3%) indicated they were the grant coordinator. Approximately one-third (36.4%) of respondents indicated their role in the marketing of the IHUM Project was creative production, 27.3% indicated increase awareness and marketing, and 18.2% indicated that they ran it. Half of the respondents (50.0%) indicated they were very involved in their community college's IHUM marketing campaign and 41.7% indicated they were often involved.

Your Community College's Marketing Campaign. Respondents were asked to indicate how active their community college had been in marketing and promoting the IHUM Project. Over half (54.6%) responded that their community college had been very active, 18.2% responded moderately active, and 27.3% responded somewhat active.

Respondents were asked how often their community college used various forms of marketing mediums in promoting the IHUM programs. Marketing mediums used either sometimes or often by community colleges included: Enhance Iowa, social media, flyer/brochure, and radio. In general, respondents reported that social media, flyer/brochure, and radio were effective or very effective in recruitment of students to their IHUM programs.

Respondents were also asked about the marketing of the EMSI Career Coach. Over three-fourths (81.8%) of the respondents indicated their community college advertised/marketed the use of the EMSI Career Coach. The community colleges marketed EMSI Career Coach by having it accessible through all college websites (22.2%), all printed materials direct students to it (22.2%), and it is used during events and recruitment (22.2%).

Overall, the respondents indicated that the IHUM marketing campaign at their community college had a positive impact on the adult workers in need of training (100.0%), unemployed (85.7%), students in general (81.8%), and veterans (66.6%).

Respondents indicated that employer partners were activity engaged (72.8%) in IHUM marketing activities at their community college and that employer partner participation had positively impacted their community college (63.7%).

Approximately one-third (37.5%) of the respondents reported that working with employer partners resulted in the best IHUM marketing event at their community college. One-fourth (25.0%) reported videos, 12.5% reported billboards, and 12.5% reported web advertising. Respondents were also asked to provide challenges they have faced marketing IHUM. The challenges included: multiple issues getting marketing going (25.0%), spending the funds since their program is full (25.0%), and the length of the disclaimers (25.0%).

For the last question in the section about their community college's marketing campaign, respondents were asked to indicate if their community college's IHUM marketing campaign was sustainable after the grant ended on September 30, 2018. Approximately three-fourths (70.0%) indicated that the campaign was sustainable, while 10.0% indicated it was not.

Statewide Marketing Campaign. Respondents indicated that the Enhance Iowa marketing campaign had a positive impact on the awareness of the IHUM signature programs (77.8%) and student recruitment and enrollment (55.5%). Seventy percent of respondents indicated that the Enhance Iowa campaign was applicable to adult workers in need of training and 60% indicated that it was applicable to the underemployed, underrepresented populations, and veterans. Also, 60.0% of the respondents indicated the Enhanced Iowa campaign was effective in marketing to the underemployed, underrepresented populations, unemployed, and adult workers in need of training.

All of the respondents (100.0%) were satisfied with the Enhance Iowa website and the EMSI Career Coach. Over half (55.5%) were satisfied with the statewide marketing efforts. The majority (90.0%) of respondents agreed that the lead marketing team at Hawkeye Community College had made sure they were aware of the grant marketing requirements, was available to answer questions regarding the marketing requirements (90.0%), and provided the needed guidance to run a successful marketing campaign (80.0%).

Lastly, respondents were asked to share any thoughts or comments about lessons learned so far. Those lessons included: activities not highlighted in time for the event due to scheduled post dates (14.3%), Directors could not agree on marketing strategies (14.3%), involving industry partners had been effective (14.3%), and the target audience had been a challenge to recruit (14.3%).

The detailed report is available in [Supplemental Appendix X](#).

Marketing Survey (distributed October 2017)

Respondent Background. Slightly more than one-third of the respondents (35.7%) indicated they were the Marketing Directors, 14.3% indicated they were the IHUM Coordinator/Director, and 14.3% indicated they were a Specialist. Over one-fifth (21.4%) of the respondents indicated their role in the marketing of the IHUM was to market the programs. The remaining respondents indicated a variety of marketing roles including: approved the marketing plan, assisted with marketing ideas, and consortium and community college marketing. One-third (35.7%) of the respondents indicated they were very involved in their community college's IHUM marketing campaign, 21.4% indicated they were often involved, and 21.4% indicated they were sometimes involved.

Your Community College's Marketing Campaign. Respondents were asked to indicate how active their community college had been in marketing and promoting the IHUM programs. Half (50.0%) of the respondents indicated that their community college had been very active, 21.4%

responded moderately active, and 14.3% responded somewhat active (see Figure 24). Respondents were asked how often their community college used various forms of marketing mediums in promoting the IHUM programs. Marketing mediums used either sometimes or often by community colleges included: radio, social media, newspaper, and flyer/brochure. In general, respondents reported that social media, flyer/brochure, and radio were effective or very

Figure 24. Level of IHUM Marketing Activity Reported by Community Colleges

effective in the recruitment of students to their IHUM programs.

Respondents were asked to indicate which marketing medium their community college used most often. Half (50.0%) responded that they used social media most often, 28.6% responded that they used other means most often, and 14.3% responded that they used radio ads most often. All (100.0%) of the respondents indicated that they used Facebook to market the IHUM programs. Respondents also indicated that they used YouTube (58.3%), Instagram (25.0%), Twitter (16.7%), and LinkedIn (16.7%) to market their programs.

Respondents were also asked about the marketing of the EMSI Career Coach. Approximately three-fourths (71.4%) of the respondents indicated their community college advertised/marketed the use of the EMSI Career Coach. The community colleges marketed EMSI Career Coach by discussing it during orientation (20.0%), housing it on each program page (20.0%), using it in the career center and with students (20.0%), and using it in the introductory courses (20.0%).

Overall, the respondents indicated that the IHUM marketing campaign at their community college had a positive impact on students in general (91.6%), adult workers in need of training (90.9%), underemployed (72.7%), and unemployed (63.6%).

Respondents were asked to indicate how their community college's marketing impacted their community college. Responses included: allowed us to advertise our simulation lab, increased our max enrollment, great for program, increased awareness of program, and the magazine gave us a publication to take to events.

Respondents indicated that employer partners were actively engaged (84.6%) in IHUM marketing activities at their community college (see Figure 25). Respondents were asked to indicate how employer partners were actively engaged in IHUM marketing activities. Responses included: allowed us to film at work sites, employers participated in trainings, helped publicize programs, and they came to open houses. Over half (53.9%) of the respondents indicated that the employer partner participation had a positive impact on their community college.
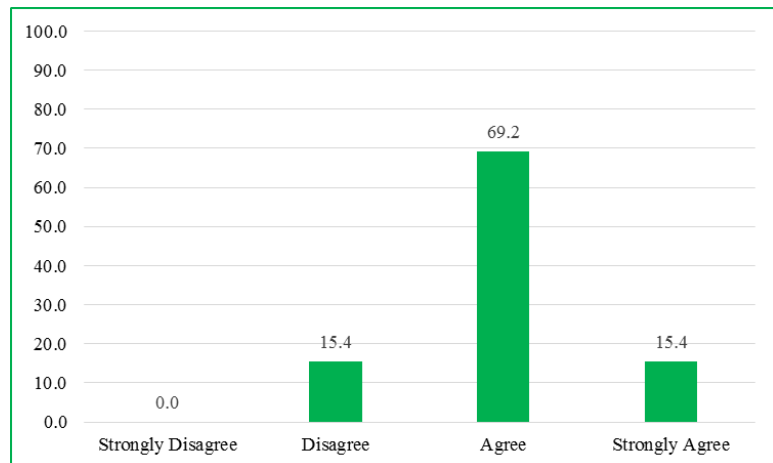
Figure 25. Perceived Level of Employer Partner's Active Engagement

Over three-fourths (76.9%) of the respondents indicated that their community college spent all of the marketing funds, 15.4% indicated they returned some of the funds, and 7.7% indicated that they did not budget funds for marketing. Challenges for spending the marketing funds included: collaborating with the original marketing team, delays in marketing due to late program start, getting all pieces onto every piece of marketing, and having pieces approved/not approved by people with no marketing people.

Over two-thirds (69.3%) of the respondents indicated that their community college was either likely or very likely to continue to market the IHUM programs after the grant ended on September 30, 2018 (see Figure 26). Less than one-third (30.8%) of the respondents indicated that their community college's marketing campaign was sustainable after the grant ended. However, 23.1% indicated that they did not know if the campaign was sustainable.
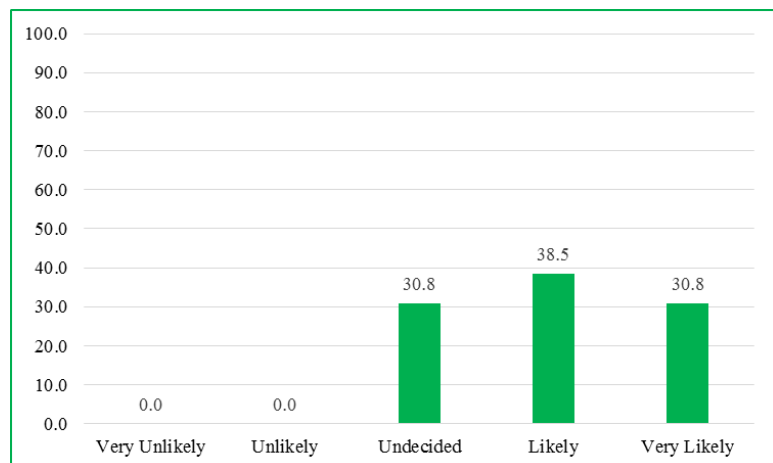
Figure 26. Perceived Likelihood of IHUM Marketing Continuing by Community College

For the last question in the section about their community college's marketing campaign, respondents were asked to describe their best IHUM marketing event in the past two years. Responses included: inviting prospective students to a skilled trades open house, nursing meet and greet, one-minute videos for each signature program, and online marketing of the program.

Statewide Marketing Campaign. Respondents indicated that the Enhance Iowa marketing campaign had a positive impact on their community college with the awareness of the IHUM signature programs (66.7%) and student recruitment and enrollment (54.6%). Almost two-thirds (61.6%) of the respondents indicated that the Enhance Iowa campaign was applicable to adult workers in need of training, 53.9% indicated it was applicable to the underemployed, and 53.9% indicated it was applicable to the unemployed. Almost half (46.2%) of the respondents indicated that the Enhance Iowa campaign was effective in marketing to the underemployed, underrepresented populations, and adult workers in need of training.

Approximately three-fourths (70.0%) of the respondents were satisfied with the EMSI Career Coach, 66.7% were satisfied with the Enhance Iowa website, and 50.0% were satisfied with the statewide marketing efforts. The majority (84.7%) of respondents agreed that the lead marketing team at Hawkeye Community College was available to answer questions regarding marketing requirements, 69.3% agreed that that lead marketing team had made sure they were aware of grant marketing requirements, 69.3% agreed that the team provided the resources needed to complete the marketing campaign, and 53.9% agreed that the team provided the needed guidance to run a successful marketing campaign.

Respondents were asked what changes or improvements they would make to a statewide marketing effort if their community college were to participate in a similar marketing effort. Responses were: devote a larger sum of money to statewide marketing, have a representative from each community college present at meetings and on phone calls, more organization, and that there were marketing funds to be used.

Lastly, respondents were asked to share any thoughts or comments about lessons learned so far – in particular, what worked, what would they change, and any other comments. In terms of what worked, respondents reported: online/social media marketing (40.0%), billboard and radio ads (20.0%), and open houses (20.0%). In terms of what they would change, respondents reported better coordination with faculty and admissions (20.0%), ensure someone from each marketing team was on the calls/meetings (20.0%), and start marketing sooner (20.0%). In terms of other comments, only one respondent provided a response. That respondent indicated that IHUM will continue to have a positive impact on Iowa.

The detailed report is available in [Supplemental Appendix Y](#).

Employer Partner Engagement

Employer Partner Survey (distributed March 2017)

Approximately half (48.8%) of the employer partners responded that they had collaborated with their partner community college(s) for over two years, 37.2% indicated 1-2 years, and 7.0% indicated 7 months – 1 year. There were three (7.0%) that indicated they did not collaborate or work with Iowa community colleges.

Of the employer partners that were collaborating, 19.4% indicated they hired 1-2 IHUM students, 8.3% hired 3-5 IHUM students, 8.3% hired over 20 IHUM students, and 63.9% had not hired any IHUM students. The majority of respondents (66.7%) indicated they did not have employees currently enrolled in IHUM programs.

Employer partners were asked about their company's involvement in IHUM activities. Over half (51.7%) indicated they had some/frequent involvement in the local advisory board, 48.1% indicated some/frequent involvement in identifying occupational needs, 40.7% indicated some/frequent involvement in providing access to facilities for Project meetings/trainings, and 37.9% indicated some/frequent involvement in incumbent worker training.

Employer partners were also asked about the opportunities they provided to students participating in the IHUM program. Two-thirds (66.7%) indicated they provided internships and tours, 60.0% indicated they participated in career fairs, 59.3% indicated they provided company sponsored training, and 50.0% indicated they provided flexibility to their incumbent workers.

For each sector the respondents indicated they are recruiting IHUM students from, they received a list of soft skills to choose the most valuable.

For Information Technology, employer partners indicated the ability to grasp and implement instructions quickly (80.0%), dependability/reliability (80.0%), complex problem solving (60.0%), critical thinking (60.0%), and troubleshooting (60.0%) were the most valuable soft skills.

For Healthcare, employer partners indicated critical thinking (81.8%), patient interaction (59.1%), dependability/reliability (50.0%), professionalism (50.0%), and time management (45.5%) were the most valuable soft skills.

For Utilities, employer partners indicated dependability/reliability (100.0%), professionalism (100.0%), ability to grasp and implement instructions quickly (66.7%), judgment and decision making (66.7%), and troubleshooting (66.7%) were the most valuable soft skills.

For Manufacturing, employer partners indicated the ability the grasp and implement instructions quickly (100.0%), dependability/reliability (100.0%), complex problem solving (50.0%), enthusiasm and attitude (50.0%), judgment and decision making (50.0%), and professionalism (50.0%) were the most valuable soft skills.

Approximately one-third (33.4%) of employer partners indicated their community college partner(s) were exceeding expectations in relation to producing quality workers, 22.7% for

producing enough workers, and 24.0% for producing students that have the technical skills/abilities required to begin working with minimal training or guidance.

Employer partners were also asked about the simulation that had been implemented at the community colleges during IHUM. All (100.0%) indicated that their company had benefited from the simulation centers, 87.5% indicated their company had benefited from the overall implementation of simulation into the programs, and 75.0% indicated their company had benefited from mobile simulation.

Respondents were asked to provide how their community college partner(s) helped their company in recruiting qualified workers, filling shortages, and upskilling their workforce. Employer partners provided a variety of answers including: being a clinical site (9.5%), facilitating internships (9.5%), listen and apply feedback from meetings (9.5%), providing opportunities for us to meet with students (9.5%), and filling an educational need in the community (4.8%).

Lastly, respondents were asked to provide any thoughts or comments about lessons learned. Again, employer partners provided a variety of answers including: concerns about communication when English is the second language (8.3%), focus on soft skills (8.3%), graduating ADNs need to get their certification (8.3%), higher standard of professionalism would be beneficial (8.3%), and more vacancies than the community college can fill (8.3%).

The detailed report is available in [Supplemental Appendix Z](#).

Employer Partner Survey (distributed October 2017)

Three-fourths (75.0%) of the employer partners responded that they collaborated with their partner community college(s) for over two years, 16.7% indicated 1-2 years, and 2.1% indicated 7 months – 1 year. There was one (2.1%) that indicated they did not collaborate or work with Iowa community colleges. Approximately three-fourths (74.5%) indicated they collaborated with their partner community college(s) prior to the start of the IHUM Project.

Of the employer partners that collaborated, 26.1% indicated they hired 3-5 IHUM students, 15.2% hired 1-2 students, 10.9% hired 6-10 students, 6.5% hired over 20 students, and 15.2% had not hired any IHUM students (see Figure 27). Half (50.0%) of the respondents indicated they do not know if they had employees currently enrolled in the IHUM programs.

Employer partners were asked about their company's involvement in IHUM activities. Over three-fourths
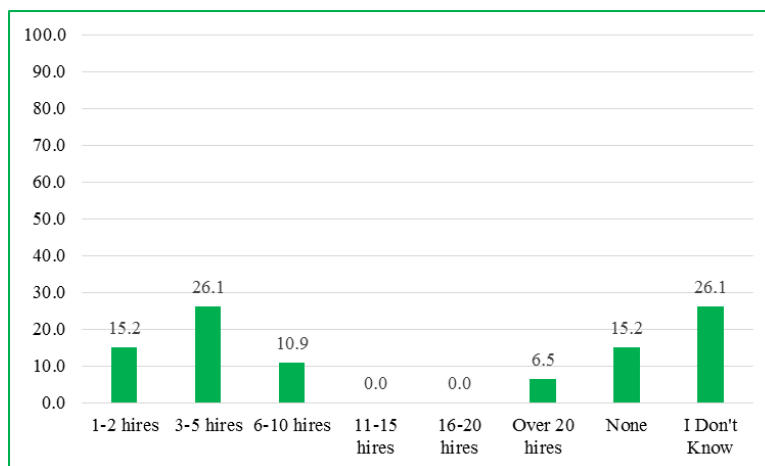
Figure 27. Number of IHUM Students Hired by Employer Partners

(76.9%) indicated they had some/frequent involvement in the local advisory board, 59.4% indicated some/frequent involvement in curriculum input, 72.2% indicated some/frequent involvement in identifying occupational needs, 50.0% indicated some/frequent involvement in identifying potential program instructors and faculty, and 53.2% indicated some/frequent involvement in incumbent worker training.

Employer partners were also asked about the opportunities they provided to students participating in the IHUM program. Over three-fourths (82.1%) indicated they participated in career fairs, 81.6% indicated they provided tours (see Figure 28), 76.3% indicated they provided internships, 71.1% indicated they hired students prior to their graduation, and 58.8% indicated they provided mentoring to students.
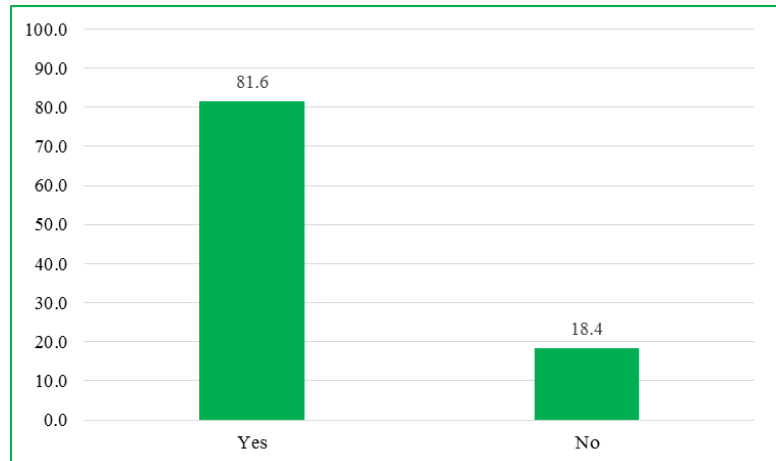
Figure 28. Percentage of Employer Partners Providing Tours

For each sector the respondents indicated they were recruiting IHUM students from, they received a list of soft skills to choose the most valuable.

For Information Technology, employer partners indicated dependability/reliability (76.9%), enthusiasm and attitude (61.5), active listening (53.8%), critical thinking (46.2%), and complex problem solving (38.5%) were the most valuable soft skills.

For Healthcare, employer partners indicated critical thinking (73.1%), dependability/reliability (65.4%), professionalism (57.7%), patient interaction (53.8%), enthusiasm and attitude (38.5%), judgment and decision making (38.5%), and verbal communication (38.5%) were the most valuable soft skills.

For Utilities, employer partners indicated the ability to grasp and implement instructions quickly (100.0%), dependability/reliability (100.0%), enthusiasm and attitude (75.0%), complex problem solving (50.0%), and critical thinking (50.0%) were the most valuable soft skills.

For Manufacturing, employer partners indicated the ability to grasp and implement instructions quickly (100.0%), dependability/reliability (100.0%), enthusiasm and attitude (100.0%), professionalism (50.0%), and time management (50.0%) were the most valuable soft skills.

Approximately one-third (36.2%) of employers indicated their community college partner(s) were exceeding expectations for producing students that had the technical skills/abilities required to begin working with minimal training or guidance, 27.8% for producing quality workers, and 30.3% for the IHUM Project succeeding in providing opportunities to upskill the workforce.

Employer partners were also asked about the simulation that had been implemented at their partner community college(s) during IHUM. Almost all (95.2%) indicated that their company had benefited from the overall implementation of simulation into the programs, 90.0% indicated that their company had benefited from the simulation centers (see Figure 29), and 83.3% indicated their company had benefited from mobile sim.
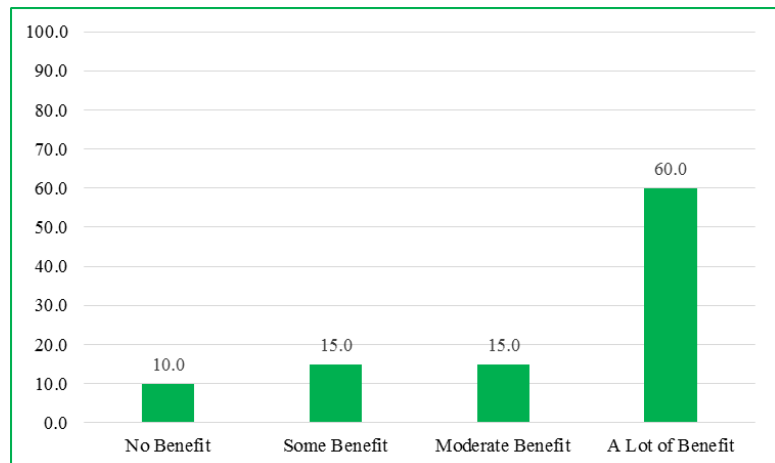
Figure 29. Employer Partners' Perceived Level of Benefits from Simulation Centers

Respondents were also asked if there were any other ways the new or expanded simulation impacted them. One-third (33.3%) indicated it assisted the future employee, 33.3% indicated that simulation was used when students were at the hospital, and 33.3% indicated that their staff partner with the community college to create scenarios for all student types.

Respondents were asked if there were any changes they would make to the IHUM Project. Employer partners provided a variety of responses including: continue with the program (14.3%), flexibility in the curriculum schedule (14.3%), keep partners involved in the simulation (14.3%), and more exposure to this kind of training (14.3%).

Respondents were asked to provide how their community college partner(s) helped their company in recruiting qualified workers, filling shortages, and upskilling their workforce. Employer partners provided a variety of answers including: they have done an excellent job with education/hands on training (25.0%), they were open to concerns about the program (16.7%), they were a tremendous partner in providing training services (25.0%), and they worked hard to make changes to the program (16.7%).

Lastly, respondents were asked to provide any thoughts or comments about lessons learned. Again, employer partners provided a variety of answers including: technology has allowed students to experience scenarios they might not otherwise see (33.3%), IHUM opened up the ability for more hands on education (11.1%), most classes were highly appropriate (11.1%), and they produced workers who were ready day one (11.1%).

The detailed report is available in Supplemental Appendix AA.

Community College Faculty Experiences

Faculty Survey (distributed March 2017)

Contributions and Training. Most respondents (89.8%) indicated that they had certifications or areas of expertise. When asked to provide their certifications/areas of expertise, the respondents provided a variety of answers including: RN (25.7%), ACLS (16.2%), BLS (12.2%), MSN in Nursing Education/MSN (12.2%), BSN (10.8%), and Dental Hygiene (5.4%).

Over three-fourths (79.8%) of the faculty members indicated they had been given the opportunity to participate in the development or modification of the curriculum, 10.7% indicated that they had not been given the opportunity, but they did not want to participate, and 9.5% indicated that they had not been given the opportunity, but they wanted to participate. Of the faculty members participating in the development or modification of the curriculum, 31.3% indicated they provided "very high" participation, 29.9% indicated "high" participation, and 19.4% indicated "moderate" participation.

Curriculum, Classrooms, and Simulation. Most respondents (89.7%) indicated they had revised and/or aligned their classes/modules, 85.4% indicated they will revise and/or align their classes/modules, 72.8% indicated the equipment in their classroom/lab is representative of what was used in industry, 72.2% indicated they will develop new classes/modules, and 62.0% indicated they developed new classes/modules.

The majority (92.7%) of the faculty indicated their community college was implementing simulation into the IHUM program. None of the respondents indicated their community college was *not* implementing simulation into the IHUM program. Most respondents (89.1%) indicated that incorporating simulation into the curriculum had been beneficial to the students, 85.1% indicated they had incorporated or will be incorporating simulation into their courses, and 50.0% indicated incorporating simulation into the curriculum expanded the number of students they can serve.

Faculty were asked to describe how simulation was used in their classroom. Half (50.0%) responded that simulation was used for scenarios/case studies, 32.3% responded that simulation was used to support information learned in the classroom, 22.6% responded that simulation was used as clinical time,11.7% responded that simulation was used for hands-on skills, and 6.5% responded that simulation was used for skill review.

Faculty were asked to describe how the use of simulation in the program has impacted them, their students, and their community college. One-third (34.9%) indicated that simulation provided a controlled environment, 28.6% indicated that simulation provided experiences students may not have had otherwise, 22.2% indicated simulation increased students' confidence, 12.7% indicated simulation allowed for structured, hands-on, educational experiences, 12.7% indicated simulation provided a greater understanding of skills, and 12.7% indicated simulation had positively impacted students.

Communication Regarding the IHUM Project. Three-fourths (75.1%) of the faculty indicated that they had been kept informed regarding the overall implementation of the IHUM Project,

71.3% indicated they were consulted regarding the types of equipment needed to implement/enhance the IHUM Project, and 65.0% indicated that students in their classrooms benefited from their interactions with the advisors.

Strengths/Challenges of the IHUM Project. Most respondents (89.9%) indicated they were supportive of IHUM efforts at their community college, 88.6% indicated the IHUM Project had a positive impact on their community college, 87.4% indicated the IHUM Project had a positive impact on students, and 86.1% indicated the IHUM Project adequately prepared students for jobs.

When asked to provide the top three strengths of the IHUM Project, the respondents provided a variety of answers including: integration of simulation/simulation in general/Sim Center (34.8%), knowledgeable instructors (33.3%), equipment/technology (24.2%), clinical settings (13.6%), faculty commitment to student success (9.1%), hands-on learning (9.1%), and students are prepared (9.1%).

When asked to provide any challenges they have encountered working on the IHUM Project, the respondents also provided a variety of answers including: not enough time (19.0%), lack of equipment (10.3%), lack of/need more training (10.3%), lack of funding for equipment (8.6%), access to locations for clinical experiences (6.9%), and finding instructors (6.9%).

The detailed report is available in Supplemental Appendix BB.

Faculty Survey (distributed October 2017)

Contributions and Training. Most respondents (91.8%) indicated that they have certifications or areas of expertise. When asked to provide their certifications/areas of expertise, the respondents provided a variety of answers including: RN (28.3%), MSN (18.9%), ACLS (9.4%), Nursing (5.7%), Programming (5.7%), and TNCC (5.7%). Approximately three-fourths (72.9%) of the faculty members indicated they were given opportunities for professional development during the course of the IHUM Project.

Over three-fourths (84.7%) of the respondents indicated they had been given the opportunity to participate in the development or modification of the curriculum, 11.9% indicated that they had not been given the opportunity, but they did not want to participate, and 3.4% indicated that they had not been given the opportunity, but they wanted to participate (see Figure 30). Of the faculty members participating in the development or modification of the curriculum, 30.6% indicated they provided "moderate" participation,
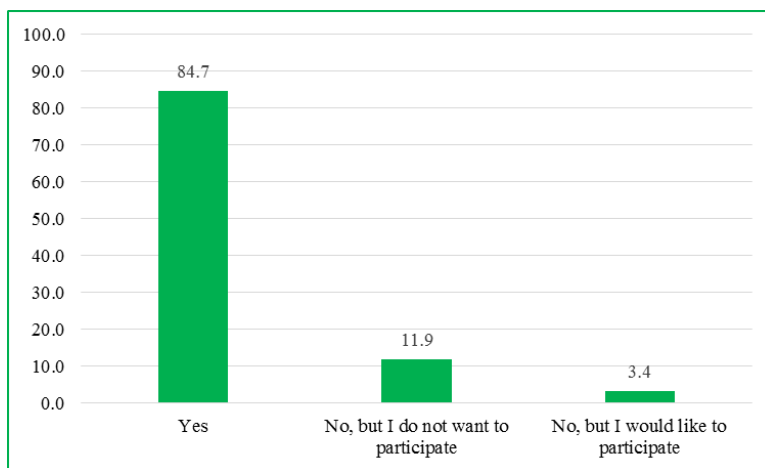
Figure 30 Perceived Level of Opportunity Afforded Faculty to Participate in Curriculum Development

28.6% indicated they provided "high" participation, and 26.5% indicated they provided "very high" participation.

Respondents were asked to describe their contributions to the development or modification of the curriculum. Responses included: updated/revised courses/curriculum (37.8%), developed/ wrote new courses/curriculum (31.1%), developed simulation scenarios (15.6%), and created new degrees (6.7%).

Curriculum, Classrooms, and Simulation. Most respondents (66.7%) indicated they had developed new classes/modules, 80.0% indicated they implemented classes/modules, 81.1% indicated they revised/aligned classes/modules, 76.9% indicated they implemented revised/aligned classes/modules, 66.7% indicated they received professional development/training needed to teach their courses, and 54.9% indicated they received professional development/training to use the equipment purchased for the program.

For the sector the respondents indicated as their area of focus, they received a list of soft skills to choose the most valuable.

For Information Technology, faculty indicated dependability/reliability (71.4%), critical thinking (57.1%), complex problem solving (42.9%), time management (42.9%), troubleshooting (42.9%), and written communication (42.9%), as the most valuable soft skills.

For Healthcare, faculty indicated critical thinking (91.9%), professionalism (70.3%), judgment and decision making (59.5%), patient interaction (54.1%), and complex problem solving (48.6%), as the most valuable soft skills.

For Utilities, faculty indicated ability to grasp and implement instructions quickly (100.0%), enthusiasm and attitude (100.0%), active listening (50.0%), critical thinking (50.0%), judgment and decision making (50.0%), and professionalism (50.0%), as the most valuable soft skills.

For Manufacturing, faculty indicated dependability/reliability (83.3%), ability to grasp and implement instructions quickly (50.0%), enthusiasm and attitude (50.0%), judgment and decision making (50.0%), and troubleshooting (50.0%), as the most valuable soft skills.

The majority (85.5%) of the faculty indicated their community college implemented simulation into the IHUM program. Three (5.5%) indicated that their community college was not implementing simulation into the IHUM program. Most respondents (82.6%) indicated that incorporating simulation into the curriculum had been beneficial to the students, 87.0% indicated they have or will be incorporating simulation into their courses, and 34.8% indicated incorporating simulation into the curriculum expanded the number of students they can serve.

Faculty were asked to describe how simulation was used in their classroom. Over half (52.8%) responded that simulation was used for clinical simulations, 22.2% responded that it was used for demonstration and skills practice, and 19.4% indicated it was used for troubleshooting scenarios.

Faculty were asked to describe how the use of simulation in the program has impacted them, their students, and their community college. Approximately one-third (29.4%) indicated that

simulation was an excellent way to practice uncommon/rare scenarios, 29.4% indicated that simulation improved retention, 23.5% indicated that simulation allowed students to practice in a safe environment, 14.7% indicated that simulation made students more confident, and 11.8% indicated that the instructors were more confident in sending students into the workforce.

Communication Regarding the IHUM Project. Three-fourths (75.5%) of the faculty indicated that they had been kept informed regarding the overall implementation of the IHUM Project, 73.6% indicated they were consulted regarding the types of equipment needed to implement/enhance the IHUM Project (see Figure 31), and 71.7% indicated that students in their classrooms benefited from their interactions with the advisors.
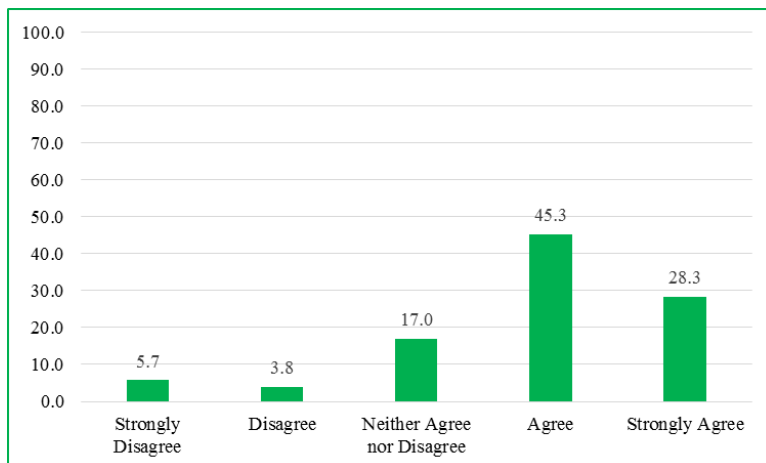
Figure 31. Percentage of Faculty Indicating they were Consulted about Equipment

Strengths/Challenges of the IHUM Project. Most respondents (84.0%) indicated that aligning the curriculum with relevant standards or credentials strengthened the program, 75.5% indicated that their department developed strong relationships or had enhanced existing relationships with industry, and 74.0% indicated that they incorporated more technology-enabled learning activities into their classroom since the start of the grant.

Most respondents (96.0%) indicated they were supportive of IHUM efforts at their community college, 94.1% indicated the IHUM Project had a positive impact on students, 90.2% indicated the IHUM Project had a positive impact on their community college, 88.0% indicated the IHUM Project adequately prepared students for jobs, and 71.4% indicated that the IHUM Project was sustainable after the grant ends on September 30, 2018.

When asked to provide the top three strengths of the IHUM Project, the respondents provided a variety of answers including: knowledge and skills base of faculty (27.3%), preparing students for career (24.2%), equipment and facilities (21.2%), simulation (15.2%), clinical preparation (12.1%), exposing students to simulation (12.1%), and variety of options available (12.1%).

When asked to provide any challenges they have encountered working on the IHUM Project, the respondents also provided a variety of answers including: time constraints/shortage of time (23.3%), staffing issues (16.7%), availability of college supplied equipment (10.0%), keeping current with advances in technology (10.0%0, attracting new students (6.7%), communication (6.7%), ESL students (6.7%), and updating and repairing simulators (6.7%).

Lastly, faculty were asked if there were any changes they would make to the IHUM program at their community college. The faculty provided a variety of responses including: continued development of diverse learning through simulation (4.8%), different choices on equipment

(4.8%), fewer courses to manage (4.8%), fewer degree options (4.8%), more money to accommodate simulations properly (4.8%), simulation rotations with each unit (4.8%), and would like to see IHUM be renewed in some form (4.8%).

The detailed report is available in Supplemental Appendix CC.

IHUM Simulation Coordinators

Simulation Coordinator Survey (distributed May 2017)

Simulation at Your Community College. One-third (33.3%) of respondents indicated they spent 100% of their time on simulation in a typical academic term. The remaining 66.7% spend between 20% and 95% of their time on simulation in a typical academic term. Community colleges in the ICCSN used various types of simulation including task trainers (34.5%), human patient simulation (24.1%), and standardized patients and teaching associates (20.7%).

Over the past three years, the community colleges had made changes in simulation (100.0%), equipment (100.0%), faculty/staff training (80.0%), and curriculum (70.0%). Simulation changes included creating of additional simulation (33.3%) and an increase in programs attending simulation (22.2%). Curriculum changes included streamlining courses (16.7%) and new scenarios (16.7%). Equipment changes included purchasing high fidelity simulator(s) (88.9%) and new computers (11.1%). Faculty/Staff training changes included conferences/ trainings (71.4%) and new expectations of staff (14.3%).

All (100.0%) of the respondents indicated: they understood their role in each simulation lab/experience, simulation labs need dedicated, well-trained simulation coordinators to run well, simulation experiences provide enhanced learning opportunities for students, and simulation serves as a bridge between classroom learning and clinical experiences. Almost all (90.0%) indicated community partners benefit from students participating in simulation-based learning because medical errors were reduced and patient safety was increased.

The respondents from the IHUM Healthcare sector were asked about the opportunities the IHUM grant afforded their community college. Almost all (85.7%) indicated the grant afforded them the opportunity to set up simulation facilities, purchase simulation equipment (85.7%), participate in professional development opportunities (85.7%), purchase simulation software (83.4%), and upgrade their simulation facilities (80.0%).

All of the respondents were asked about the faculty use of simulation at their community college. Over three-fourths (80.0%) indicated faculty were involved in simulation labs/experiences and provided input on simulation needs and 70.0% indicated faculty were involved in the development or alignment of the curriculum for the simulation labs/experiences. In terms of students, all respondents (100.0%) indicated students enjoyed the simulation labs/simulations, benefited from the simulation labs/experiences, were better trained for future employment because of their simulation labs/experiences, and were getting real world experiences in their simulation work.

Respondents indicated that their current simulation center configuration worked well for students (70.0%), but not so well for community partners (30.0%). To help meet the needs of students and community partners, the respondents indicated they needed lab space (60.0%), education on equipment (40.0%), more training (40.0%), and faculty enthusiasm (20.0%).

Respondents were asked to provide examples of how simulation had impacted their community college. Examples included: exposure to high risk, low volume settings (40.0%), huge benefit to

students (40.0%), students understanding importance of simulation (30.0%), and increased skill (20.0%). For challenges, respondents indicated time (50.0%), not enough people (40.0%), faculty involvement (30.0%), simulation increased faculty load (30.0%), cost (20.0%), and training for simulation (20.0%) are ones they had faced.

Respondents hoped to see simulation: expanded to serve more people (33.3%), full integration of simulation into curriculum (33.3%), give students more simulation time (22.2%), and increase the rigor of scenarios (11.1%). To keep the equipment and curriculum up to date, the community colleges planned to put it in the budget (20.0%), create a sustainability plan (10.0%), explore options (10.0%), have a preventative maintenance schedule (10.0%), and work closely with various groups to meet needs (10.0%).

Iowa Community College Simulation Network (ICCSN). The majority (60.0%) of respondents indicated the ICCSN meets once a quarter and the remainder (40.0%) indicated once a month. During the ICCSN meetings, simulation was discussed. Over half (60.0%) of the respondents indicated those simulation discussions were extremely useful, 30.0% indicated very useful and 10.0% indicated moderately useful.

Respondents were asked about communication and sharing between ICCSN community colleges. All (100.0%) of the respondents indicated communication between community colleges in the ICCSN was open, they are listened to when they share their thoughts/ideas with the ICCSN, they listen to others share their thoughts/ideas concerning the ICCSN, brainstorming with other community colleges in the ICCSN has been useful, ICCSN meetings have been helpful to their community college, sharing best practices for simulation has helped their community college think about ways to improve their programs, and their community college has implemented or willing be implementing an activity related to best practices in simulation shared by other community colleges.

Lastly, respondents were asked to provide additional comments about simulation or the ICCSN. Half (50.0%) of the respondents indicated ICCSN was instrumental in networking opportunities, 25.0% indicated ICCSN was a very important resource, 25.0% indicated the simulation program was an immense benefit, and 25.0% indicated students were receptive and enjoyed simulation.

The detailed report is available in [Supplemental Appendix DD](#).

Simulation Coordinator Survey (distributed February 2018)

Simulation at Your Community College. One-fifth (20.0%) of respondents indicated they spent 100% of their time on simulation in a typical academic term. Another one-fifth (20.0%) indicated they spent 20%, and another one-fifth (20%) indicated 60%.

All (100.0%) of the respondents indicated that the simulation labs need dedicated, well-trained simulation coordinators to run well and simulation serves as a bridge between classroom learning and clinical experiences (see Figure 32). Almost all (90.9%) of the respondents indicated that the community partners benefited from students participating in the simulation based learning. Over three-fourths (81.8%) indicated that the community partners benefited from the access to the simulation labs/experiences.

All of the respondents were asked about the faculty use of simulation at their community college. All (100.0%) of the respondents indicated that faculty were involved in simulation labs/experiences, faculty provided input in simulation needs, and faculty were involved in the development or alignment of the curriculum for the simulation labs/experiences. In terms of the students, all respondents (100.0%) indicated students enjoyed the simulation labs/simulations,
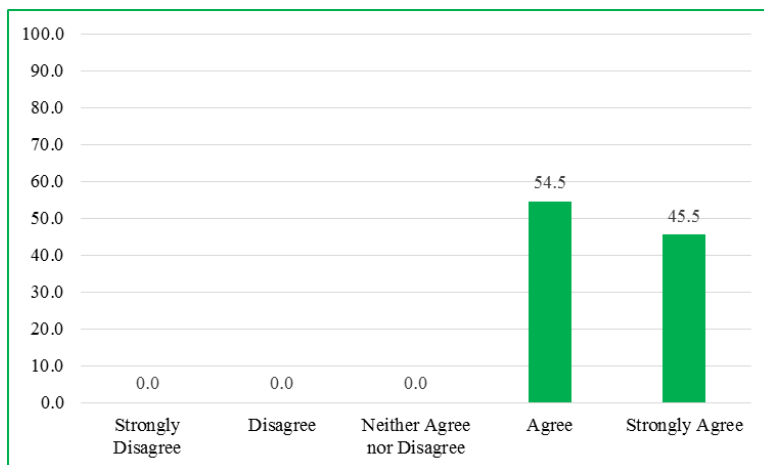
Figure 32. Perceived agreement on whether simulation serves as a bridge between Classroom Learning and Clinical Experience.

benefited from the simulation labs/experiences, were better trained for future employment because of their simulation labs/experiences, and were getting real world experiences in their simulation work.

Respondents indicated that their current simulation center configuration works well for students (91.0%), but not so well for community partners (36.4%). To help meet the needs of students and community partners, the respondents indicated that they do not have resources for their current students (50.0%), they have not partnered with local community partners (50.0%), and they are having issues with scheduling to meet everyone's needs (50.0%).

Respondents were asked to provide any challenges they or their community college faced in incorporating simulation. Challenges included: lack of dedicated faculty/staff (40.0%), coordinating schedules (30.0%), faculty time (20.0%), and lack of space (20.0%).

To keep the equipment and curriculum up to date, the community colleges performed constant monitoring/repairing of the equipment (30.0%), developed a sustainability plan (20.0%),

dedicated faculty time for simulation labs (20.0%), purchased warranties and maintenance contracts (20.0%), and simulation committee reviewed equipment needs (20.0%).

Iowa Community College Simulation Network (ICCSN). The majority (72.7%) of respondents indicated the ICCSN met once a quarter and 18.2% indicated the ICCSN met once a month. During the ICCSN meetings, simulation was discussed. Over half (63.6%) of the
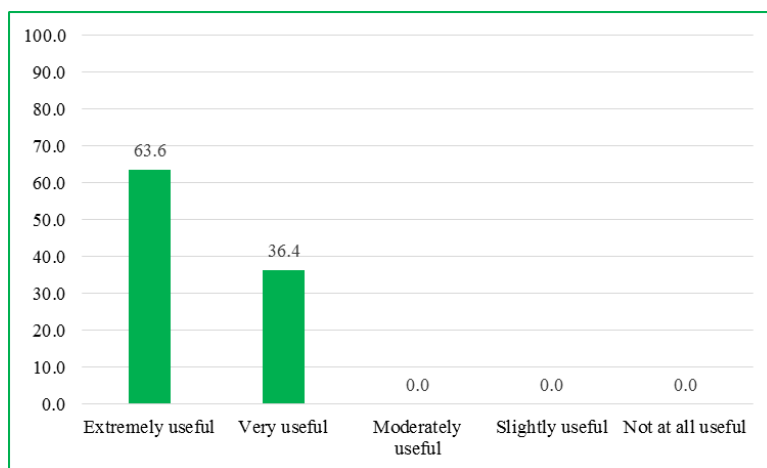
Figure 33. Perceived Usefulness of Simulation Discussion s at ICCSN

respondents indicated those simulation discussions were extremely useful and the remainder (36.4%) indicated those discussions were very useful (see Figure 33).

Respondents were asked about communication and sharing between ICCSN community colleges. All (100.0%) of the respondents indicated that brainstorming with the other community colleges had been useful, ICCSN meetings have been helpful, and sharing best practices for simulation helped their community college think about ways to improve their programs. Almost all (90.9%) indicated their community college implemented or will implement an activity related to best practices shared by other community colleges.

Lastly, respondents were asked to provide additional comments about simulation or the ICCSN. One-third (33.3%) of the respondents indicated that the collaborative efforts were useful, 33.3% indicated that their community college was in the early stages of implementing simulation and 33.3% indicated that the ICCSN was beneficial in meeting their needs.

The detailed report is available in Supplemental Appendix EE.

Community College Leadership

College Leadership Survey (distributed March 2018)

IHUM Project Opportunities. Over half (64.3%) of the respondents indicated that they were extremely familiar with the IHUM Project and the remaining respondents indicated that they were moderately familiar (21.4%) or somewhat familiar (14.3%) with the IHUM Project (see Figure 34).

Almost all (93.1%) of the respondents agreed that the IHUM Project afforded their community college the opportunity to increase their program-specific marketing, 92.8% agreed that they were able to train existing instructors, 92.3% agreed that they were able to purchase or update simulation, 88.6% agreed that they were able to increase their recruitment, and 85.8% agreed that they were able to strengthen existing partnerships with industry and local businesses.
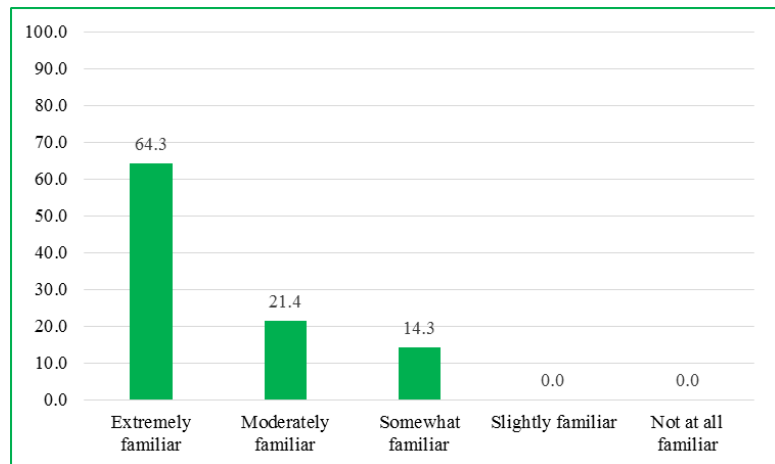
Figure 34. Perceived Familiarity of the IHUM Project by Community College Leadership

As a result of the IHUM Project, 92.9% agreed that their faculty were willing to fully implement the revised curriculum, 92.8% agreed that they expanded efforts to market to the community and that students have received enhanced technology enabled learning (see Figure 35), and 85.7% agreed that they had increased success in attracting students overall, their department chair/dean was willing to fully implement the revised curriculum, and students received enhanced support services.
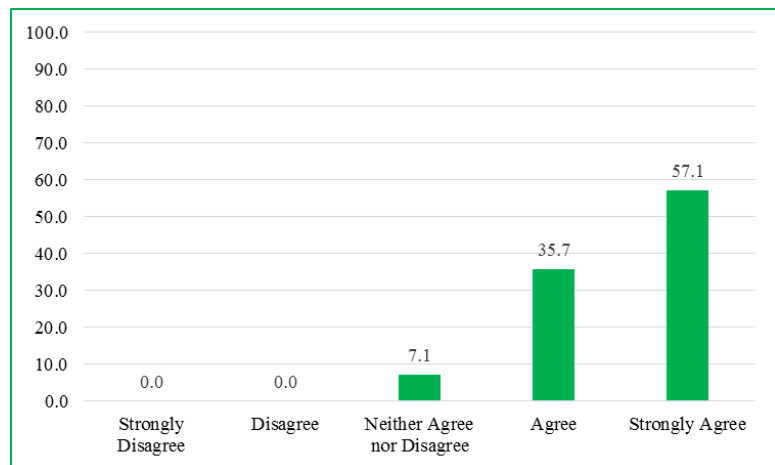
Figure 35. Students have Received Enhanced Technology-Engable Learning

Statewide Management of the Iowa's Information Technology, Healthcare, Utilities, and Manufacturing (IHUM) Project. Almost all (92.9%) agreed that the communication between them and their community college's IHUM team was effective or very effective; 85.8% agreed that the IHUM Project overall and 85.7% agreed that the statewide administrative team in managing the IHUM Project was effective or very effective.

Sustainability of the IHUM Project. Three-fourths (75.0%) of the respondents indicated that the grant-funded faculty positions were sustainable after the grant ends and 80.0% indicated the simulation coordinator position was sustainable. All (100.0%) of the respondents indicated the courses developed for IHUM, awards, and the simulation center were going to continue to be offered after the grant ends on September 30, 2018.

Respondents were asked about their community college's plan for sustainability. The plans included: adjusting the budget (18.2%), simulation and online learning continuing based on needs (18.2%), simulation lab to continue to bring in revenue (18.2%), and revised programs will continue to be offered (9.1%). To ensure the programs stay up to date, respondents indicated their community colleges planned to: continue to solicit input from industry (30.0%), complete annual program evaluation (20.0%), keep up to date with evidence based practices (20.0%), and stay in communication with the boards (20.0%).

Strengths and Challenges. The IHUM Project had meant a variety of factors to the community colleges including: expanded simulation opportunities (66.7%), expanded relationships with industry (33.3%), brought curriculum and equipment up to date (25.0%), and increased the number of students (16.7%). The IHUM Project had also meant a variety of factors to the surrounding community including: provided local training (36.4%), graduates have more work based skills (27.3%), upskilling the local workforce (27.3%), and all graduates are employed in the local area (18.2%).

Lastly, respondents were asked to provide any final thoughts or comments. Those included: the ability to create new programs (20.0%), expansion of current offerings (20.0%), funding provided tremendous amount of training, equipment, and supplies (20.0%), and needing to keep the processes the same throughout the grant (20.0%).

The detailed report is available in Supplemental Appendix FF.

IHUM PROGRAM PARTICIPANTS

A total of 7,030 unique participants enrolled in IHUM programs between 2014 and 2018. The total reflects 102.6% of the projected number of participants (see Table 19). Of these, 5,953 resided in Iowa (see Figure 36, see Supplemental Appendix GG for the distribution of participants by community college) with the remainder residing in neighboring states (e.g., Nebraska, Illinois). Approximately 71.6% of the total unique participants were female, 3.8% were veterans, 78.9% were White, 0.8% were eligible for TAA, and 72.2% were enrolled as credit students (see Figures 37, 38, 39, 40, and 41 respectively).

Table 19.
Outcomes Measures for the IHUM Project as of June 30, 2018

Participant Outcome	Goal	Actual Outcomes	% of Goal Met
1. Unique Participants Served/Enrollees	7,030	7,210	102.6
2. Total Number of Participants Who Have Completed a Grant-Funded Program of Study	4,747	3,366	70.9
2a. Total Number of Grant-Funded Program of Study Completers who are Incumbent Workers	--	2,523	--
3. Total Number Still Retained in Grant Funded Programs of Study	3,011	2,454	81.5
4. Total Number Retained in Other Education Programs	--	69	--
5. Total Number of Credit Hours Completed	--	121,897	--
5a. Total Number of Students Completing Credit Hours	6,659	5,208	78.2
6. Total Number of Earned Credentials (Aggregate across all enrollees)	4,835	3,941	81.5
6a. Total Number of Students Earning Certificates-Less than One Year	--	1,109	--
6b. Total Number of Students Earning Certificates-More than One Year	--	1,310	--
6c. Total Number of Students Earning Degrees	--	1,522	--
7. Total Number Pursuing Further Education After Program of Study Completion	1,561	1,379	88.3
8. Total Number Employed After Program of Study Completion	2,621	453	17.3
9. Total Number Retained in Employment After Program of Study Completion	2,040	267	13.1
10. Total Number of Those Employed at Enrollment Who Receive a Wage Increase Post-Enrollment	3,113	3,426	110.1

Employed and Incumbent Workers. At enrollment, 75.6% of IHUM participants were employed and 73.7% of the IHUM participants were incumbent workers (based on the US DOL TAACCCT grant definition for incumbent workers). Of the students employed at the time of intake, 73.6% resided in Iowa (see Figure 42). Notably, 3,426 participants employed at enrollment received an increase in wages post-enrollment (see Table 19), reflecting a 110.1% increase over the projected goal of 3,113 workers to receive a wage increase post-enrollment.

College-Issued Credentials. A total of 5,208 participants completed 121,897 credit hours in IHUM programs. While the number of participants earning credit hours reflects 78.2% of the

projected goal, the number of credit hours completed is impressive (see Table 20). A total of 4,066 college-issued credentials were awarded to participants, of which, 3,450 college-issued credentials were awarded to Iowa residents (see Table 20, Figures 43-46).

Table 20.

Number of College-Issued Credentials earned by IHUM Participants

College-Issued Credential		All Participants	Participants Residing in Iowa
Certificate		1,198	1,059
Diploma		1,335	1,118
Associates' Degree		1,533	1,273
	Total	4,066	3,450
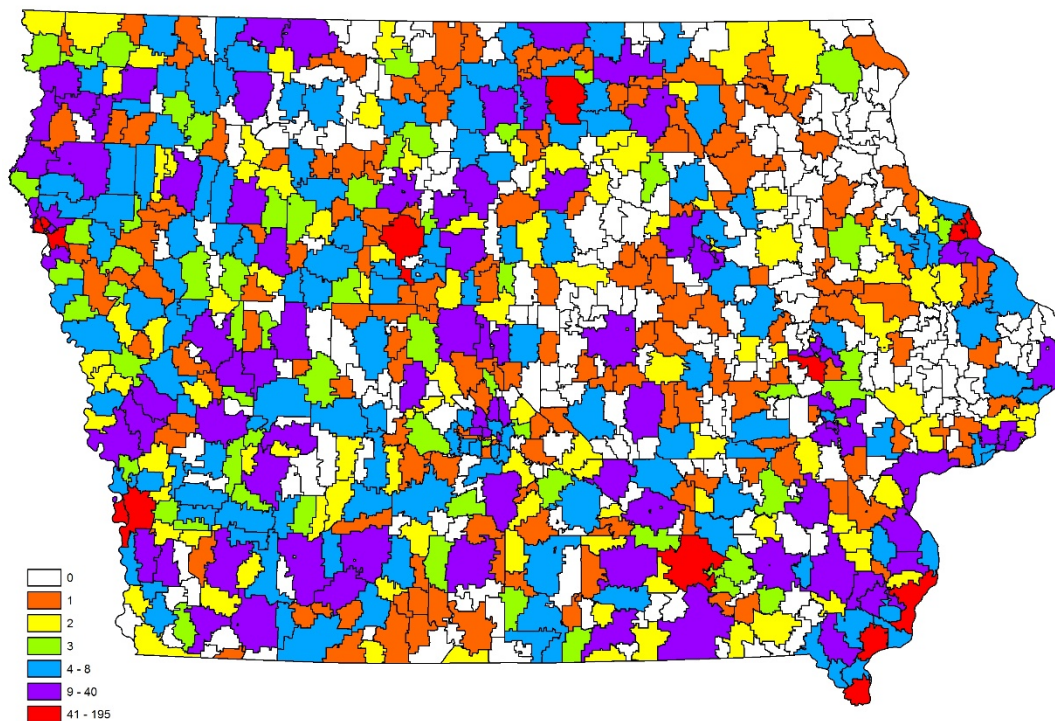
Figure 36. Distribution of all IHUM Participants by Iowa Zip Code
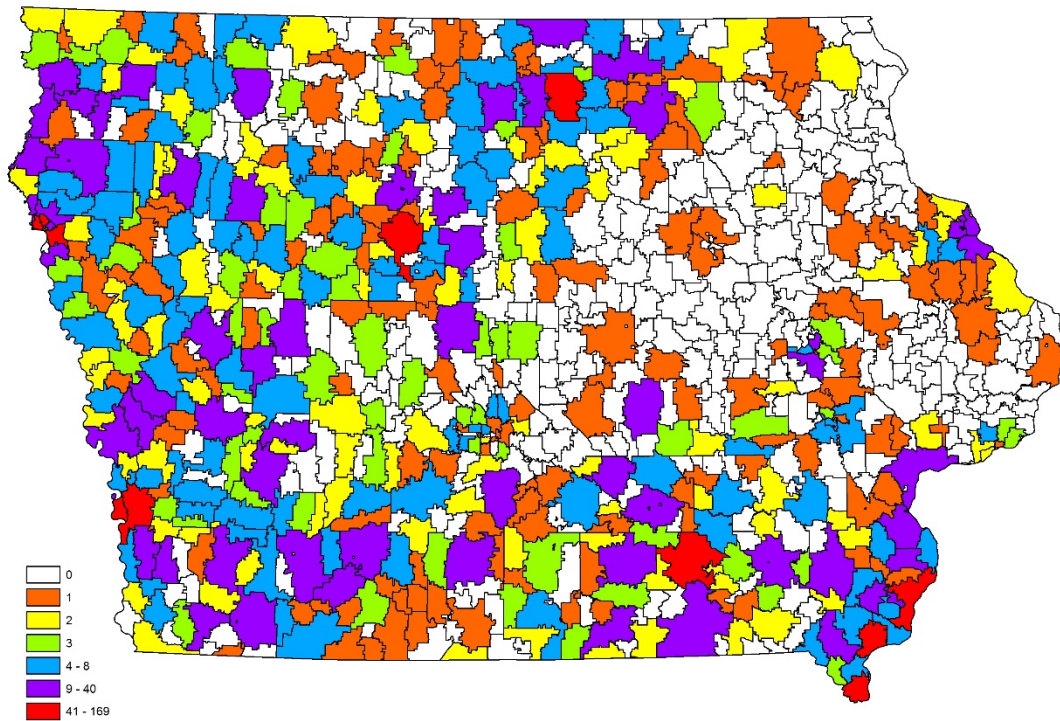
Figure 37. Distribution of Female IHUM Participants by Iowa Zip Code
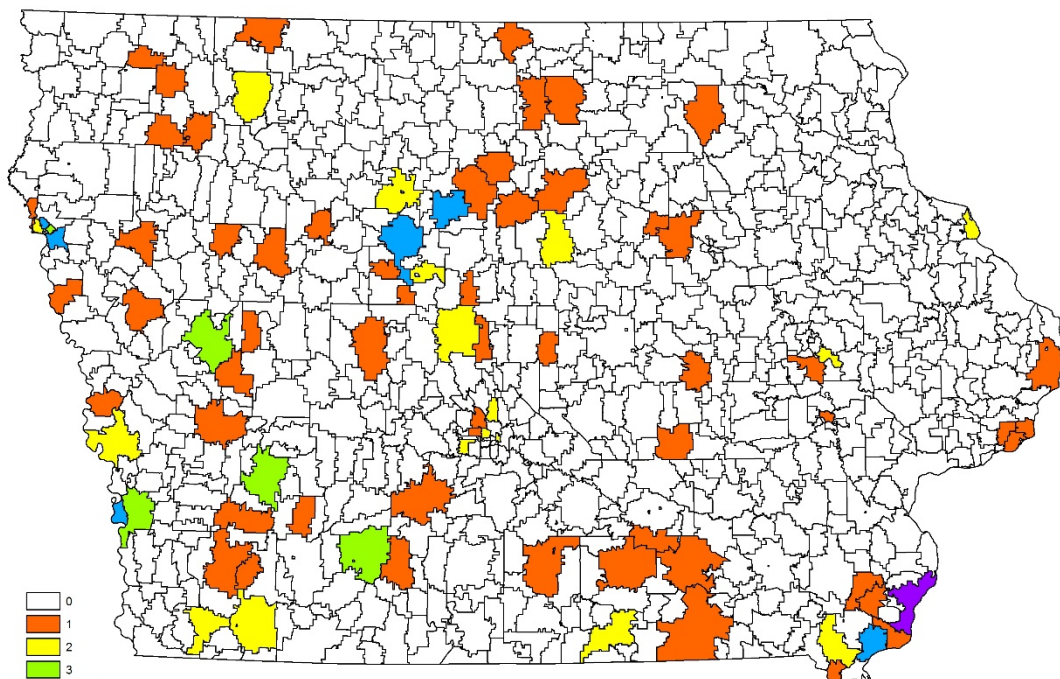
Figure 38. Distribution of IHUM Participants with Veteran Status by Iowa Zip Code
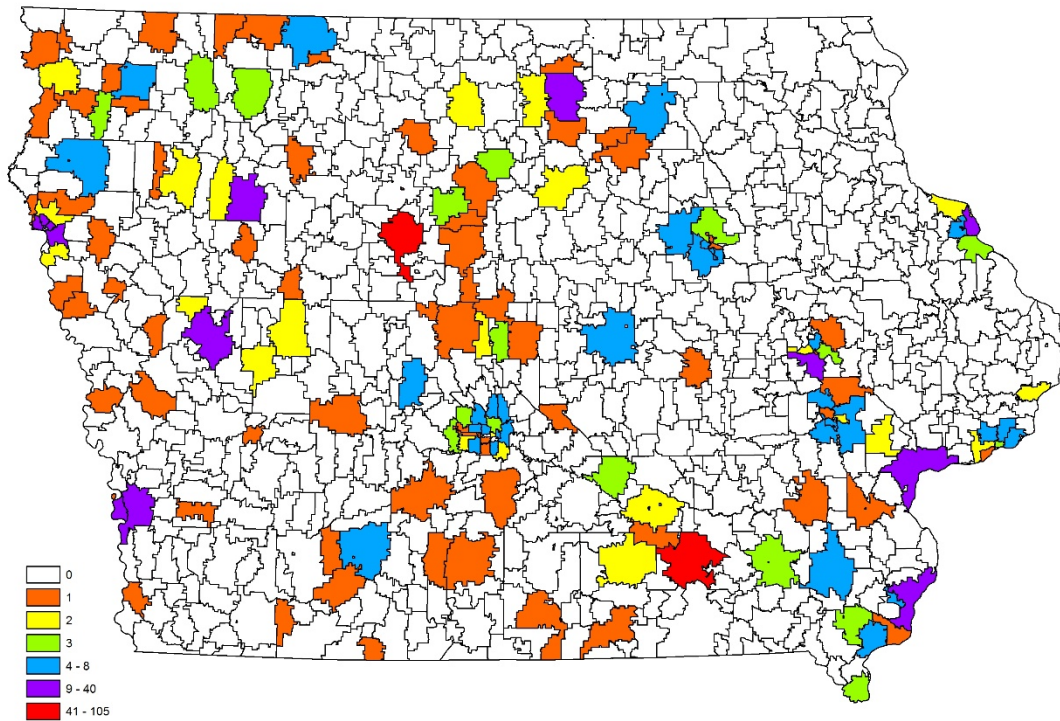
Figure 39. Distribution of Non-White IHUM Participants by Iowa Zip Code
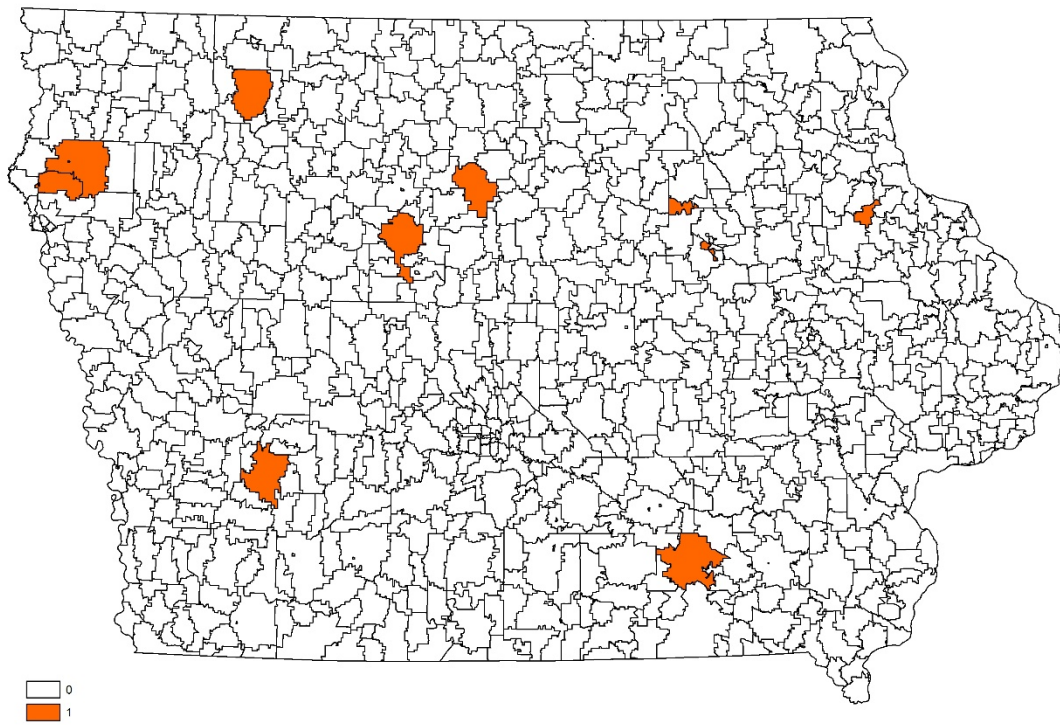
Figure 40. Distribution of TAA Eligible IHUM Participants by Iowa Zip Code
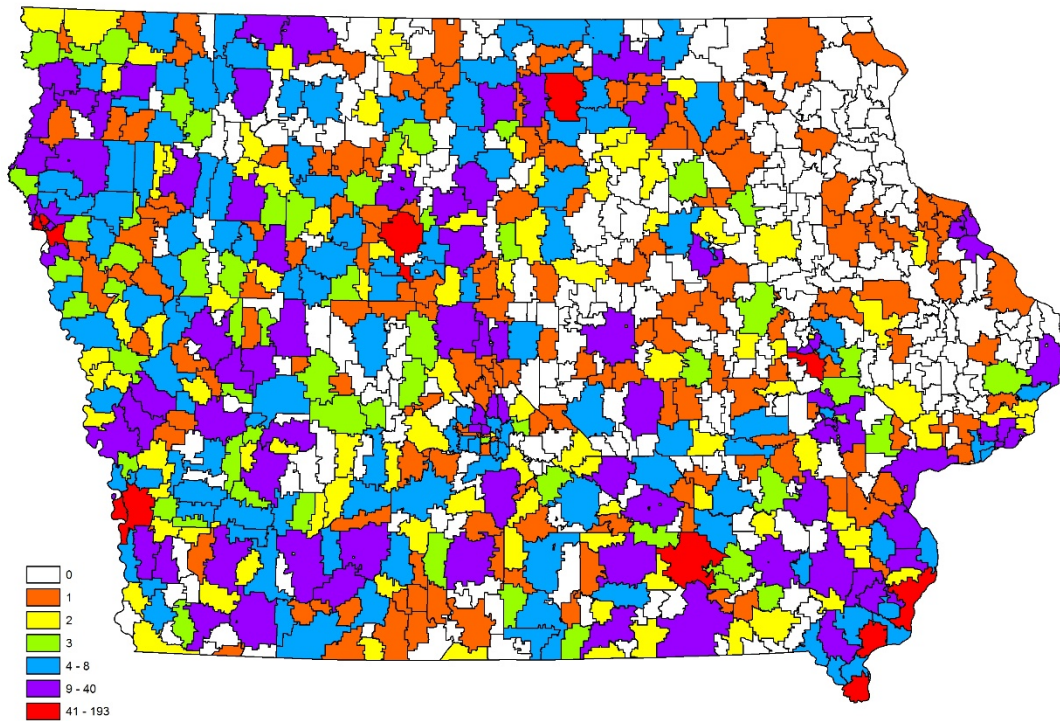
Figure 41. Distribution of IHUM Participants Enrolled in Credit Programs by Iowa Zip Code
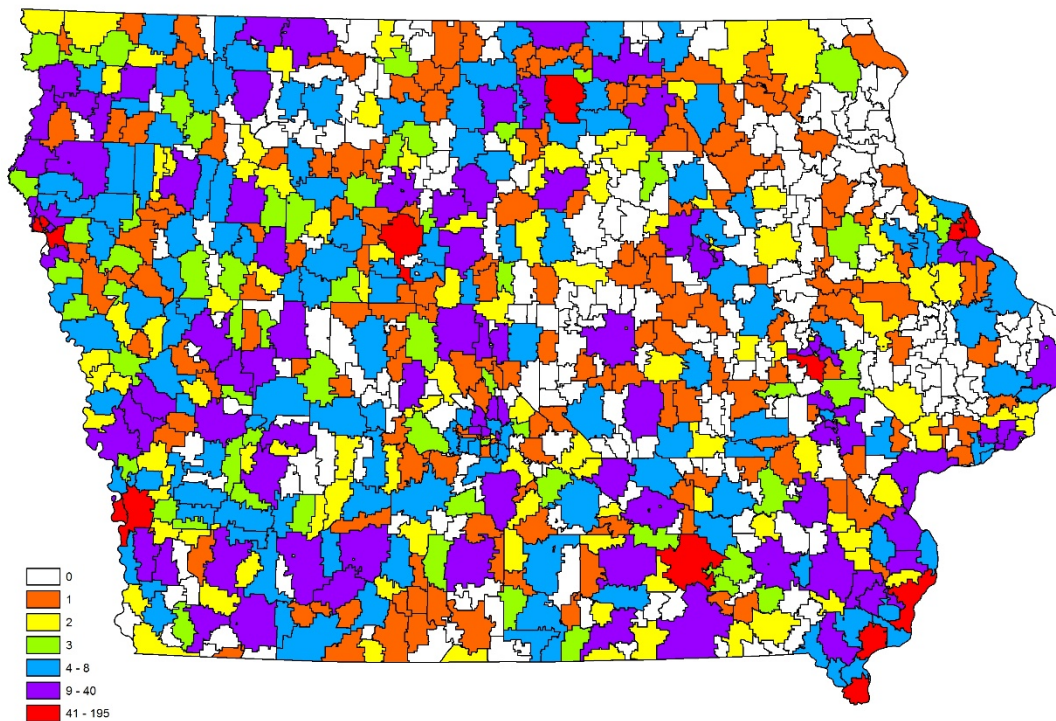
Figure 42. Distribution of IHUM Participants Employed at the Time of Intake by Iowa Zip Code
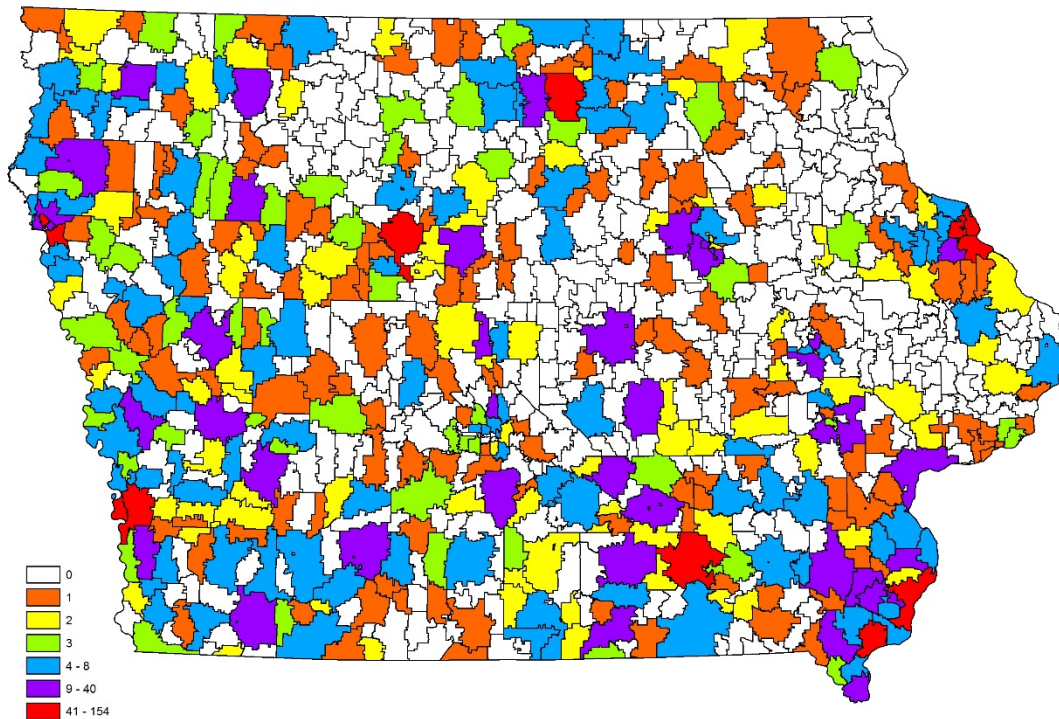
Figure 43. Number of All Awards Issued by Iowa Zip Code
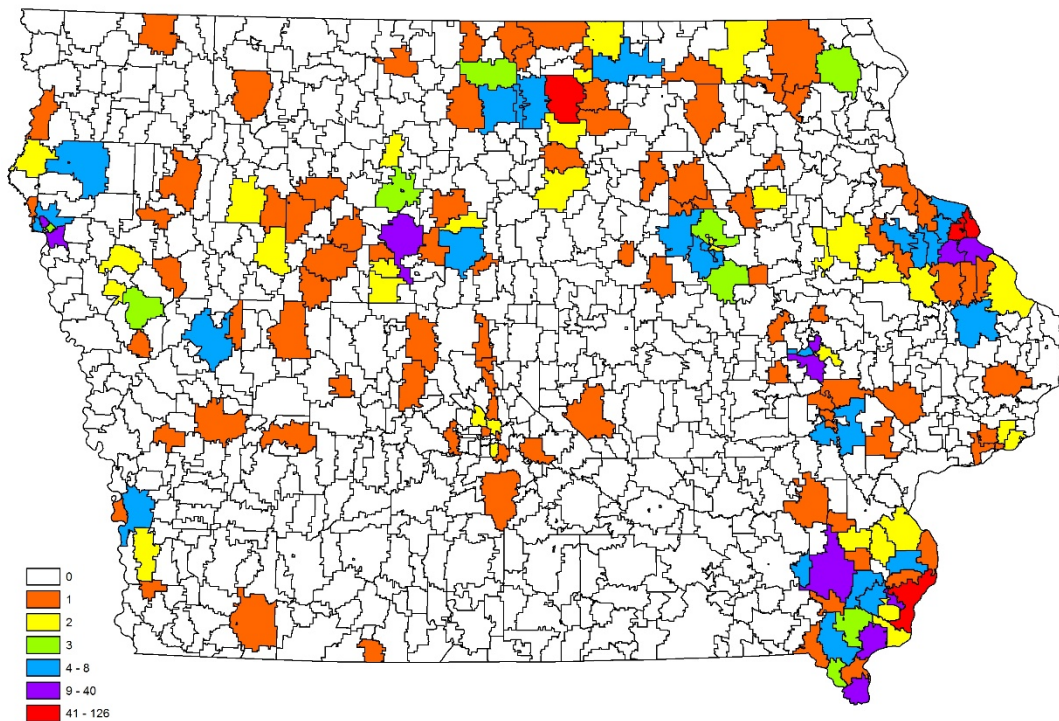
Figure 44. Number of Certificates Issued by Iowa Zip Code
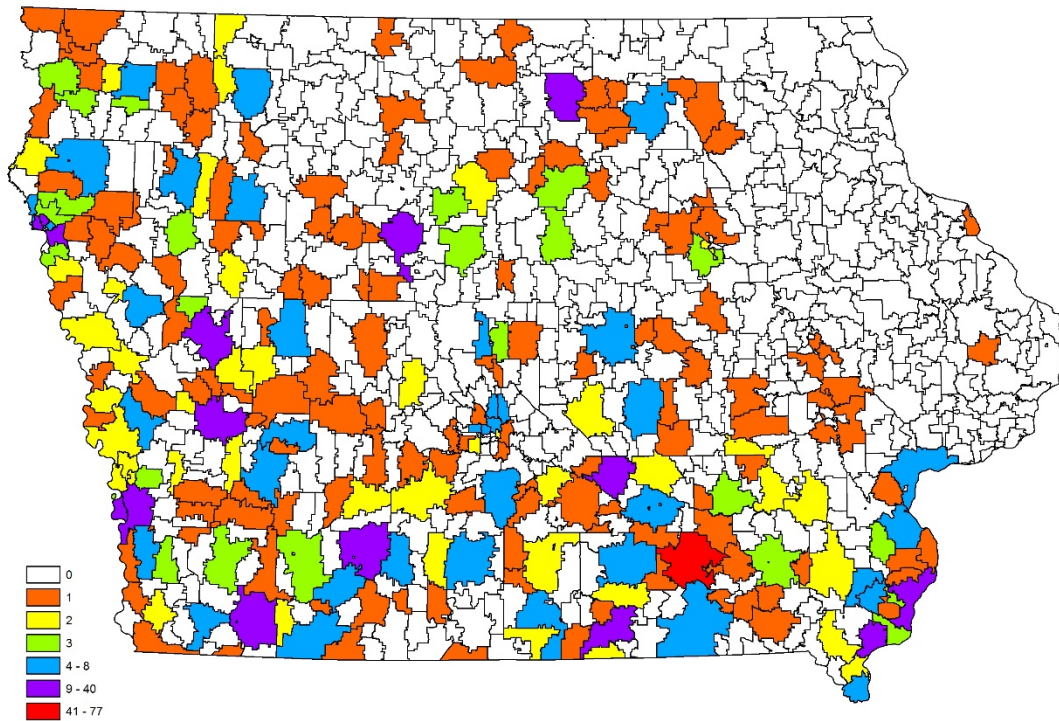
Figure 45. Number of Diplomas Issued by Iowa Zip Code
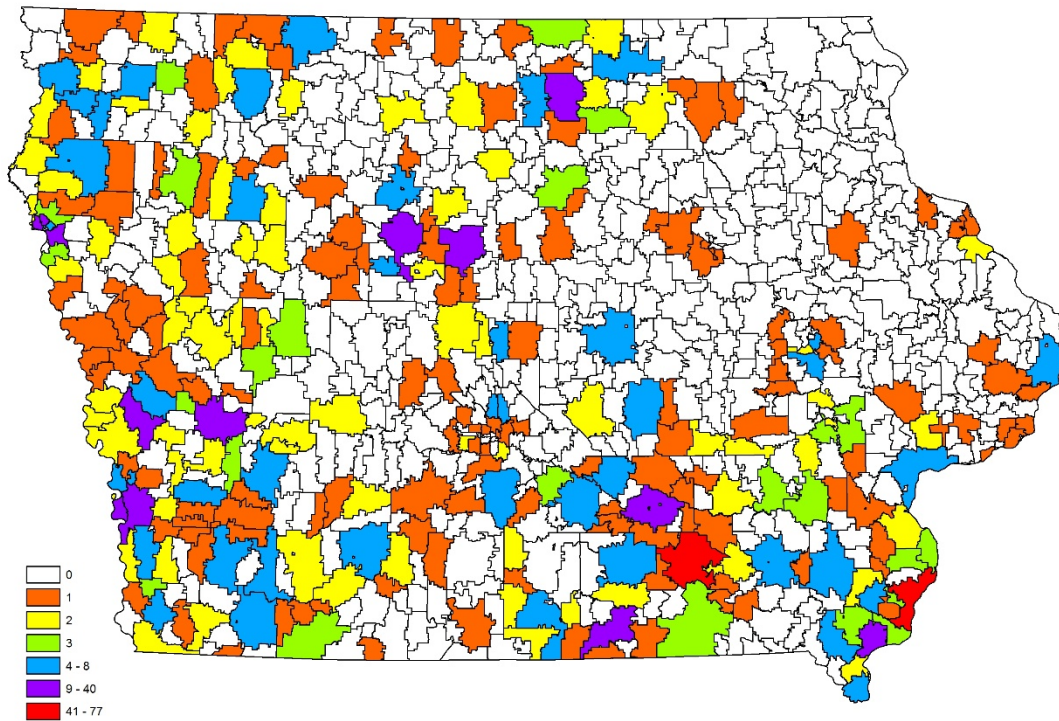
Figure 46. Number of Degrees Issued by Iowa Zip Code

IHUM PROJECT OUTCOMES EVALUATION

The following section describes the methodology (e.g., research questions, data sources, types of analysis conducted) utilized to conduct the analysis of IHUM student/participant outcomes.

Quasi-Experimental Research Design

To determine the impact of the IHUM Project on participant outcomes among multiple student groups, we utilized a quasi-experimental research design to compare two cohorts of treatment group and control group participants. For the purpose of this analysis, the treatment group includes students who were enrolled in an IHUM program and the control group includes students who were not enrolled in an IHUM program.

Research Questions[1]

The following broad questions provide a framework for the development of specific research questions we will pursue in the outcomes evaluation analysis:

Differential Enrollment

- Do students who enroll in IHUM programs differ from students who enroll in non-IHUM programs with regard to demographic characteristics (e.g., gender, age, ethnicity) and/or previous work experiences (e.g., overall and within-industry quarterly wage/increases, job placement)?

Prediction of Completion

- Do demographic factors, previous work experiences, and post-program intentions predict successful program completion among IHUM students?

- Do factors related to program completion differ between IHUM and non-IHUM students?

IHUM Program Efficacy

- Do students in IHUM programs experience general increases in job placement rates and wages relative to non-IHUM students?

- Do IHUM students experience industry-specific increases in job placement and wage trajectories relative to non-IHUM students?

- Are there potential factors that diminish successful outcomes following IHUM program exposure to target for future program improvement?

Research Design

Our general research strategy employed a non-equivalent control group design that included pretest and posttest assessments from both IHUM (treatment) and non-IHUM (control) students. In addition, we incorporated features of an interrupted time series design by using multiple

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[1] The original evaluation plan included a fourth research question examining differential program efficacy, however, analyses were not conducted due to sample size restrictions and empty cells across classification predictors.

pretest and posttest assessments of evaluation outcomes that change over time (i.e., wages). By using multiple pretest assessments for both treatment and control groups, we can directly assess possible selection-maturation interactions. In addition, use of multiple posttest assessments in both the treatment and control groups allows for direct examination of potential history artifacts that might operate to inflate otherwise apparent post-program wages if only a single post-program assessment was used.

Data Sources

To answer the evaluation questions, RISE evaluators requested participant data from two sources, (1) educational data from Iowa Department of Education (IDoE) and (2) wage data from Iowa Workforce Development (IWD). The dataset requested included IHUM affected programs for the treatment groups and non-TAACCCT affected programs for the control groups.

Community colleges that participated in previous rounds of TAACCCT funding for a specific sector (Information Technology, Healthcare, Utilities, and/or Manufacturing), were not included as control groups for those sectors. For each of the treatment and control groups, the start dates were explicitly defined as Fall starting in <u>August or September</u> and Spring starting in <u>January or February</u>. For example, a student in the Fall 2015 cohort must have been <u>first enrolled in the designated program</u> at his/her community college in August or September 2015. Alternatively, a student in the Spring 2016 cohort, must have been <u>first enrolled in the designated program</u> at his/her community college in January or February 2016.

Our design and data request included multiple treatment groups and control groups, where possible, to maximize sample sizes for proposed analyses, to provide large reservoirs of available cases where matching methods are deemed necessary, and to examine the efficacy of IHUM implementation across a broad range of program/award options. Due to our exclusion of previous TAACCCT-affected programs as controls and to new program offerings, some of our planned comparisons lacked a reasonable control group.

In order to evaluate IHUM effectiveness in these unpaired treatment groups, we used the repeated pretest measures of wage earnings as a within-subject comparison point against which post IHUM wage trajectories were compared. While not definitive, marked differences in wage trajectories before and after IHUM participation would be suggestive of program efficacy. Aside from these unusual circumstances, all other analytic comparisons involved a reasonable control. While most of these comparisons involved large numbers of treatment/control participants, there were some programs where enrollment is less pronounced.

Whether to use median wages or mean wages in the analysis presented an issue given that both of these measures of central tendency can be affected by the shape of the distribution. Results of the tests for the difference in median wages were very similar (e.g., skewness, p-value) to results of tests for the difference (e.g., t-tests) in mean wage, therefore, mean wage data were used in the analysis presented in this report. It should be noted that all participants with reported wages (including participants that earned "$0" wages) at Time 1, Time 2, or Time 3, were included in the tests for the difference in means and tests for the difference in medians analysis.

IHUM PROJECT OUTCOMES EVALUATION RESULTS

Outcomes Evaluation Participants

Initial cleaning of the data provided by the Iowa Department of Education involved removal of participants who were younger than 18 years of age, or who majored in a program other than the IHUM programs included in this evaluation. The resulting data included 6,930 participants in five cohorts based on students' first enrollment in either the fall 2013, 2014, 2015, or 2016 semesters or the spring 2016 semester. Treatment Group participants included three cohorts first enrolled in IHUM programs during fall 2015 and 2016, and spring 2016 semesters. Control cohorts included two pre-IHUM cohorts enrolled in fall 2013 and 2014 at the same community colleges that would offer IHUM programs starting in fall 2015. These two pre-programming cohorts served as control groups in comparisons of changes in student outcomes following IHUM program implementation. The remaining three control cohorts were students enrolled in identical programs in non-IHUM schools concurrently with each of the three treatment cohorts. These contemporaneous cohorts served as control groups for comparisons of student outcomes across IHUM and non-IHUM programs holding time constant.

Overall, the majority of students were women (72.8%), white (79.3%), and ranged in age from 18-68 ($M = 26.75$, $SD = 8.62$). Few students (9.1%) had earned a previous degree and only 4.3% reported disability status. Small minorities of students completed developmental English (3.2%) and math (9.8%) courses. Across the full outcomes evaluation sample 19.2% of students ($n = 1,333$) completed an Associate's Degree, 0.4% ($n = 28$) completed a program certificate, and 13.0% ($n = 904$) completed a program diploma. In comparing treatment and control groups, students in the treatment group were younger on average ($M = 26.46$, $SD = 8.28$) than their control group peers ($M = 27.03$, $SD = 8.93$), $t_{(6925.434)} = 2.78$, $p = .005$. Although average age differed significantly across treatment and control groups, the size of the effect would be considered very small ($g_{Hedges} = .07$). As shown in Table 21, treatment and control group participants also differed significantly in that treatment group students were more likely to be women, less likely to be white, and less likely to have taken a developmental math course. Although these differences in percentage were statistically significant across groups, phi (ϕ) coefficients shown in the right column of the table are indicative of trivially small effects.

Table 21. *Treatment and Control Group Characteristics*

Demographic Characteristic	Control ($n = 3563$)	Treatment ($n = 3367$)	χ^2	ϕ
Female	70.2%	75.4%	23.76[*]	.06
White	81.2%	77.2%	16.65[*]	.05
Disabled	4.2%	4.4%	0.10	.01
Developmental Math	11.7%	7.7%	31.93[*]	.07
Developmental English	3.2%	3.2%	0.01	.01
Previous Degree	9.4%	8.8%	0.83	.01

Note: * p < 0.05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.

The majority of students (35.9%) across conditions indicated that they were not sure about their intentions for enrolling in their respective programs. However, this group was followed by sizeable groups of students who were pursuing credentials to prepare for job market entry (26.4%), transfer to college/university (14.0%), or to meet certification requirements in their current jobs (9.1%). As shown in Table 22, student intentions were generally similar across the treatment and control groups, with the exception that treatment group students were less likely to be improving skills for a current job, less likely to be undecided about their intentions for enrolling in programs, and more likely to be preparing to transfer to college/university. Consistent with demographic differences described above, the statistically significant differences in student intentions across groups reflect very small effects.

Table 22. *Student Intentions for Pursuing Credentials*

Students' Intentions	Control (n = 3563)	Treatment (n = 3367)	χ^2	ϕ
Explore courses to decide on career	2.8%	2.7%	0.07	.01
Improve skills for current job	3.0%	2.1%	5.62[*]	.03
Meet certification/licensure requirements	9.3%	8.9%	0.22	.01
Preparing for career change	5.2%	4.9%	0.30	.01
Preparing to enter job market	25.6%	27.2%	2.48	.02
Self-improvement	2.3%	2.6%	0.58	.01
Personal reasons	1.7%	2.0%	0.89	.01
Preparing to transfer	12.6%	15.4%	11.63[*]	.04
Undecided/other	37.6%	34.1%	9.14[*]	.04

Note: * $p < 0.05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.

Across the full sample of students, credential completion rates did differ across the collapsed treatment and control cohorts. As shown in Table 23, students in the control cohorts were 2.23 times more likely to complete an associate's degree than were students in the treatment cohorts. However, this pattern was reversed for diploma completion, where treatment cohort students were 2.81 times more likely than control cohort students to complete their program diplomas.

Table 23. *Overall Credential Completion*

Credential	Control (n = 3563)	Treatment (n = 3367)	χ^2	ϕ
Associate's Degree	25.1%	13.0%	161.88[*]	.15
Program Certificate	0.5%	0.3%	1.87	.02
Program Diploma	7.6%	18.8%	191.24[*]	.17

Note: * $p < 0.05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.

Information Technology Sector

Students pursuing credentials in Information Technology programs ($N = 945$) were predominantly men (81.6%) and most were white (75.0%). Relative to the whole sample, disability rates were slightly higher among Information Technology students (8.5%). In addition, the proportions of Information Technology students who had completed developmental math (22.9%) or English (7.2%) courses was also higher in comparison to the full sample. Finally, students in IT also tended to be slightly older, on average ($M = 27.49$, $SD = 9.70$), and less likely to have earned a previous degree (7.6%) relative to the full sample.

Across all Information Technology programs and student cohorts, Associate's degrees were most commonly completed (14.5%; $n = 137$). Comparatively small numbers of students completed program diplomas (3.9%; $n = 37$) and very few students completed program certificates (1.0%; $n = 9$).

Among students in Information Technology programs, those in the treatment cohorts were significantly older ($M = 28.58$, $SD = 9.63$), on average, than those in the control cohorts ($M = 26.66$, $SD = 9.68$), $t_{(943)} = 3.02$, $p = .003$, corresponding to nearly a quarter standard deviation difference between the two groups ($g_{Hedges} = 0.20$). As shown in Table 24 below, treatment and control students did not differ on most other demographic characteristics, with the exception of taking a developmental math course, which was significantly more likely among treatment cohort students than among control cohort students.

Table 24. *Information Technology: Treatment and Control Group Characteristics*

Demographic Characteristic	Control ($n = 537$)	Treatment ($n = 408$)	χ^2	ϕ
Female	17.3%	19.9%	0.99	.03
White	75.6%	74.3%	0.22	.02
Disabled	7.3%	10.0%	2.32	.05
Developmental Math	19.6%	27.2%	7.70*	.09
Developmental English	7.4%	6.9%	0.12	.01
Previous Degree	8.2%	6.9%	0.58	.03

Note: * $p < 0.05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.

While many students (21.8%) indicated being unsure about their intentions for pursing credentials in information technology programs, the clear majority (32.8%) indicated that their intention was preparation for job market entry. A sizeable group of students (16.1%) also indicated that their intention involved transferring to college/university. In addition to differing from the full sample, students' intentions for pursuing credentials in Information Technology programs differed significantly across treatment and control cohorts (see Table 25). Specifically, students in the treatment cohorts were significantly more likely than those in the control cohorts to be exploring courses to decide on a career, taking courses to meet certification requirements in

an existing job, and preparing to change careers. Alternatively, students in the control cohorts were significantly more likely than those in the treatment cohorts to be either preparing to enter the job market or unsure about their current intentions.

Table 25. *Information Technology: Student Intentions for Pursuing Credentials*

Students' Intentions	Control ($n = 537$)	Treatment ($n = 408$)	χ^2	ϕ
Explore courses to decide on career	6.3%	11.5%	7.63[*]	.09
Improve skills for current job	2.8%	3.4%	0.32	.02
Meet certification/licensure requirements	2.6%	5.9%	6.44[*]	.08
Preparing for career change	5.2%	9.8%	7.31[*]	.09
Preparing to enter job market	37.8%	26.2%	14.10[*]	.12
Self-improvement	2.4%	4.7%	3.54	.06
Personal reasons	3.2%	2.9%	0.04	.01
Preparing to transfer	13.2%	19.9%	7.55	.09
Undecided/other	26.4%	15.7%	15.74[*]	.13

Note: * p < 0.05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.

Collapsing over programs, credential completion rates within Information Technology programs did not differ significantly across treatment and control cohorts. Given the small numbers of total students who completed program diplomas and certificates, comparisons across treatment and control cohorts are descriptive at best. As shown in Table 26, Associate's degree completion was nearly equally likely across treatment and control cohorts, whereas there was a tendency for students to earn diplomas and certificates at higher rates when enrolled in non-IHUM programs.

Table 26. *Information Technology: Overall Credential Completion*

Credential	Control ($n = 537$)	Treatment ($n = 408$)	χ^2	ϕ
Associate's Degree	14.9%	14.0%	0.16	.01
Program Certificate	1.7%	0.0%	*[b]	.09
Program Diploma	6.7%	0.2%	*[b]	.17

Note: * *p* < .05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.
    [a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Computer Support Specialist

Data were provided for a single treatment cohort (IHUM; $n = 87$) and a single control cohort (Non-IHUM; $n = 5$) pursuing the Computer Support Specialist Associate's Degree. Both cohorts enrolled in the fall semester of 2015. The overall sample of Computer Support Specialist students were slightly older ($M = 29.30$, $SD = 10.40$), on average, than the full Information Technology Sector sample. Consistent with the full IT sample, most students pursing the Computer Support Specialist Degree were white (75.0%) and male (80.4%). Proportions of students who completed a developmental math (21.7%) or English (5.4%) course were comparable to the full IT sector sample. Interestingly, disability status was reported by a considerably higher number of students (19.6%) pursing the Computer Support Specialist Degree. Finally, rate of prior degree completion (4.4%) was also consistent with the full IT sector. Across both the IHUM and Non-IHUM student cohorts, only Associate's degrees were completed (31.5%; $n = 29$). No students completed program diplomas or program certificates.

Given the small number of students in the Non-IHUM control cohort, comparisons between groups of students are presented below for descriptive purposes only. Apparent differences should be interpreted cautiously, as there is no accompanying statistical evidence to support conclusions regarding reliable group differences. Students in the Non-IHUM cohort tended to be younger ($M = 21.60$, $SD = 5.13$), on average, than students in the IHUM cohort ($M = 29.75$, $SD = 10.47$), corresponding to a large difference ($g_{Hedges} = 0.79$) if observed in a larger control group sample. As shown in Table 27 below, the IHUM and Non-IHUM groups were comparable in terms of the proportions of women and white students pursing degrees.

Table 27. *Computer Support Specialist: Treatment and Control Group Characteristics*

Demographic Characteristic	Control ($n = 5$)	Treatment ($n = 87$)	χ^2	ϕ
Female	20.0%	19.5%	[a]	.01
White	100.0%	73.6%	[a]	.14
Disabled	0.0%	20.7%	[a]	.12
Developmental Math	0.0%	23.0%	[a]	.13
Developmental English	0.0%	5.7%	[a]	.06
Previous Degree	0.0%	4.6%	[a]	.05

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Student intentions for pursuing Computer Support Specialist Degrees overwhelmingly related to preparing to enter the job market (34.8%) or transferring to college/university (10.9%). Although slightly smaller, the proportion of students who indicated being unsure of their intentions (18.5%) was consistent with the overall IT Sector sample. As shown in Table 28, overall conclusions about student intentions were generally consistent with responses provided by only those students in IHUM programs.

Table 28. *Computer Support Specialist: Student Intentions for Pursuing Credentials*

Students' Intentions	Control (*n* = 5)	Treatment (*n* = 87)	χ^2	ϕ
Explore courses to decide on career	0.0%	10.3%	a	.08
Improve skills for current job	20.0%	4.6%	a	.15
Meet certification/licensure requirements	0.0%	9.2%	a	.07
Preparing for career change	0.0%	6.9%	a	.06
Preparing to enter job market	60.0%	33.3%	a	.13
Self-improvement	20.0%	1.1%	a	.29
Personal reasons	0.0%	3.4%	a	.04
Preparing to transfer	0.0%	11.5%	a	.08
Undecided/other	0.0%	19.5%	a	.11

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
 [a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Finally, as shown in Table 29, only students in IHUM programs completed any credential and those credentials included only Associate's Degrees. While the disproportionate rate of completion across IHUM and Non-IHUM schools is suggestive of program effects, results must be interpreted in context of the small Non-IHUM sample size.

Table 29. *Computer Support Specialist: Overall Credential Completion*

Credential	Control (*n* = 5)	Treatment (*n* = 87)	χ^2	ϕ
Associate's Degree	0.0%	33.3%	a	.16
Program Certificate	0.0%	0.0%	---	---
Program Diploma	0.0%	0.0%	---	---

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
 [a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Assessing Differential Completion among IHUM Computer Support Specialist Students

IHUM students who did (*M* = 30.34, *SD* = 9.84) or did not (*M* = 29.45, *SD* = 10.83) complete their Associate's Degree were approximately the same age on average, $t_{(85)} = 0.38$, $p = .71$. Rates of degree completion were also similar across all of the demographic characteristics for which data were available (see Table 30).

Table 30. *IHUM Computer Support Specialist Characteristics by Degree Completion*

Demographic Characteristic	Not Complete ($n = 58$)	Complete ($n = 29$)	χ^2	ϕ
Female	22.4%	13.8%	[a]	.10
White	70.7%	79.3%	0.74	.09
Disabled	24.1%	13.8%	[a]	.12
Developmental Math	20.7%	27.6%	0.52	.08
Developmental English	6.9%	3.4%	[a]	.07
Previous Degree	3.4%	6.9%	[a]	.08

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Differential rates of degree completion were consistently tied to students' intentions. However, those who completed were more likely to indicate that preparing for a career change was their primary motivation. While preparing to enter the job market was endorsed by the majority of students, rate of endorsement did not differ as a function of degree completion. Alternatively, those who did not complete their degrees tended to indicate either intentions to transfer or that they were uncertain about their motivation for enrolling in the Computer Support Specialist program (see Table 31). While these tendencies are suggestive, it is important to interpret these patterns in the context of small absolute numbers of students in the single IHUM cohort.

Table 31. *IHUM Computer Support Specialist Intentions by Degree Completions*

Students' Intentions	Not Complete ($n = 58$)	Complete ($n = 29$)	χ^2	ϕ
Explore courses to decide on career	8.6%	13.8%	[a]	.08
Improve skills for current job	6.9%	0.0%	[a]	.16
Meet certification/licensure requirements	10.3%	6.9%	[a]	.06
Preparing for career change	1.7%	17.2%	*[b]	.29
Preparing to enter job market	31.0%	37.9%	0.41	.07
Self-improvement	1.7%	0.0%	[a]	.08
Personal reasons	3.4%	3.4%	[a]	---
Preparing to transfer	13.8%	6.9%	[a]	.10
Undecided/other	22.4%	13.8%	[a]	.10

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Employment and Earnings Impacts among IHUM Computer Support Specialist Students

Of the 87 students in the IHUM cohort, wage and employment data were available for 78 (89.7%). As shown in Table 32 below, proportions of students employed prior to enrollment were very similar between the groups who would eventually complete or not complete their degrees. However, employment rates demonstrated an approximately 10% increase in the six months after the end of the program among students who completed their degrees, such that those who completed their Associate's degree were significantly more likely than those who did not complete their degrees to be employed six months later.

Table 32. *IHUM Computer Support Specialist Students Employed Before and After Program*

Employment	Not Complete ($n = 50$)	Complete ($n = 28$)	χ^2	ϕ
12 Months Prior	76.0%	89.3%	a	.16
9 Months Prior	88.0%	89.3%	a	.02
6 Months Prior	86.0%	85.7%	a	.01
3 Months Prior	84.0%	82.1%	a	.02
3 Months After	82.0%	92.9%	---[a]	.15
6 Months After	78.0%	96.4%	*[b]	.25

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Consistent with higher likelihood of employment following degree completion, students who earned Computer Support Specialist degrees also earned more income, on average, than did students who did not finish their credential. As shown in Table 33, and graphically in Figure 47, students did not differ in average income three months prior to program enrollment. Those who completed degrees were already earning moderately more than their peers only three months after their program and significantly more than their peers within six months.

Table 33. *IHUM Computer Support Specialist Students Earnings Before and After Program*

Earnings Period	Not Complete ($n = 50$)		Complete (n = 28)		t	g
	M	SD	M	SD		
12 Months Prior	4025.23	4220.34	5682.55	5329.92		
9 Months Prior	3885.49	3793.52	5764.86	5121.98		
6 Months Prior	4036.48	4236.36	4928.58	5010.10		
3 Months Prior	4518.34	5257.86	4515.53	4774.22	0.01	0.00
3 Months After	5957.90	4485.63	7988.21	5388.57	1.69	0.42
6 Months After	6227.10	5034.58	9162.51	4696.49	2.58*	0.60

Note: * $p < .05$; g = Hedges Adjusted d.
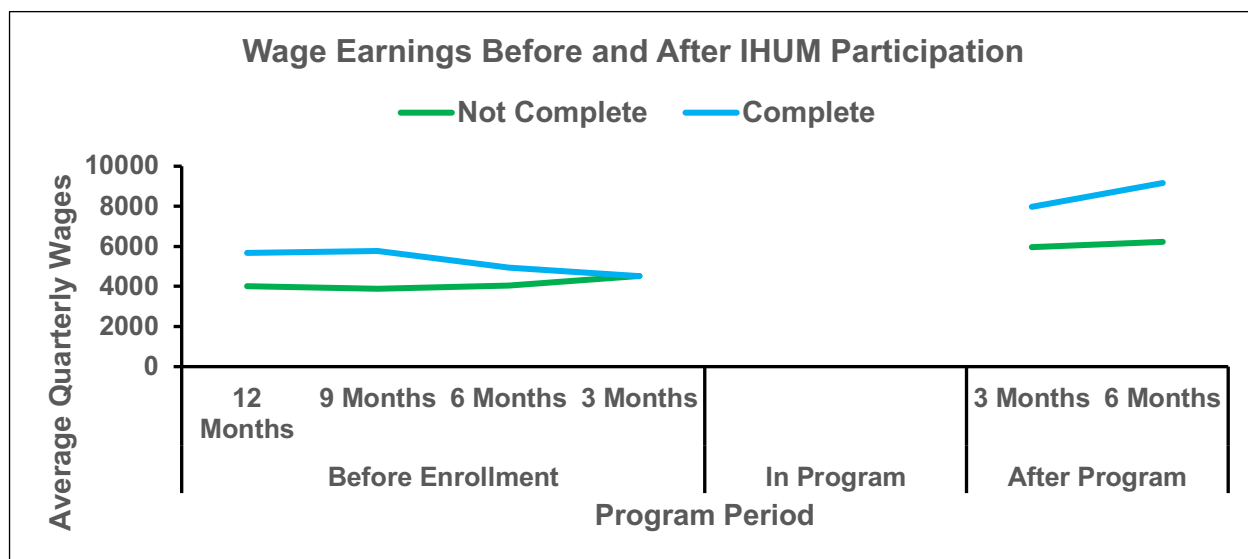
Figure 47. Average Wage Earning for IHUM Computer Support Specialist Students

Networking

Data for students pursuing networking credentials were provided for multiple treatment control cohorts. Two of the control cohorts included students who pursued credentials in networking programs at the same schools that would later implement IHUM programming. Specifically, students who started in the fall semesters of 2013 ($n = 133$) and 2014 ($n = 177$) provide a within-school comparison group against the first IHUM cohort that first enrolled in the fall semester of 2015 ($n = 171$). Initial comparisons between the pre-IHUM implementation cohorts revealed no differences between the two groups of students in terms of demographic characteristics, intentions for enrolling in the program, or credential completion (all ps > .14). Therefore, the two pre-IHUM cohorts were combined into a single group ($n = 310$) for comparison with the first cohort of IHUM networking students.

The first IHUM students and their previous years' peers did not differ in terms of age ($M = 27.90$, $SD = 10.39$ vs. $M = 27.95$, $SD = 9.51$). The two groups did not differ significantly on any of the demographic characteristics for which data were available (see Table 34). Although not statistically significant, the later cohort of IHUM students tended to complete developmental math and English courses at a lower rate than their peers in the previous two years.

Table 34. *Networking: Treatment and Control Group Characteristics*

Demographic Characteristic	Pre-IHUM ($n = 310$)	IHUM ($n = 171$)	χ^2	ϕ
Female	15.8%	17.5%	0.24	.02
White	73.5%	76.0%	0.36	.03
Disabled	7.7%	10.5%	1.07	.05
Developmental Math	30.0%	24.0%	1.99	.06
Developmental English	11.6%	6.4%	3.35	.08
Previous Degree	11.3%	8.2%	1.16	.05

In both groups, students were most likely pursuing education to enter the job market or to transfer to a college or university. Interestingly, students in the first IHUM cohort tended to report intending to transfer at a higher rate and being unsure or undecided about their intentions at a lower rate than students in the previous two years. While suggestive, these differences, and differences in other intentions (see Table 35) were not statistically reliable.

Table 35. *Networking: Student Intentions for Pursuing Credentials*

Students' Intentions	Pre-IHUM ($n = 310$)	IHUM ($n = 171$)	χ^2	ϕ
Explore courses to decide on career	10.3%	8.8%	0.30	.03
Improve skills for current job	3.9%	3.5%	0.04	.01
Meet certification/licensure requirements	4.2%	5.8%	0.66	.04
Preparing for career change	7.1%	9.4%	0.77	.04
Preparing to enter job market	29.0%	25.7%	0.60	.04
Self-improvement	3.2%	5.8%	1.90	.06
Personal reasons	3.5%	2.3%	[a]	.03
Preparing to transfer	17.7%	22.8%	1.80	.06
Undecided/other	21.0%	15.8%	1.91	.06

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Finally, as shown in Table 36, students in the first IHUM cohort were slightly more likely to complete their Associate's Degree than were students in the previous two years, suggesting a possible increase in the rate of completion over time, but the difference was not statistically significant ($p = .14$).

Table 36. *Networking: Overall Credential Completion*

Credential	Pre-IHUM ($n = 310$)	IHUM ($n = 171$)	χ^2	ϕ
Associate's Degree	11.6%	16.4%	2.17	.07
Program Certificate	0.0%	0.0%	---	---
Program Diploma	0.0%	0.0%	---	---

Comparing IHUM and Non-IHUM Cohorts

Comparisons between contemporaneous cohorts of IHUM and Non-IHUM students were possible across three academic terms including the fall semesters of 2015 and 2016, and the spring semester of 2016. Students enrolled in IHUM networking programs were consistently significantly older than students in comparable Non-IHUM programs across all three comparison groups (see Table 37).

Table 37. *Networking: Treatment and Control Group Age Differences*

| Comparison Term | Non-IHUM | | IHUM | | | |
	M (SD)	n	M (SD)	n	t	g
Fall 2015	24.45 (8.41)	103	27.95 (9.51)	171	3.08*	0.38
Spring 2016	26.73 (9.12)	78	30.21 (10.05)	53	2.06*	0.37
Fall 2016	20.43 (3.67)	21	28.45 (6.96)	22	4.76*	1.43

Note: * $p < .05$; g = Hedges Adjusted d.

Demographic characteristics did not differ appreciably across student groups pursuing networking credentials at IHUM and Non-IHUM schools across the three comparison periods (see Tables 38-40). However, students attending IHUM schools were consistently more likely than students attending Non-IHUM schools to have completed a developmental math course. IHUM students enrolled in networking programs were also significantly more likely to have completed a developmental English course than their Non-IHUM peers, but this difference emerged only for the cohort who first enrolled in the spring 2016 semester (see Table 39).

Table 38. *Networking: Treatment and Control Group Characteristics (Fall 2015)*

Demographic Characteristic	Non-IHUM ($n = 103$)	IHUM ($n = 171$)	χ^2	ϕ
Female	15.5%	17.5%	0.19	.03
White	80.6%	76.0%	0.77	.05
Disabled	5.8%	10.5%	[a]	.08
Developmental Math	4.9%	24.0%	*[b]	.25
Developmental English	1.9%	6.4%	[a]	.10
Previous Degree	4.9%	8.2%	[a]	.06

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Table 39. *Networking: Treatment and Control Group Characteristics (Spring 2016)*

Demographic Characteristic	Non-IHUM ($n = 78$)	IHUM ($n = 53$)	χ^2	ϕ
Female	25.6%	26.4%	0.01	.01
White	74.4%	71.7%	0.11	.03
Disabled	5.1%	7.5%	[a]	.05
Developmental Math	1.3%	32.1%	*[b]	.44
Developmental English	1.3%	13.2%	*[b]	.24
Previous Degree	2.6%	1.9%	[a]	.02

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Table 40. *Networking: Treatment and Control Group Characteristics (Fall 2016)*

Demographic Characteristic	Non-IHUM ($n = 21$)	IHUM ($n = 22$)	χ^2	ϕ
Female	14.3%	9.1%	[a]	.08
White	71.4%	77.3%	[a]	.07
Disabled	19.0%	4.1%	[a]	.23
Developmental Math	0.0%	31.8%	*[b]	.43
Developmental English	0.0%	9.1%	[a]	.22
Previous Degree	0.0%	4.5%	[a]	.15

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

In fall 2015, the majority of Non-IHUM students majoring in networking were either preparing to enter the job market or undecided about their motivation for enrolling (see Table 41). Alternatively, those enrolled in an IHUM networking program were significantly more likely to be preparing to transfer and significantly less likely to be undecided about their intentions. Nearly a quarter of IHUM students still indicated that they were preparing to enter the job market, but this proportion was significantly lower than that of Non-IHUM students. In spring of 2016, student in Non-IHUM were overwhelmingly preparing to enter the job market (see Table 42). Students in IHUM networking programs were more diversified in their intentions indicating being more likely than Non-IHUM students to pursue credentials in preparation for a career change or to meet certification requirements in a current job. Fall 2016 students appear more similar to their 2015 peers (see Table 43) in that Non-IHUM students were largely either preparing to enter the job market or undecided about their intentions. Alternatively, students in IHUM programs were significantly more likely to be preparing for a career change and less likely, though not significantly so, to be preparing to enter the job market.

Table 41. *Networking: Treatment and Control Group Student Intentions (Fall 2015)*

Students' Intentions	Non-IHUM ($n = 103$)	IHUM ($n = 171$)	χ^2	ϕ
Explore courses to decide on career	0.0%	8.8%	*b	.19
Improve skills for current job	0.0%	3.5%	a	.12
Meet certification/licensure requirements	0.0%	5.8%	*b	.15
Preparing for career change	1.0%	9.4%	*b	.17
Preparing to enter job market	42.7%	25.7%	8.51*	.18
Self-improvement	1.0%	5.8%	a	.12
Personal reasons	1.9%	2.3%	a	.01
Preparing to transfer	6.8%	22.8%	*b	.21
Undecided/other	46.6%	15.8%	30.67*	.34

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Table 42. *Networking: Treatment and Control Group Student Intentions (Spring 2016)*

Students' Intentions	Non-IHUM ($n = 78$)	IHUM ($n = 53$)	χ^2	ϕ
Explore courses to decide on career	0.0%	9.4%	*b	.24
Improve skills for current job	0.0%	1.9%	a	.11
Meet certification/licensure requirements	0.0%	9.4%	*b	.24
Preparing for career change	3.8%	18.9%	*b	.25
Preparing to enter job market	60.3%	22.6%	18.04*	.37
Self-improvement	1.3%	3.8%	a	.08
Personal reasons	3.8%	3.8%	a	.01
Preparing to transfer	9.0%	13.2%	a	.07
Undecided/other	21.8%	17.0%	a	.06

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Table 43. *Networking: Treatment and Control Group Student Intentions (Fall 2016)*

Students' Intentions	Non-IHUM (*n* = 21)	IHUM (*n* = 22)	χ^2	ϕ
Explore courses to decide on career	0.0%	9.1	a	.22
Improve skills for current job	0.0%	0.0%	---	---
Meet certification/licensure requirements	0.0%	0.0%	---	---
Preparing for career change	0.0%	27.3%	*b	.39
Preparing to enter job market	47.6%	22.7%	a	.26
Self-improvement	0.0%	9.1%	a	.22
Personal reasons	0.0%	0.0%	---	---
Preparing to transfer	4.8%	22.7%	a	.26
Undecided/other	47.6%	9.1%	*b	.43

Note: * p < .05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.
a Proportions do not differ by Fisher's exact test. b Proportions differ significantly by Fisher's exact test.

IHUM students enrolled in fall 2015 were significantly less likely than Non-IHUM students to complete either an Associate's degree or a networking program diploma (see Table 44). In the following two semesters, IHUM networking students did not complete any credentials, whereas Non-IHUM students were more likely to complete a networking diploma in spring 2016 (see Table 45) or a networking certificate in fall 2016 (see Table 46).

Table 44. *Networking: Treatment and Control Group Credential Completion (Fall 2015)*

Credential	Non-IHUM (*n* = 103)	IHUM (*n* = 171)	χ^2	ϕ
Associate's Degree	41.7%	16.4%	21.56*	.28
Program Certificate	0.0%	0.0%	---	---
Program Diploma	18.5%	0.0%	*b	.34

Note: * p < .05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.
a Proportions do not differ by Fisher's exact test. b Proportions differ significantly by Fisher's exact test.

Table 45. *Networking: Treatment and Control Group Credential Completion (Spring 2016)*

Credential	Non-IHUM ($n = 78$)	IHUM ($n = 53$)	χ^2	ϕ
Associate's Degree	0.0%	0.0%	---	---
Program Certificate	0.0%	0.0%	---	---
Program Diploma	23.1%	0.0%	*[b]	.33

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Table 46. *Networking: Treatment and Control Group Credential Completion (Fall 2016)*

Credential	Non-IHUM ($n = 21$)	IHUM ($n = 22$)	χ^2	ϕ
Associate's Degree	0.0%	0.0%	---	---
Program Certificate	42.9%	0.0%	*[b]	.53
Program Diploma	0.0%	0.0%	---	---

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Assessing Differential Completion among IHUM Networking Students

Given that IHUM students only completed credentials in networking programs in fall 2015, only those students were examined to assess both differential completion and impacts on employment and earnings. As shown in Table 47, students in IHUM networking programs did not differ significantly on any demographic characteristics assessed as a function of whether they completed their degrees. Intentions for pursuing degrees also did not differ significantly for students who either did or did not complete their credentials, with the exception that degree completers indicated being more likely than non-completers to be pursuing their degrees for personal reasons (see Table 48).

Table 47. *IHUM Networking Student Characteristics by Degree Completion*

Demographic Characteristic	Not Complete ($n = 143$)	Complete ($n = 28$)	χ^2	ϕ
Female	16.1%	25.0%	[a]	.09
White	74.1%	85.7%	[a]	.10
Disabled	11.0%	3.6%	[a]	.10
Developmental Math	24.5%	21.4%	[a]	.03
Developmental English	7.7%	0.0%	[a]	.12
Previous Degree	9.1%	3.6%	[a]	.07

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] No statistics computed due to empty/small cells ($n < 10$).

Table 48. *IHUM Networking Student Intentions by Degree Completions*

Students' Intentions	Not Complete (*n* = 143)	Complete (*n* = 28)	χ^2	ϕ
Explore courses to decide on career	7.7%	14.3%	a	.09
Improve skills for current job	4.2%	0.0%	a	.08
Meet certification/licensure requirements	7.0%	0.0%	a	.11
Preparing for career change	9.8%	7.1%	a	.03
Preparing to enter job market	24.5%	32.1%	a	.07
Self-improvement	6.3%	3.6%	a	.04
Personal reasons	0.7%	10.7%	*b	.25
Preparing to transfer	24.5%	14.3%	a	.09
Undecided/other	15.4%	17.9%	a	.03

Note: * *p* < .05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.
[a] No statistics computed due to empty/small cells (*n* < 10).

Table 49. *IHUM Networking Students Employed Before and After Program*

Employment	Not Complete (*n* = 130)	Complete (*n* = 27)	χ^2	ϕ
12 Months Prior	71.5	77.8	0.51	.05
9 Months Prior	76.2	66.7	a	.08
6 Months Prior	73.8	63.0	a	.09
3 Months Prior	75.4	66.7	a	.08
3 Months After	80.0	77.8	a	.02
6 Months After	77.7	81.5	a	.04

Note: * *p* < .05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.
[a] No statistics computed due to empty/small cells (*n* < 10).

Employment and Earnings Impacts among IHUM Networking Students

Employment and earnings data were available for 157 of the original 171 members of the fall 2015 cohort. The remaining members included 27 students who completed their Associate's degree in an IHUM program and 130 students who were also majoring in networking at an IHUM school, but who did not complete their degree. Although rates of employment before and after program completion did not differ significantly between those who did and did not complete their degrees (see Table 49), rates of employment among degree completers did

increase from the mid-60% range prior to program enrollment to approximately 80% after degree completion. Similarly, as shown in Table 50, those who would eventually complete their networking degrees saw their pre-program wages drop considerably to a point approximately 0.30 standard deviations below their non-completing peers. However, post-program wages returned to levels approximately equal to those among students who did not complete (and did not see their pre-program wages drop) within six months of post-program employment (see Figure 48).

Table 50. *IHUM Networking Students Earnings Before and After Program*

Earnings Period	Not Complete ($n = 130$)		Complete ($n = 27$)		t	g
	M	SD	M	SD		
12 Months Prior	4463.83	7044.73	3189.79	3368.24		
9 Months Prior	4976.69	5927.95	3336.98	3611.55		
6 Months Prior	4901.99	6816.74	2768.71	3136.21		
3 Months Prior	4531.53	5274.14	2782.25	3206.41	2.27*	0.35
3 Months After	5933.89	5762.32	5314.60	4166.31	0.65	0.11
6 Months After	6426.21	6283.51	6973.23	4596.46	0.53	0.09

Note: * $p < .05$; g = Hedges Adjusted d.
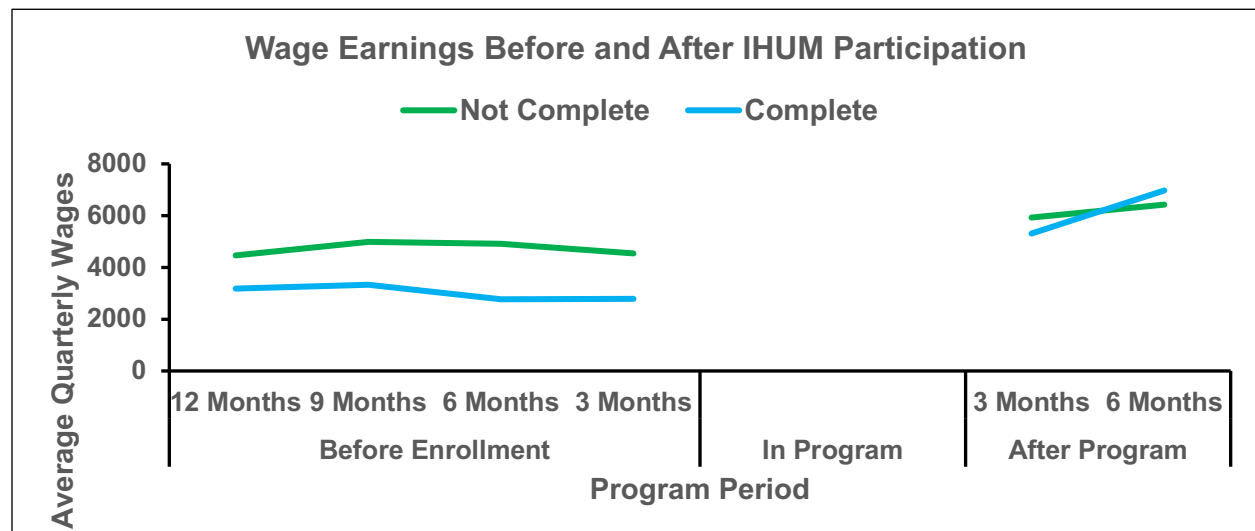
Figure 48. Average Wage Earning for IHUM Networking Students

Programming

Data available for comparisons among students in IHUM and Non-IHUM Programming programs was limited to only a single control cohort ($n = 20$) that first enrolled in fall 2014. Additional data were available for three IHUM cohorts that started their programs in fall 2015 ($n = 25$), spring 2016 ($n = 37$), and fall 2016 ($n = 13$). Preliminary analyses examined whether students in the three IHUM cohorts differed in terms of demographic characteristics, intentions, or likelihood of completing credentials. Results indicated no significant differences across the three cohorts (all $ps > .10$), suggesting that the three small groups could be combined into a single IHUM cohort. Students in the combined IHUM cohort ($M = 27.55$, $SD = 9.22$) were similar to Non-IHUM students ($M = 26.45$, $SD = 7.09$) in terms of average age, $t_{(93)} = 0.49$, $p = .62$. As shown in Table 51 below, IHUM and Non-IHUM students did not differ significantly on any of the demographic characteristics assessed. Students in the IHUM and Non-IHUM groups also did not differ significantly in their intentions for pursuing a programming credential (see Table 52). Although not statistically significant, Non-IHUM students did indicate being more likely to enter the job market while IHUM students indicated being more likely to transfer to a college or university. Finally, students did not differ in the likelihood of completing a credential (see Table 53) as a function of IHUM programming, with only a single Non-IHUM student completing an Associate's degree and a single IHUM student completing a programming diploma.

Table 51. *Programming: Treatment and Control Group Characteristics*

Demographic Characteristic	Non-IHUM ($n = 20$)	IHUM ($n = 75$)	χ^2	ϕ
Female	20.0%	24.0%	[a]	.04
White	85.0%	72.0%	[a]	.12
Disabled	5.0%	0.0%	[a]	.20
Developmental Math	30.0%	34.7%	[a]	.04
Developmental English	5.0%	4.0%	[a]	.02
Previous Degree	10.0%	10.7%	[a]	.01

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Table 52. *Programming: Student Intentions for Pursuing Credentials*

Students' Intentions	Non-IHUM ($n = 20$)	IHUM ($n = 75$)	χ^2	ϕ
Explore courses to decide on career	10.0%	21.3%	[a]	.12
Improve skills for current job	10.0%	4.0%	[a]	.11
Meet certification/licensure requirements	5.0%	1.3%	[a]	.10
Preparing for career change	10.0%	2.7%	[a]	.15
Preparing to enter job market	45.0%	22.7%	[a]	.20
Self-improvement	0.0%	5.3%	[a]	.11
Personal reasons	5.0%	4.0%	[a]	.02
Preparing to transfer	5.0%	26.7%	[a]	.21
Undecided/other	10.0%	12.0%	[a]	.03

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Table 53. *Programming: Overall Credential Completion*

Credential	Non-IHUM ($n = 20$)	IHUM ($n = 75$)	χ^2	ϕ
Associate's Degree	5.0%	0.0%	[a]	.20
Program Certificate	0.0%	0.0%	---	---
Program Diploma	0.0%	1.3%	[a]	.05

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Assessing Differential Completion among IHUM Programming Students

By combining the three IHUM treatment cohorts, sample size did increase enough to justify reasonable comparisons. However, the rate of credential completion (1.3% of the IHUM student group) was too low to reach any meaningful conclusions about how those who completed a programming credential might differ from those who did not.

Employment and Earnings Impacts among IHUM Networking Students

Of the original 75 students in the IHUM cohorts identified for programming credential analyses, employment and earnings data were available for only 13 IHUM students who entered in fall 2015. Among these students, none completed any programming credential making comparisons of pre- and post-program employment and earnings impossible.

Healthcare Sector

Students pursuing credentials in Healthcare programs ($N = 5488$) were predominantly women (88.4%) and the majority were white (79.3%). Relative to the whole sample, disability rates were slightly lower among Healthcare students (3.6%). In addition, the proportions of Healthcare students who had completed developmental math (7.9%) or English (2.7%) courses was also slightly lower in comparison to the full sample. Finally, students in Healthcare programs also tended to be close in age, on average ($M = 26.77$, $SD = 8.34$), and approximately equally likely to have earned a previous degree (9.7%) relative to the full sample.

Across all Healthcare programs and student cohorts, Associate's degrees were most commonly completed (20.4%; $n = 1121$). Comparable numbers of students completed program diplomas (15.2%; $n = 834$) but nearly no certificates ($< 0.1\%$; $n = 2$).were completed by Healthcare students.

Among students in Healthcare programs, those in the treatment cohorts were significantly younger ($M = 26.22$, $SD = 7.90$), on average, than those in the control cohorts ($M = 27.34$, $SD = 8.73$), $t_{(5388.69)} = 5.02$, $p < .001$, but the difference was small, corresponding to slightly more than one-tenth of a standard deviation ($g_{Hedges} = 0.14$). As shown in Table 54 below, treatment and control students did not differ on most other demographic characteristics, with the exception of taking a developmental math course, which was significantly more likely among control cohort students than among control cohort students. In addition, treatment cohort students were significantly less likely to be white but the size of the difference is small.

Table 54. *Healthcare: Treatment and Control Group Characteristics*

Demographic Characteristic	Control ($n = 2696$)	Treatment ($n = 2792$)	χ^2	ϕ
Female	89.0%	87.9%	1.49	.02
White	81.7%	76.9%	18.77[*]	.06
Disabled	3.8%	3.3%	0.95	.01
Developmental Math	10.8%	5.1%	60.59[*]	.11
Developmental English	2.6%	2.8%	0.14	.01
Previous Degree	9.6%	9.8%	0.09	.01

Note: * p < 0.05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.

While most Healthcare students (37.3%) indicated being unsure about their intentions for pursing credentials, sizeable groups indicated that their intention was preparation for job market entry (25.2%) or transferring to college/university (14.3%). Students' intentions for pursuing credentials in Healthcare programs differed significantly across treatment and control cohorts (see Table 55). Specifically, students in the treatment cohorts were significantly less likely than those in the control cohorts to be exploring courses to decide on a career or taking courses to improve skills for their current job. However, students in the treatment cohorts were significantly

more likely than those in the control cohorts to be preparing to enter the job market or preparing to transfer to college/university.

Table 55. *Healthcare: Student Intentions for Pursuing Credentials*

Students' Intentions	Control ($n = 2696$)	Treatment ($n = 2792$)	χ^2	ϕ
Explore courses to decide on career	2.3%	1.5%	4.28*	.03
Improve skills for current job	2.8%	1.9%	5.51*	.03
Meet certification/licensure requirements	11.4%	9.7%	3.76	.03
Preparing for career change	4.8%	4.0%	1.77	.02
Preparing to enter job market	23.3%	27.0%	10.43*	.04
Self-improvement	2.4%	2.2%	0.31	.01
Personal reasons	1.6%	1.9%	0.93	.01
Preparing to transfer	13.2%	15.4%	5.22*	.03
Undecided/other	38.3%	36.3%	2.34	.02

Note: * p < 0.05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.

Collapsing over programs, credential completion rates within Healthcare programs differed significantly across treatment and control cohorts. As shown in Table 56, students in the control cohorts were slightly more than 2.5 times more likely to complete an Associate's degree than were students in the treatment cohorts. Alternatively, students in the treatment cohorts were slightly more than 3 times as likely as students in the control cohorts to complete diplomas in healthcare programs.

Table 56. *Healthcare: Overall Credential Completion*

Credential	Control ($n = 2696$)	Treatment ($n = 2792$)	χ^2	ϕ
Associate's Degree	28.0%	13.1%	185.40*	.18
Program Certificate	0.1%	0.0%	a	.02
Program Diploma	8.2%	22.0%	201.46*	.19

Note: * *p* < .05; ϕ < .10 reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Nursing

Data were provided for multiple treatment cohorts (IHUM; $n = 958$) and multiple control cohorts (Non-IHUM; $n = 1693$) pursuing Nursing credentials. IHUM cohorts enrolled in the fall semesters of 2015 and 2016, as well as in the spring semester of 2016. Contemporaneous cohorts of Non-IHUM students were available for each of the three IHUM student semesters. In addition, two control cohorts enrolled in fall semesters 2013 and 2014 were available to conduct within school comparisons. As shown in Table 57 below, Non-IHUM cohorts in nursing programs during 2016 were exceptionally small and inappropriate for comparison purposes. Historic comparisons between pre-IHUM students in Fall 2013 and 2014 and IHUM students in Fall 2015 were possible, as was a descriptive analysis of IHUM nursing students who first enrolled in Fall 2016.

Table 57. *Nursing: Treatment and Control Cohorts*

Cohort Academic Term	Non-IHUM n	IHUM n	Comparison
Fall 2013	468	0	Against IHUM Fall 2015
Fall 2014	622	0	Against IHUM Fall 2015
Fall 2015	596	730	Non-IHUM vs. IHUM
Spring 2016	3	148	None: Description Only
Fall 2016	4	80	None: Description Only

Comparison of the two Pre-IHUM control cohorts indicated that the groups of students were reasonably similar but with a few important exceptions. Students in the fall 2014 cohort were significantly more likely than fall 2013 students to be pursuing nursing credentials to meet certification requirements in a current job or for self-improvement reasons. In addition, fall 2014 students were significantly more likely than fall 2013 students to have completed either an Associate's degree or a nursing program diploma. Finally, earlier students from the fall 2013 cohort were significantly more likely than their later peers to be pursuing credentials in preparation to enter the job market. Given the nature of these differences, the two Pre-IHUM cohorts were not combined in to a single comparison group. Rather, the first IHUM cohort of nursing students was compared to both Pre-IHUM groups simultaneously using group contrasts via Analysis of Variance (ANOVA) and logistic regression methods for continuous and binary outcomes, respectively.

Students in the IHUM cohort who first enrolled in fall 2015 were significantly younger ($M = 27.54$, $SD = 8.46$) on average than the students who first enrolled in fall 2013 ($M = 29.00$, $SD = 9.01$), $p = .012$. However, Pre-IHUM students who first enrolled in fall 2014 were neither younger ($p = .110$) nor older ($M = 28.48$, $SD = 8.48$; $p = .593$) than students in either the Pre-IHUM fall 2013 or IHUM fall 2015 groups. As shown in Table 58, Pre-IHUM students enrolled in fall 2014 were significantly less likely than their fall 2015 peers to have completed a developmental English course or to have completed a previous degree.

Table 58. *Nursing: Pre-IHUM vs. IHUM Demographic Comparisons*

Demographic Characteristic	Pre-IHUM Fall 2013 (*n* = 468)	Pre-IHUM Fall 2014 (*n* = 622)	IHUM Fall 2015 (*n* = 730)
Female	89.1%	88.7%	88.6%
White	83.8%	83.3%	81.6%
Disabled	3.6%	3.1%	4.1%
Developmental Math	4.3%	4.5%	4.9%
Developmental English	1.5%	1.3%[a]	3.0%
Previous Degree	13.5%	11.4%[a]	17.0%

Note: [a] Proportion differs significantly from that of the fall 2015 IHUM cohort at $p < .05$.

Table 59. *Nursing: Pre-IHUM vs. IHUM Student Intentions for Pursuing Credentials*

Student Intentions	Pre-IHUM Fall 2013 (*n* = 468)	Pre-IHUM Fall 2014 (*n* = 622)	IHUM Fall 2015 (*n* = 730)
Explore courses to decide on career	0.6%	1.4%	1.6%
Improve skills for current job	4.7%	4.7%	3.2%
Meet certification/licensure requirements	9.0%	15.4%[a]	10.4%
Preparing for career change	5.3%	4.8%	3.3%
Preparing to enter job market	34.6%[a]	24.6%	27.0%
Self-improvement	1.9%	4.0%[a]	1.9%
Personal reasons	1.3%	1.1%	1.9%
Preparing to transfer	10.7%[a]	14.3%	16.3%
Undecided/other	31.8%	29.6%	34.4%

Note: [a] Proportion differs significantly from that of the fall 2015 IHUM cohort at $p < .05$.

Student intentions for pursuing nursing credentials were generally similar over time both before and after IHUM programming implementation (see Table 59). Although some significant differences did emerge, the patterns were not consistent across cohorts. For example, students in the fall 2014 Pre-IHUM cohort were significantly more likely than the IHUM students in fall 2015 to pursuing credentials to meet licensure or certification requirement. However, no such difference emerged between the fall 2015 IHUM cohort and the earliest Non-IHUM cohort in fall 2013. Similarly, those in the earliest cohort were significantly more likely to be pursuing nursing credentials to enter the job market but no such difference emerged between the 2014 and 2015 cohorts. Perhaps the only consistent developmental pattern to emerge among student intentions involves preparation to transfer to college/university where the proportion of students

with such intentions increased each year to the point where the rate among the IHUM cohort in 2015 was significantly higher than the rate two years earlier prior to IHUM implementation.

Rates of credential completion in nursing programs also differed before and after IHUM program implementation. As shown in Table 60 below, students in the first IHUM cohort in fall 2015 were significantly more likely to complete their Associate's degree than students two years earlier but significantly less likely to complete their degree than students just one year earlier in fall 2014. Although no students completed certificates, rates of diploma completion did increase over time such that students in the first IHUM cohort were significantly more likely to complete a diploma than were students in the previous year.

Table 60. *Nursing: Pre-IHUM vs. IHUM Credential Completion*

Credential	Pre-IHUM Fall 2013 ($n = 468$)	Pre-IHUM Fall 2014 ($n = 622$)	IHUM Fall 2015 ($n = 730$)
Associate's Degree	28.6%[a]	64.8%[a]	50.3%
Program Certificate	0.0%	0.0%	0.0%
Program Diploma	0.0%	3.5%[a]	10.8%

Note: [a] Proportion differs significantly from that of the fall 2015 IHUM cohort at $p < .05$.

Comparing IHUM and Non-IHUM Students

Students enrolled in IHUM nursing programs were significantly older ($M = 27.54$, $SD = 8.46$), on average, than students enrolled in Non-IHUM nursing programs ($M = 26.18$, $SD = 8.00$) during the same period, $t_{(1324)} = 2.99$, $p = .003$. While the difference in age was statistically significant, the magnitude of the difference was rather small ($g_{Hedges} = 0.17$). As shown in Table 61 below, students in IHUM nursing programs, relative to their Non-IHUM nursing peers, were also significantly less likely to have completed a developmental math course but significantly more likely to have completed a previous degree.

Table 61. *Nursing: IHUM vs. Non-IHUM Demographic Characteristics (Fall 2015)*

Demographic Characteristic	Non-IHUM ($n = 596$)	IHUM ($n = 730$)	χ^2	ϕ
Female	87.4%	88.6%	0.46	.02
White	77.3%	81.6%	3.74	.05
Disabled	6.0%	4.1%	2.59	.04
Developmental Math	15.9%	4.9%	44.66[*]	.18
Developmental English	3.0%	3.0%	---	---
Previous Degree	11.7%	17.0%	7.22[*]	.07

Note: [*] $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

In comparison to their Non-IHUM nursing program peers, students in IHUM programs were significantly more likely to be improving skills for a current job. Alternatively, Non-IHUM students were significantly more likely to be pursuing credentials for exploratory purposes or to be undecided about their intentions (see Table 62).

Table 62. *Nursing: Student Intentions for Pursuing Credentials (Fall 2015)*

Students' Intentions	Non-IHUM (n = 596)	IHUM (n = 730)	χ^2	ϕ
Explore courses to decide on career	3.7%	1.6%	5.51*	.06
Improve skills for current job	1.3%	3.2%	*b	.06
Meet certification/licensure requirements	8.9%	10.4%	0.86	.03
Preparing for career change	3.7%	3.3%	0.16	.01
Preparing to enter job market	23.0%	27.0%	2.79	.05
Self-improvement	1.3%	1.9%	a	.02
Personal reasons	1.0%	1.9%	a	.04
Preparing to transfer	12.8%	16.3%	3.30	.05
Undecided/other	44.3%	34.4%	13.57*	.10

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

With regard to degree completion, IHUM students were significantly more likely than Non-IHUM students to complete either their Associate's degrees or a nursing diploma (see Table 63). Findings related to diploma completion should be interpreted cautiously due to the very low frequency of diploma completion in Non-IHUM nursing programs. However, findings suggest that students enrolled in IHUM nursing programs were approximately 1.75 times more likely to finish their Associate's degree than were students enrolled in Non-IHUM programs.

Table 63. *Nursing: Overall Credential Completion (Fall 2015)*

Credential	Non-IHUM (n = 596)	IHUM (n = 730)	χ^2	ϕ
Associate's Degree	36.4%	50.3%	25.59*	.14
Program Certificate	0.0%	0.0%	---	---
Program Diploma	0.5%	10.8%	*b	.21

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Assessing Differential Completion among IHUM Nursing Students

Initial examination of students in the fall 2015 IHUM cohort indicated that no student earned both a diploma and an Associate's degree. Therefore, subsequent analyses examining differential completion focused on three groups, including those who earned their Associate's degree, those who earned a diploma, and those who complete no credentials (see Table 63 above for proportions). As described earlier with regard to the pre- post-IHUM comparisons, analyses examining differential credential completion incorporated contrast tests in ANOVA and logistic models.

Students who completed a diploma, completed an Associate's degree, or completed no credentials did not differ significantly in terms of age, $F_{(2,727)} = 0.64$, $p = .529$. Rates of degree completion were also similar across many of the demographic characteristics for which data were available (see Table 64). Notably, students who completed their Associate's degrees were significantly less likely to have completed a developmental math course than those who did not earn any credential. Results are similar diploma earners of whom none completed a developmental math course. Of particular interest, those who completed any credential (diploma or Associate's) were significantly more likely to have completed a previous degree than those students who did not earn a nursing credential.

Table 64. *IHUM Nursing Students Characteristics by Degree Completion*

Demographic Characteristic	No Credential ($n = 284$)	Nursing Diploma ($n = 79$)	Nursing Associate's ($n = 367$)
Female	87.3%	89.9%	89.4%
White	79.2%	83.5%	83.1%
Disabled	4.9%	7.6%	2.7%
Developmental Math	10.9%	0.0%	1.4%[a]
Developmental English	7.7%	0.0%	0.0%
Previous Degree	7.4%	15.2%[a]	24.8%[a]

Note: [a] Proportion differs significantly from that of the group that earned no credential at $p < .05$.

Students who completed nursing credentials did differ from those who did not on multiple intention measures. As shown in Table 65 below, those students who completed nursing diplomas were significantly more likely to do so in order to prepare for a career change or to enter the job market. Alternatively, students who completed their Associate's degree were significantly more likely to do so in order to transfer to college/university. While not statistically significant, a similar pattern of elevate transfer intentions was observed for diploma earners as well. Students who complete either a diploma or an Associate's were significantly more likely to do so to meet certification or licensure requirements. Finally, and perhaps not surprisingly, students who did not earn a nursing credential were significantly more likely to be undecided or unsure about why they were pursuing nursing credentials than were students who earned either a nursing diploma or an Associate's degree.

Table 65. *IHUM Nursing Student Intentions by Degree Completions*

Student Intentions	No Credential (*n* = 284)	Nursing Diploma (*n* = 79)	Nursing Associate's (*n* = 367)
Explore courses to decide on career	1.1%	1.3%	2.2%
Improve skills for current job	4.6%	0.0%	2.7%
Meet certification/licensure requirements	6.7%	15.2%[a]	12.3%[a]
Preparing for career change	1.8%	7.6%[a]	3.5%
Preparing to enter job market	23.6%	36.7%[a]	27.5%
Self-improvement	1.8%	3.8%	1.6%
Personal reasons	2.8%	1.3%	1.4%
Preparing to transfer	12.7%	16.5%	19.1%[a]
Undecided/other	45.1%	17.7%[a]	29.7%[a]

Note: [a] Proportion differs significantly from that of the group that earned no credential at *p* < .05.

Employment and Earnings Impacts among IHUM Nursing Students

Of the 730 students in the fall 2015 IHUM cohort, wage and employment data were available for 558 (76.4%). As shown in Table 66 below, proportions of students employed prior to enrollment were very similar between the groups who would eventually complete or not complete their degrees. However, employment rates demonstrated an approximately 8-10% increase in the six months after the end of the program among students who completed nursing credentials, such that those who completed credentials were significantly more likely to be employed six months later than were those who did not complete nursing credentials.

Table 66. *IHUM Nursing Students Employed Before and After Program*

Employment	No Credential (*n* = 204)	Nursing Diploma (*n* = 65)	Nursing Associate's (*n* = 289)
12 Months Prior	77.0%	75.4%	77.5%
9 Months Prior	76.0%	69.2%	72.0%
6 Months Prior	75.5%	76.9%	70.9%
3 Months Prior	78.4%	80.0%	73.7%
3 Months After	78.9%	92.3%[a]	88.6%[a]
6 Months After	78.4%	86.2%	86.2%[a]

Note: [a] Proportion differs significantly from that of the group that earned no credential at *p* < .05.

Consistent with higher likelihood of employment following degree completion, students who earned nursing credentials also earned more income, on average, than did students who did not finish their credential. As shown in Table 67, and graphically in Figure 49, students did not differ in average income three months prior to program enrollment, $F_{(2, 555)} = 2.17$, $p = .116$. Impacts reflected in differential earnings were evidence within three months after program completion, $F_{(2, 555)} = 60.61$, $p < .001$. Within three months of program completion, those who completed a diploma were earning significantly more than those without credentials ($p < .001$) as were those who completed their Associate's degree ($p < .001$). In addition, those who completed their Associate's degree were also significantly out-earning their colleagues with diplomas ($p = .036$). At six months after program completion, credential earners were still earning significantly more than their non-credentialed peers [$F_{(2, 555)} = 68.60$, $p < .001$] but earnings between those with a diploma and those with an Associate's had become roughly equal ($p = .234$).

Table 67. *IHUM Nursing Students Earnings Before and After Program*

Earnings Period	No Credential (n = 204)		Nursing Diploma (n = 65)		Nursing Associate's (n = 289)	
	M	*SD*	*M*	*SD*	*M*	*SD*
12 Months Prior	3498.54	3737.60	2876.56	2920.80	3247.15	3256.59
9 Months Prior	3370.35	3774.48	3129.10	3095.89	2867.07	3238.39
6 Months Prior	3444.11	3786.25	3131.22	2708.19	2832.53	3347.67
3 Months Prior	3530.84[a]	3817.90	3123.76[a]	2576.01	2883.35[a]	3253.91
3 Months After	4998.70[a]	4429.62	8417.18[b]	4343.54	9990.55[c]	5438.24
6 Months After	5105.37[a]	4924.25	9616.91[b]	5067.16	10785.25[b]	5702.75

Note: Values with different subscripts differ significantly at $p < .05$
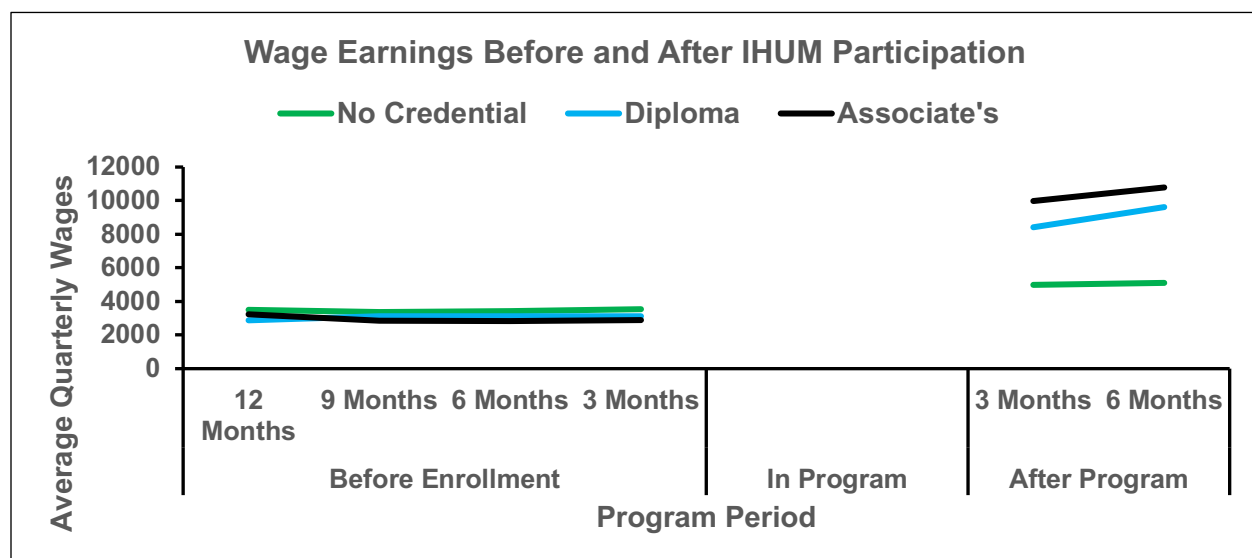
Figure 49. Average Wage Earnings for IHUM Nursing Students

Description of IHUM 2016 Cohorts

In addition to the initial IHUM nursing cohort presented above, two additional cohorts were available for examination. Although the two remaining cohorts reflect unique IHUM nursing program students, comparison groups of Non-IHUM students also pursuing nursing credentials were not available. Therefore, the information below serves only to describe the most recent IHUM cohorts and compare them to one another in a descriptive manner to identify potential trends moving forward. The spring 2016 cohort was similar in age to previous IHUM and Non-IHUM cohorts described above. However, IHUM students enrolled in nursing programs in fall 2016 are significantly younger ($M = 24.94$, $SD = 7.17$), on average, than student who enrolled the prior semester ($M = 27.27$, $SD = 8.66$), $t_{(226)} = 2.06$, $p = .041$. As shown in Table 68, the two most recent IHUM cohorts available do not differ across any of the demographic characteristics and student intention items. Interestingly, the primary student intention, across both groups of students, for pursuing credentials in nursing is to prepare for entry into the job market. Although none of the students in these cohorts had completed an Associate's degree at the time these data were compiled, rates of nursing diploma completion were quite high for both the spring 2016 and fall 2016 students. In comparison to previous cohorts of both IHUM and Non-IHUM, the rate of diploma completion appears to be increasing among students in 2016. In fact, diploma completion rates were significantly higher among IHUM students enrolled in fall 2016 than among students enrolled in IHUM nursing programs one semester earlier.

Table 68. *Nursing: Demographic Characteristics, Student Intentions and Credential Completion*

Demographic Characteristic Student Intention Nursing Credential	IHUM Spring 2016 ($n = 148$)	IHUM Fall 2016 ($n = 80$)	χ^2	ϕ
Female	90.5%	87.5%	0.51	.05
White	84.5%	82.5%	0.15	.03
Disabled	4.1%	3.8%	[a]	.01
Developmental Math	1.4%	0.0%	[a]	.07
Developmental English	0.0%	0.0%	---	---
Previous Degree	17.6%	8.8%	[a]	.12
Explore courses to decide on career	1.4%	1.3%	[a]	.01
Improve skills for current job	0.7%	0.0%	[a]	.01
Meet certification/licensure requirements	10.1%	17.5%	2.54	.11
Preparing for career change	6.8%	5.0%	[a]	.04
Preparing to enter job market	43.2%	41.3%	0.08	.02

Demographic Characteristic Student Intention Nursing Credential	IHUM Spring 2016 ($n = 148$)	IHUM Fall 2016 ($n = 80$)	χ^2	ϕ
Self-improvement	2.7%	3.8%	a	.03
Personal reasons	2.0%	0.0%	a	.09
Preparing to transfer	18.9%	10.0%	a	.12
Undecided/other	14.2%	21.3%	1.86	.09
Associate's Degree	0.0%	0.0%	---	---
Program Certificate	0.0%	0.0%	---	---
Program Diploma	68.2%	90.0%	*b	.24

Note: $*$ $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Practical Nursing

As with nursing programs examined above, data were also available for multiple treatment cohorts (IHUM; $n = 1834$) and multiple control cohorts (Non-IHUM; $n = 995$) of students pursuing Practical Nursing credentials. IHUM cohorts enrolled in the fall semesters of 2015 and 2016, as well as in the spring semester of 2016. Contemporaneous cohorts of Non-IHUM students were available for each of the three IHUM student semesters. In addition, one control cohort enrolled in the fall semester of 2014 was available to conduct within school comparisons. Initial comparisons of the three Non-IHUM control cohorts revealed no significant differences on any of the demographic, intention, or credential completion measures assessed (all ps > .08), suggesting that the three cohorts could be combined into a single Non-IHUM comparison group. Alternatively, the three IHUM cohorts did differ significantly on multiple indices and differences were spread across each cohort pair indicating that the IHUM cohorts should not be combined into groups. Given the differences between IHUM cohorts, comparisons were conducted for each set of contemporaneous cohorts instead of against a combined Non-IHUM group. Table 69 below indicates the set of comparisons made to examine IHUM programming impacts among Practical Nursing students.

Table 69. *Nursing: Treatment and Control Cohorts*

Cohort Academic Term	Non-IHUM n	IHUM n	Comparison
Fall 2014	620	0	Against IHUM Fall 2015
Fall 2015	102	478	Non-IHUM vs. IHUM
Spring 2016	190	881	Non-IHUM vs. IHUM
Fall 2016	83	475	Non-IHUM vs. IHUM

Table 70. *Practical Nursing: Pre-IHUM vs. IHUM Demographic Comparisons*

Demographic Characteristic	Pre-IHUM Fall 2014 ($n = 620$)	IHUM Fall 2015 ($n = 478$)	χ^2	ϕ
Female	90.2%	86.0%	4.58[*]	.07
White	82.6%	74.3%	11.23[*]	.10
Disabled	2.4%	3.1%	0.53	.02
Developmental Math	20.5%	6.9%	39.99[*]	.19
Developmental English	5.6%	4.0%	1.61	.04
Previous Degree	3.5%	5.0%	1.46	.04

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.

Students enrolled in practical nursing programs prior to IHUM implantation were approximately the same age ($M = 25.36$, $SD = 7.75$), on average, as students that enrolled in the same programs the following year ($M = 25.49$, $SD = 7.52$) during implementation of IHUM programming, $t_{(1096)} = 0.30$, $p = .768$. As shown in Table 70 above, IHUM students were significantly less likely to be women and significantly less likely to be white than practical nursing students who enrolled prior to IHUM implementation. Of particular interest, students who enrolled in practical nursing programs prior to IHUM implementation were nearly 3.5 times more likely to have completed a developmental math course than their peers who enrolled one year later.

Table 71. *Practical Nursing: Pre-IHUM vs. IHUM Student Intentions for Pursuing Credentials*

Students' Intentions	Pre-IHUM Fall 2014 ($n = 620$)	IHUM Fall 2015 ($n = 478$)	χ^2	ϕ
Explore courses to decide on career	2.9%	1.5%	a	.05
Improve skills for current job	1.8%	0.8%	a	.04
Meet certification/licensure requirements	10.2%	5.6%	7.31[*]	.08
Preparing for career change	2.6%	3.6%	0.88	.03
Preparing to enter job market	19.8%	25.3%	4.68[*]	.07
Self-improvement	1.5%	1.9%	a	.02
Personal reasons	2.3%	2.1%	0.04	.01
Preparing to transfer	16.0%	12.8%	2.23	.05
Undecided/other	43.1%	46.4%	1.25	.03

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Practical Nursing students enrolled before and after IHUM implementation did not differ substantially in their intentions to pursue credentials (see Table 71). Those enrolled prior to IHUM implementation were significantly more likely to do so in order to meet certification/licensure requirements, whereas those enrolled after IHUM implementation were significantly more likely to be preparing to enter the job market. Although statistically significant, both differences were relatively small. In both groups of students, the majority indicated being unsure or undecided about their intentions to pursue practical nursing credentials.

Credential completion rates were nearly identical among Pre-IHUM and IHUM students with regard to earning program diplomas. No students completed Associate's degrees or program certificates (see Table 72).

Table 72. *Practical Nursing: Pre-IHUM vs. IHUM Credential Completion*

Credential	Pre-IHUM Fall 2014 ($n = 620$)	IHUM Fall 2015 ($n = 478$)	χ^2	ϕ
Associate's Degree	0.0%	0.0%	---	---
Program Certificate	0.0%	0.0%	---	---
Program Diploma	26.0%	25.3%	0.06	.01

Note: $* p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.

Comparing IHUM and Non-IHUM Groups

Non-IHUM students enrolled in Practical Nursing programs were significantly older (M = 28.90, SD = 11.53), on average, than students enrolled in IHUM programs across all three academic terms being compared (see Table 73).

Table 73. *Practical Nursing: IHUM vs. Non-IHUM Student Ages*

Academic Term	Non-IHUM			IHUM			t	g
	M	SD	n	M	SD	n		
Fall 2015	28.90	11.53	102	25.49	7.52	478	2.86*	0.41
Spring 2016	28.04	9.64	190	25.89	7.27	881	2.90*	0.28
Fall 2016	29.57	11.01	83	25.66	7.56	475	3.30*	0.48

As shown in Table 74 below, students pursuing Practical Nursing credentials in IHUM and Non-IHUM programs were very similar in terms of demographic characteristics. There was a consistent trend across cohorts in which IHUM students were less likely to be white than Non-IHUM students but this difference was statistically significant only in the spring 2016 cohort. Although not consistently significant, the difference was generally consistent in magnitude reflecting an approximate 8% difference across the three academic terms. The only other consistent difference involved a higher likelihood of IHUM students having completed a

developmental English course in both fall 2015 and spring 2016. It is important to note that this pattern was not evident in the most recent cohort and in both previous academic terms, the overall frequency of Non-IHUM students completing a developmental English class was exceptionally small.

Table 74. *Practical Nursing: IHUM vs. Non-IHUM Demographic Characteristics*

Cohort	Demographic Characteristic	Non-IHUM (n = 102)	IHUM (n = 478)	χ^2	ϕ
Fall 2015					
	Female	92.2%	86.0%	a	.07
	White	82.4%	74.3%	2.99	.07
	Disabled	4.9%	3.1%	a	.04
	Developmental Math	6.9%	6.9%	a	.01
	Developmental English	0.0%	4.0%	*b	.09
	Previous Degree	4.9%	5.0%	a	.01
	Demographic Characteristic	Non-IHUM (n = 190)	IHUM (n = 881)	χ^2	ϕ
Spring 2016					
	Female	88.9%	87.6%	0.26	.02
	White	82.6%	75.9%	3.97*	.06
	Disabled	4.2%	3.5%	a	.01
	Developmental Math	5.8%	7.2%	0.45	.02
	Developmental English	0.5%	3.5%	*b	.07
	Previous Degree	10.0%	7.7%	1.09	.03
	Demographic Characteristic	Non-IHUM (n = 83)	IHUM (n = 475)	χ^2	ϕ
Fall 2016					
	Female	91.6%	88.6%	a	.03
	White	79.5%	70.9%	2.59	.07
	Disabled	3.6%	1.7%	a	.05
	Developmental Math	3.6%	1.9%	a	.04
	Developmental English	1.2%	1.1%	a	.01
	Previous Degree	7.2%	5.5%	a	.01

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Intentions for pursuing Practical Nursing credentials did differ considerably across IHUM and Non-IHUM students but the differences were also largely specific to academic terms (see Table 75). Pursuing credentials to meet licensure/certification requirements or to prepare for a career change was more common among Non-IHUM students. In all three academic periods, Non-IHUM students were significantly more likely than IHUM students to indicate that they were preparing for a career change. In two of the academic terms (fall 2015 and fall 2016), Non-IHUM students were also significantly more likely to be attempting to meet certification requirements, though this pattern was not evident in the spring 2016 cohort. In the latter two cohorts, IHUM students were more likely to be preparing to transfer to college/university but only significantly so in spring 2016. In terms of dramatic changes over time, the most recent IHUM cohort saw a large increase in the proportion of students preparing to enter the job market and a correspondingly large decrease in the proportion of students who were unsure or undecided about their intentions for pursuing Practical Nursing credentials.

Table 75. *Practical Nursing: IHUM vs. Non-IHUM Student Intentions for Pursuing Credentials*

Cohort	Student Intentions	Non-IHUM ($n = 102$)	IHUM ($n = 478$)	χ^2	ϕ
Fall 2015					
	Explore courses to decide on career	2.0%	1.5%	a	.01
	Improve skills for current job	2.0%	0.8%	a	.04
	Meet certification/licensure requirements	15.7%	5.6%	12.34[*]	.15
	Preparing for career change	9.8%	3.6%	7.39[*]	.11
	Preparing to enter job market	16.7%	25.3%	3.47	.08
	Self-improvement	4.9%	1.9%	a	.08
	Personal reasons	1.0%	2.1%	a	.03
	Preparing to transfer	11.8%	12.8%	0.08	.01
	Undecided/other	36.3%	46.4%	3.52	.08
	Student Intentions	Non-IHUM ($n = 190$)	IHUM ($n = 881$)	χ^2	ϕ
Spring 2016					
	Explore courses to decide on career	2.1%	1.4%	a	.02

Cohort	Student Intentions	Non-IHUM (n = 102)	IHUM (n = 478)	χ^2	ϕ
	Improve skills for current job	1.6%	1.5%	a	.01
	Meet certification/licensure requirements	12.1%	11.6%	0.04	.01
	Preparing for career change	7.9%	3.3%	8.41*	.09
	Preparing to enter job market	13.7%	19.4%	3.41	.06
	Self-improvement	3.2%	1.7%	a	.04
	Personal reasons	2.6%	2.0%	a	.02
	Preparing to transfer	8.4%	15.8%	6.83*	.08
	Undecided/other	48.4%	43.4%	1.62	.04

Cohort	Student Intentions	Non-IHUM (n = 83)	IHUM (n = 475)	χ^2	ϕ
Fall 2016	Explore courses to decide on career	3.6%	1.7%	a	.05
	Improve skills for current job	1.2%	2.3%	a	.03
	Meet certification/licensure requirements	15.7%	8.0%	5.00*	.10
	Preparing for career change	12.0%	6.1%	3.84*	.08
	Preparing to enter job market	6.0%	35.6%	*b	.23
	Self-improvement	4.8%	3.6%	a	.02
	Personal reasons	3.6%	1.7%	a	.05
	Preparing to transfer	8.4%	15.6%	a	.07
	Undecided/other	44.6%	25.5%	12.71*	.15

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Completion of Associate's degrees and program certificates was largely not observed in any of the three comparison cohorts, with the exception of two students who completed certificates in fall 2016 that were not connected to IHUM programming. Completion of Practical Nursing diplomas was reasonably consistent across academic terms for both IHUM and Non-IHUM students (see Table 76). Importantly, the difference in completion rates was also consistent across academic terms with IHUM students completing diplomas at significantly higher rates than their Non-IHUM peers.

Table 76. *Practical Nursing: IHUM vs. Non-IHUM Credential Completion*

Cohort	Credential	Non-IHUM ($n = 102$)	IHUM ($n = 478$)	χ^2	ϕ
Fall 2015					
	Associate's Degree	0.0%	0.0%	---	---
	Program Certificate	0.0%	0.0%	---	---
	Program Diploma	9.8%	25.3%	11.57[*]	.14
	Credential	Non-IHUM ($n = 190$)	IHUM ($n = 881$)	χ^2	ϕ
Spring 2016					
	Associate's Degree	0.0%	0.0%	---	---
	Program Certificate	0.0%	0.0%	---	---
	Program Diploma	7.4%	17.6%	12.30[*]	.11
	Credential	Non-IHUM ($n = 83$)	IHUM ($n = 475$)	χ^2	ϕ
Fall 2016					
	Associate's Degree	0.0%	0.0%	---	---
	Program Certificate	2.4%	0.0%	[*b]	.14
	Program Diploma	8.4%	17.9%	[*b]	.09

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership. [a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Employment and Earnings Impacts among IHUM Practical Nursing Students

Of the 1,834 students in the three IHUM cohorts, wage and employment data were available for 1399 (76.3%). As shown in Tables 77-79 below, proportions of students employed prior to enrollment were again very similar between the groups who would eventually complete or not complete their degrees, reaching approximate equality within three months prior to program enrollment. Employment rates immediately after program completion were consistently high across student cohorts but rates of employment did not consistently differ as a function of

credential completion. Although Practical Nursing students enrolled in spring 2016 who completed their diplomas were significantly more likely to be employed within three months after earning their credentials, this pattern was not observed in the other two cohorts.

Table 77. *IHUM Practical Nursing Students Employed Before and After Program (Fall 2015)*

Employment	Not Complete (*n* = 268)	Complete (*n* = 100)	χ^2	ϕ
12 Months Prior	71.6%	81.0%	3.30	.10
9 Months Prior	70.5%	82.0%	4.94[*]	.12
6 Months Prior	70.9%	79.0%	2.43	.08
3 Months Prior	78.0%	82.0%	0.71	.04
3 Months After	81.7%	85.0%	0.55	.04
6 Months After	78.0%	81.0%	0.40	.03

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Table 78. *IHUM Practical Nursing Students Employed Before and After Program (Spring 2016)*

Employment	Not Complete (*n* = 563)	Complete (*n* = 110)	χ^2	ϕ
12 Months Prior	74.1%	78.2%	0.83	.04
9 Months Prior	78.7%	81.8%	0.55	.03
6 Months Prior	80.8%	82.7%	0.22	.02
3 Months Prior	76.9%	79.1%	0.25	.02
3 Months After	82.2%	90.9%	5.06[*]	.09
6 Months After	80.5%	85.5%	1.51	.05

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Table 79. *IHUM Practical Nursing Students Employed Before and After Program (Fall 2016)*

Employment	Not Complete ($n = 284$)	Complete ($n = 74$)	χ^2	ϕ
12 Months Prior	78.2%	89.2%	4.53[*]	.11
9 Months Prior	78.9%	78.4%	0.01	.01
6 Months Prior	79.6%	75.7%	0.43	.04
3 Months Prior	84.2%	86.5%	0.25	.03
3 Months After	84.5%	83.8%	0.23	.01
6 Months After	82.8%	85.1%	0.24	.03

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Although rates of employment after program completion did not differ as a function of earning a credential, average earnings suggest a positive benefit of completing the Practical Nursing diploma. As shown in Tables 80-81, those who would eventually complete their diploma earned significantly (and substantially) more on average at both three and six months after program completion. For those students enrolled in fall 2015 (see Figure 50), average wages did not differ in the three months prior to program enrollment. While average wages did differ three months prior to program enrollment for students in spring 2016 (see Figure 51), those who would not finish their credential were actually earning more than those who would finish, making the differential wage gains even more impressive for the spring 2016 cohort. Surprisingly, average wages did not differ, either before enrollment or after program completion for students in the fall 2016 cohort (see Table 82 and Figure 52). This finding is somewhat surprising given that the fall 2016 student overwhelming indicated intentions to complete their credential and enter the job market.

Table 80. *IHUM Practical Nursing Students Earnings Before and After Program (Fall 2015)*

| Earnings Period | Not Complete (*n* = 268) | | Complete (*n* = 100) | | *t* | *g* |
	M	SD	M	SD		
12 Months Prior	2852.42	2986.26	3595.09	3316.64		
9 Months Prior	2749.45	3048.55	3428.59	2961.51		
6 Months Prior	2811.79	2912.58	3570.57	2908.36		
3 Months Prior	2946.06	2865.41	3499.33	2752.80	1.67	0.20
3 Months After	4265.37	3732.79	6540.88	4637.52	4.40*	0.57
6 Months After	4775.42	4585.23	8093.18	5604.47	5.30*	0.68

Note: * *p* < .05; g = Hedges Adjusted d.

Figure 50. Average Wage Earnings for IHUM Practical Nursing Students (Fall 2015)

Table 81. *IHUM Practical Nursing Students Earnings Before and After Program (Spring 2016)*

Earnings Period	Not Complete (*n* = 563)		Complete (*n* = 110)		*t*	*g*
	M	*SD*	*M*	*SD*		
12 Months Prior	3130.13	3060.85	3540.02	2884.03		
9 Months Prior	3269.09	3055.71	3440.28	2705.64		
6 Months Prior	3382.95	3041.91	3376.60	3227.94		
3 Months Prior	3382.09	3194.52	2592.61	2801.63	2.64*	0.25
3 Months After	4329.16	3534.60	6474.58	4212.57	5.01*	0.59
6 Months After	4594.75	4172.02	7779.74	5390.84	5.86*	0.73

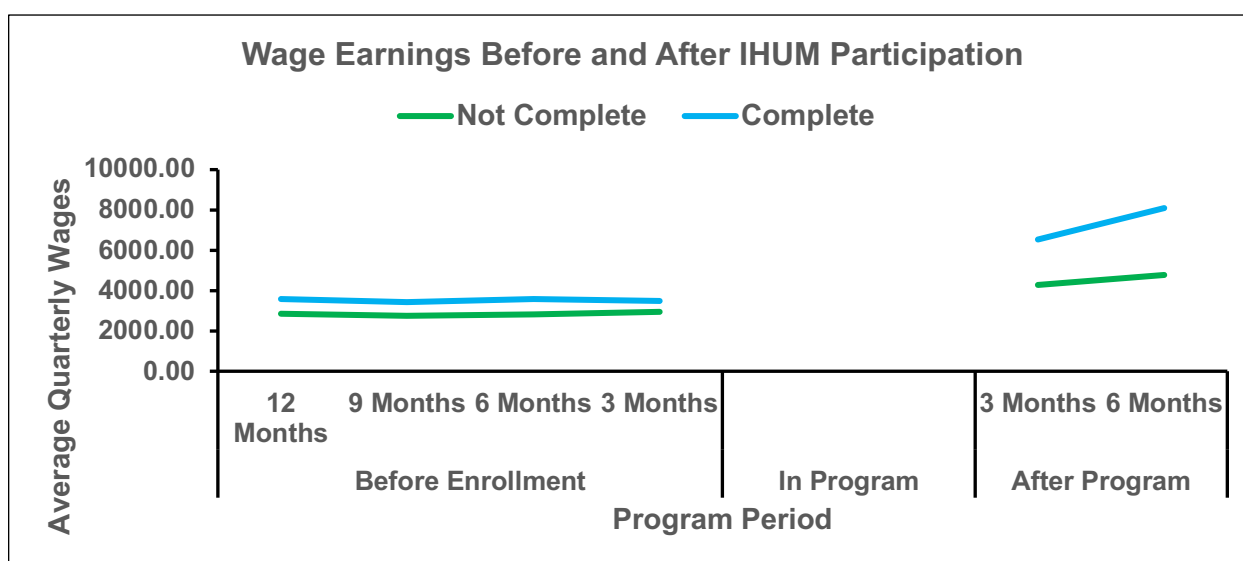*Note:* * $p < .05$; g = Hedges Adjusted d.
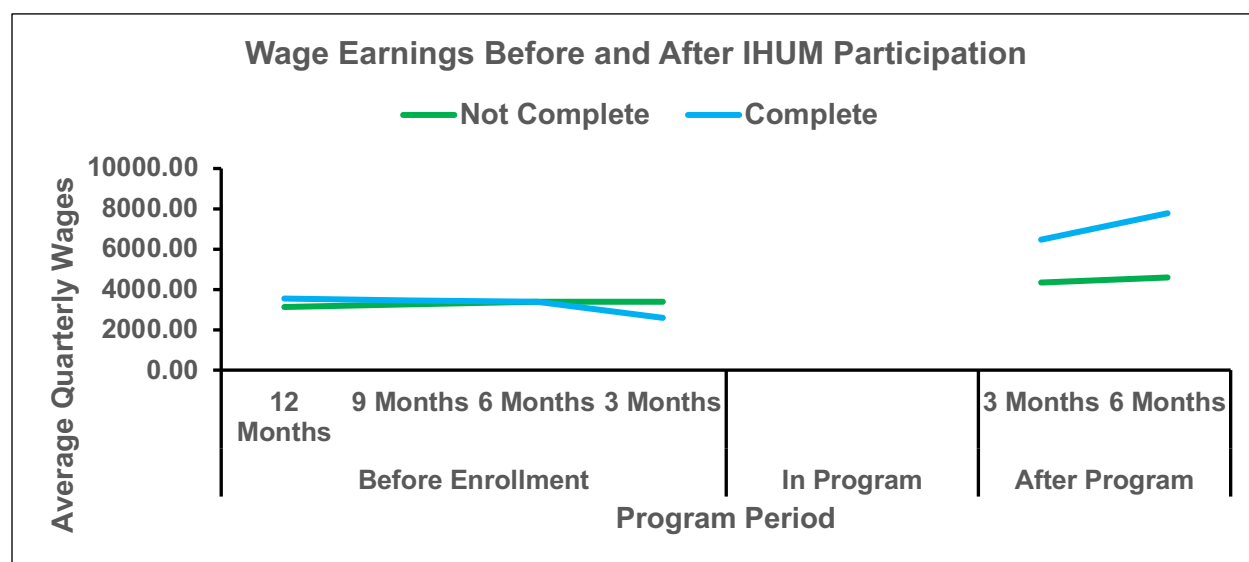
Figure 51. Average Wage Earnings for IHUM Practical Nursing Students (Spring 2016)

Table 82. *IHUM Practical Nursing Students Earnings Before and After Program (Fall 2016)*

Earnings Period	Not Complete (*n* = 284)		Complete (*n* = 74)		*t*	*g*
	M	*SD*	*M*	*SD*		
12 Months Prior	3306.19	3108.94	4227.45	3544.77		
9 Months Prior	3356.17	3423.50	3884.44	3610.24		
6 Months Prior	3042.74	3002.02	3358.42	3157.28		
3 Months Prior	3484.75	3196.69	3892.49	3231.57	0.98	0.13
3 Months After	3753.58	3284.85	3608.26	2845.51	0.35	0.05
6 Months After	3724.61	3297.77	4011.64	3598.08	0.65	0.09

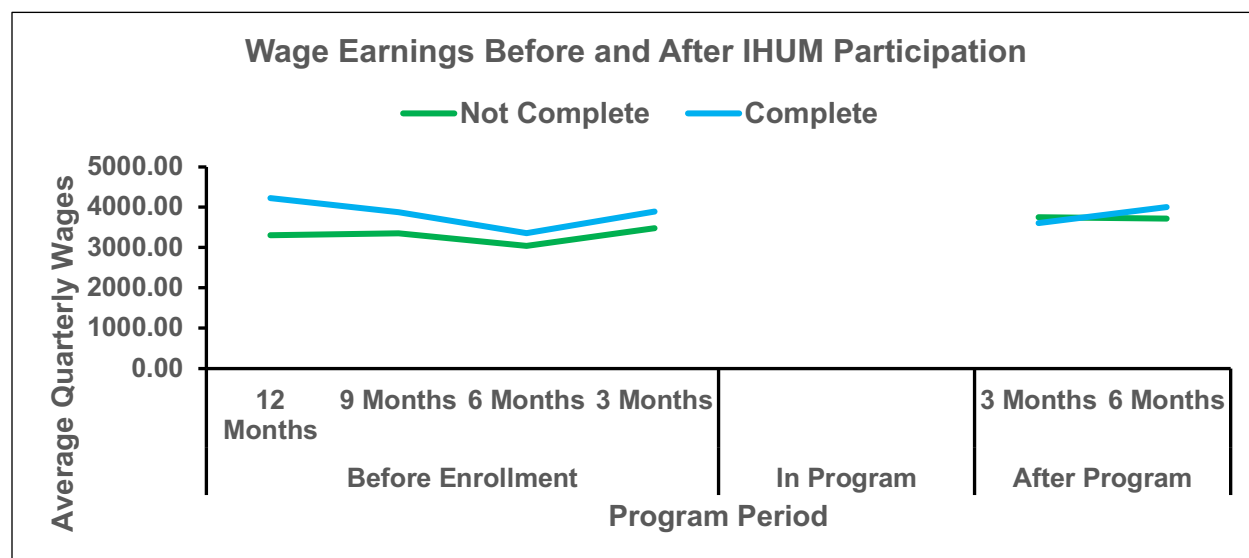*Note:* * *p* < .05; g = Hedges Adjusted d.

Figure 52. Average Wage Earnings for IHUM Practical Nursing Students (Fall 2016)

Utilities Sector

Students pursuing credentials in Utilities programs ($N = 180$) were men (99.4%) with only a single woman pursuing credentials in a Pre-IHUM Wind program during fall 2014. The majority of Utilities students were white (85.6%). Relative to the whole sample, disability rates were similar among Utilities students (4.4%). The proportions of Utilities students who had completed developmental math (8.3%) or English (1.1%) courses were slightly lower in comparison to the full sample. Finally, students in Utilities programs also tended to be younger in age, on average ($M = 21.84$, $SD = 6.04$), but approximately equally likely to have earned a previous degree (10.0%) relative to the full sample.

Across all Utilities programs and student cohorts, Associate's degrees were most commonly completed (20.0%; $n = 36$). Smaller numbers of students completed program diplomas (7.8%; $n = 14$) but no students completed certificates in Utilities programs.

Collapsing across Utilities programs and cohorts, those in the treatment cohorts were significantly younger ($M = 20.18$, $SD = 3.17$), on average, than those in the control cohorts ($M = 22.98$, $SD = 7.19$), $t_{(156.31)} = 3.56$, $p < .001$, with the difference corresponding to nearly half of a standard deviation ($g_{Hedges} = 0.48$). As shown in Table 83 below, treatment and control students did not differ significantly on any demographic characteristics, though the lack of observed differences should be interpreted in the context of very small cell sizes in many cases.

Table 83. *Utilities: Treatment and Control Group Characteristics*

Demographic Characteristic	Control ($n = 107$)	Treatment ($n = 73$)	χ^2	ϕ
Female	99.1	100.0	a	.06
White	82.2	90.4	a	.11
Disabled	3.7	5.5	a	.04
Developmental Math	8.4	8.2	a	.01
Developmental English	0.9	1.4	a	.02
Previous Degree	6.5	15.1	a	.14

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

The majority of Utilities students (46.1%%) indicated that their intention to pursue credentials centered on preparing to enter the job market. Although a sizeable proportion (29.4%) of students did indicate that they were uncertain or unsure about their intentions for pursuing Utilities credentials, the percentage of students was considerable lower than in other sectors. Students' intentions for pursuing credentials in Utilities programs generally did not differ significantly across treatment and control cohorts (see Table 84). However, students in the treatment cohorts were significantly less likely than those in the control cohorts to be uncertain or unsure about their intentions to pursue credentials in Utilities programs.

Table 84. *Utilities: Student Intentions for Pursuing Credentials*

Students' Intentions	Control (*n* = 107)	Treatment (*n* = 73)	χ^2	ϕ
Explore courses to decide on career	2.8%	0.0%	a	.11
Improve skills for current job	0.0%	1.4%	a	.09
Meet certification/licensure requirements	0.9%	2.7%	a	.07
Preparing for career change	5.6%	11.0%	a	.10
Preparing to enter job market	41.1%	43.4%	2.64	.12
Self-improvement	0.9%	5.5%	a	.14
Personal reasons	0.0%	2.7%	a	.07
Preparing to transfer	6.5%	11.0%	a	.08
Undecided/other	41.1%	12.3%	*b	.31

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Collapsing over programs, credential completion rates within Utilities programs differed across treatment and control cohorts. As shown in Table 85, students in the control cohorts were significantly more likely to complete an Associate's degree than were students in the treatment cohorts. Alternatively, students in the treatment cohorts were slightly more likely than students in the control cohorts to complete diplomas in Utilities programs but the difference did not achieve statistical significance.

Table 85. *Utilities: Overall Credential Completion*

Credential	Control (*n* = 107)	Treatment (*n* = 73)	χ^2	ϕ
Associate's Degree	28.0%	8.2%	*b	.24
Program Certificate	0.0%	0.0%	---	---
Program Diploma	5.6%	11.0%	a	.10

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Wind

Data were provided for multiple treatment cohorts (IHUM; $n = 48$) and multiple control cohorts (Non-IHUM; $n = 86$) pursuing Wind credentials. Once again, IHUM cohorts enrolled in the fall semesters of 2015 and 2016, as well as in the spring semester of 2016. Contemporaneous cohorts of Non-IHUM students were available for only the fall 2015 and spring 2016 semesters. In addition, two control cohorts enrolled in fall semesters 2013 and 2014 were available to conduct within school comparisons. As shown in Table 86 below, all cohorts in Wind programs were exceptionally small and inappropriate for isolated comparison purposes. Historic comparisons between pre-IHUM students in fall 2013 and 2014 and IHUM students in fall 2015 were also questionable due to the small size of the first IHUM cohort. In order to optimize subsample sizes for comparison purposes, cohorts were combined into Pre-IHUM (fall 2013/2014), IHUM (fall 2015/2016, spring 2016), and Non-IHUM (fall 2015, spring 2016) groups. While such collapsing across cohorts is necessary to justify comparisons of treatment and control groups, such aggregation necessarily limits the depth of comparisons possible and potentially confounds cohort differences within each of the comparison groups.

Table 86. *Wind: Treatment and Control Cohorts*

Cohort Academic Term	Non-IHUM n	IHUM n	Comparison
Fall 2013	28	0	Pre-IHUM combined against IHUM combined
Fall 2014	14	0	
Fall 2015	39	13	
Spring 2016	5	13	Non-IHUM combined against IHUM combined
Fall 2016	0	22	

Collapsing the Pre-IHUM groups resulted in a control sample of 42 students whereas combining the IHUM groups resulted in a treatment sample of 48 students. Students in the IHUM cohort ($M = 20.06$, $SD = 3.37$) did not differ from students in the Pre-IHUM cohort ($M = 21.43$, $SD = 4.96$) with regard to age, $t_{(88)} = 1.54$, $p = .013$. Pre-IHUM students were also similar to IHUM students on most demographic characteristics (see Table 87), with the exception of ethnicity. Students enrolled in IHUM Wind programs were significantly more likely to be white than students enrolled in Wind programs prior to IHUM implementation. Importantly, these findings should be considered in the context of the small samples involved in the comparison. For example, the statistically significant difference in ethnic composition reflects a raw count of 8 vs. 2 non-white individuals in the Pre-IHUM and IHUM groups, respectively.

Table 87. *Wind: Pre-IHUM vs. IHUM Demographic Comparisons*

Demographic Characteristic	Pre-IHUM ($n = 42$)	IHUM ($n = 48$)	χ^2	ϕ
Female	2.4%	0.0%	[a]	.11
White	81.0%	95.8%	*[b]	.24
Disabled	2.4%	4.2%	[a]	.05
Developmental Math	21.4%	12.5%	[a]	.12
Developmental English	0.0%	2.1%	[a]	.10
Previous Degree	4.8%	0.0%	[a]	.16

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Student intentions for pursuing Wind credentials were generally similar over time both before and after IHUM programming implementation (see Table 88). Overwhelmingly, students pursuing Wind program credentials were doing so with the intention to enter the job market and this intention was consistent across Pre-IHUM and IHUM implementation periods. Pre-IHUM students were slightly more likely than IHUM students to be preparing for a career change, whereas IHUM students were slightly more likely than Pre-IHUM students to be preparing to transfer to college/university. Although these trends are suggestive of possible changes in student motivation over time, neither difference achieved statistical significance.

Table 88. *Wind: Pre-IHUM vs. IHUM Student Intentions for Pursuing Credentials*

Students' Intentions	Pre-IHUM ($n = 42$)	IHUM ($n = 48$)	χ^2	ϕ
Explore courses to decide on career	4.8%	0.0%	[a]	.16
Improve skills for current job	0.0%	2.1%	[a]	.10
Meet certification/licensure requirements	2.4%	4.2%	[a]	.05
Preparing for career change	14.3%	10.4%	[a]	.06
Preparing to enter job market	61.9%	56.3%	0.30	.05
Self-improvement	2.4%	8.3%	[a]	.13
Personal reasons	0.0%	0.0%	---	---
Preparing to transfer	7.1%	12.5%	[a]	.09
Undecided/other	7.1%	6.3%	[a]	.02

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Rates of credential completion in Wind programs differed before and after IHUM program implementation. As shown in Table 89 below, students in Wind programs prior to IHUM implementation were significantly more likely to complete their Associate's degree than students enrolled in Wind programs after IHUM implementation. No students in the current sample completed certificates or diplomas in Wind programs either before or after IHUM implementation.

Table 89. *Wind: Pre-IHUM vs. IHUM Credential Completion*

Credential	Pre-IHUM ($n = 42$)	IHUM ($n = 48$)	χ^2	ϕ
Associate's Degree	42.9%	12.5%	*[b]	.34
Program Certificate	0.0%	0.0%	---	---
Program Diploma	0.0%	0.0%	---	---

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
  [a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Comparing IHUM and Non-IHUM Students

Collapsing the Non-IHUM groups enrolled after IHUM implementation resulted in a control sample of 44 students for comparison against the combined IHUM treatment sample of 48 students. Students enrolled in IHUM Wind programs were significantly younger ($M = 20.06$, $SD = 3.37$), on average, than students enrolled in Non-IHUM Wind programs ($M = 24.73$, $SD = 8.54$) during the same period, $t_{(55.14)} = 3.39$, $p = .001$. The difference in age was statistically significant, but also rather large in magnitude ($g_{Hedges} = 0.73$). As shown in Table 90 below, students in IHUM Wind programs, relative to their Non-IHUM Wind peers, were also significantly more likely to be white and to have completed a developmental math course.

Table 90. *Wind: IHUM vs. Non-IHUM Demographic Characteristics (Fall 2015)*

Demographic Characteristic	Non-IHUM ($n = 44$)	IHUM ($n = 48$)	χ^2	ϕ
Female	0.0%	0.0%	---	---
White	79.5%	95.8%	*[b]	.25
Disabled	2.3%	4.2%	[a]	.05
Developmental Math	0.0%	12.5%	*[b]	.25
Developmental English	2.3%	2.1%	[a]	.01
Previous Degree	2.3%	0.0%	[a]	.11

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
  [a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

In comparison to their Non-IHUM Wind program peers, students in IHUM programs were significantly more likely to be preparing to enter the job market. Alternatively, Non-IHUM students were significantly, and substantially, more likely to be undecided or unsure about their intentions to seek credentials in Wind programs (see Table 91).

Table 91. *Wind: Student Intentions for Pursuing Credentials (Fall 2015)*

Students' Intentions	Non-IHUM ($n = 44$)	IHUM ($n = 48$)	χ^2	ϕ
Explore courses to decide on career	2.3%	0.0%	a	.11
Improve skills for current job	0.0%	2.1%	a	.10
Meet certification/licensure requirements	0.0%	4.2%	a	.14
Preparing for career change	0.0%	10.4%	a	.23
Preparing to enter job market	34.1%	56.3%	4.54*	.22
Self-improvement	0.0%	8.3%	a	.20
Personal reasons	0.0%	0.0%	---	---
Preparing to transfer	6.8%	12.5%	a	.10
Undecided/other	56.8%	6.3%	*b	.55

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

With regard to degree completion, IHUM students tended to be less likely to complete Associate's degrees than students pursuing similar credentials in Non-IHUM schools (see Table 92). Although students in Non-IHUM Wind programs were 2.63 times as likely to complete their Associate's degrees as were IHUM students, the difference in completion rates was not statistically significant.

Table 92. *Wind: Overall Credential Completion (Fall 2015)*

Credential	Non-IHUM ($n = 44$)	IHUM ($n = 48$)	χ^2	ϕ
Associate's Degree	27.3%	12.5%	a	.19
Program Certificate	0.0%	0.0%	---	---
Program Diploma	0.0%	0.0%	---	---

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Assessing Differential Completion among IHUM Wind Students

Among students enrolled in IHUM Wind programs, the Associate's degree completion rate reflects only six individual students. Comparisons between those IHUM students who completed their credentials and those who did not lack statistical power to detect differences in all cases, and are likely to produce invalid or misleading results. Rather than provide comparative information between groups, characteristics of degree completers are presented for descriptive purposes only. Students who completed an Associate's degree were white men who enrolled in their Wind program shortly after high school (average enrollment age = 18.33). Associate's degree earners did not complete developmental math or English courses, nor did they complete any previous degrees. Although the large majority of completers did not indicate disability status, this was not constant across the group. Associate's degree completers intended to meet current certification/licensure requirements ($n = 1$), enter the job market ($n = 3$), or transfer to college/university ($n = 2$).

Employment and Earnings Impacts among IHUM Wind Students

Of the 48 original IHUM cases, data related to employment and earnings was available for only 18 (37.5%) individuals. Credential completers among these 18 cases included only 4 of the 6 IHUM students who earned their Associate's degree in a Wind program. Average rates of employment in the year prior to enrollment among IHUM Wind students were similar for both those who would complete their credential (56.3%) and those who would not (67.9%). However, the average rate of employment in the six months after program completion was slightly higher (37.5%) for those who completed their Associate's degree, relative to those who did not (28.6%). Although based on only four students who completed their Wind Associate's degree, average wages before program enrollment and after program completion are suggestive of a beneficial impact of credential completion on wage earnings (see Figure 53). Note that because wage earnings are based on so few cases, means, standard deviations, and test statistics are not provided and that the pattern reflected in Figure 53 should be interpreted cautiously.
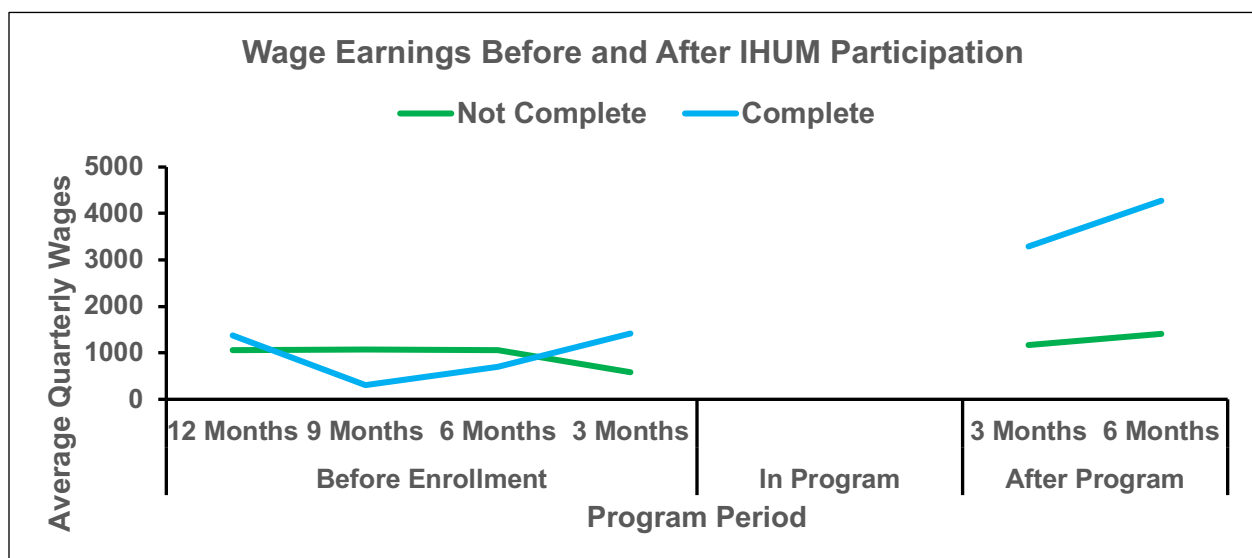

Figure 53. Average Wage Earnings for IHUM Wind Students

Utility Technician

Consistent with the Wind program sample presented above, the Utility Technician sample also included small groups of students. The full sample of Utility Technician students ($N = 46$) included two IHUM cohorts that entered the program in either fall 2015 ($n = 12$) or spring 2016 ($n = 13$). Only a single control cohort of Non-IHUM students ($n = 21$) who entered their program in fall 2014 was available for comparison purposes. Given that the control cohort reflected both Non-IHUM and Pre-IHUM students, only a single set of comparisons is presented below. In addition, to maximize the utility of cross-group comparisons, the two IHUM cohorts were combined into a single treatment cohort.

Students enrolled in Utility Technician programs prior to IHUM implantation were approximately the same age ($M = 22.43$, $SD = 7.37$), on average, as students that enrolled in the same programs in the following academic year ($M = 20.40$, $SD = 2.78$), $t_{(24.79)} = 1.19$, $p = .244$. As shown in Table 93 below, IHUM students were quite similar to students in Utility Technician programs prior to IHUM implementation with regard to demographic characteristics. Although not statistically significant, IHUM students were more likely than Pre-IHUM students to have completed a previous degree.

Table 93. *Utility Technician: Pre-IHUM vs. IHUM Demographic Comparisons*

Demographic Characteristic	Pre-IHUM Fall 2014 ($n = 21$)	IHUM ($n = 25$)	χ^2	ϕ
Female	0.0%	0.0%	---	---
White	90.5%	80.0%	[a]	.15
Disabled	9.5%	8.0%	[a]	.03
Developmental Math	0.0%	0.0%	---	---
Developmental English	0.0%	0.0%	---	---
Previous Degree	19.0%	44.4%	[a]	.27

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.

Utility Technician students enrolled before and after IHUM implementation did differ in important ways regarding their intentions to pursue credentials (see Table 94). Of particular note, those enrolled prior to IHUM implementation were significantly, and substantially, more likely to be unsure or undecided about their intentions for seeking Utility Technician credentials. Alternatively, students who entered IHUM Utility Technician programs were significantly more likely than their Pre-IHUM peers to do so in order to prepare for job market entry.

Table 94. *Utility Technician: Pre-IHUM vs. IHUM Student Intentions for Pursuing Credentials*

Students' Intentions	Pre-IHUM Fall 2014 ($n = 21$)	IHUM ($n = 25$)	χ^2	ϕ
Explore courses to decide on career	0.0%	0.0%	---	---
Improve skills for current job	0.0%	0.0%	---	---
Meet certification/licensure requirements	0.0%	0.0%	---	---
Preparing for career change	0.0%	12.0%	[a]	.24
Preparing to enter job market	14.3%	48.0%	*[b]	.36
Self-improvement	0.0%	0.0%	---	---
Personal reasons	4.8%	8.0%	[a]	.07
Preparing to transfer	4.8%	8.0%	[a]	.07
Undecided/other	76.2%	24.0%	*[b]	.52

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Credential completion rates were nearly identical among Pre-IHUM and IHUM students with regard to earning program diplomas. No students completed Associate's degrees or program certificates (see Table 95).

Table 95. *Utility Technician: Pre-IHUM vs. IHUM Credential Completion*

Credential	Pre-IHUM Fall 2014 ($n = 21$)	IHUM ($n = 25$)	χ^2	ϕ
Associate's Degree	0.0%	0.0%	---	---
Program Certificate	0.0%	0.0%	---	---
Program Diploma	28.6%	32.0%	[a]	.04

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Assessing Differential Completion among IHUM Utility Technician Students

Among students enrolled in IHUM Utility Technician programs, the diploma completion rate reflects only 8 out of 17 individual students. Comparisons between those IHUM students who completed their credentials and those who did not again lack statistical power and have the potential to yield misleading results. As with IHUM Wind program students above, characteristics of degree completers are presented for descriptive purposes only. Students who completed Utility Technician diplomas were predominately white (75.0%) men who did not

necessarily enroll in their programs immediately after high school (average enrollment age = 20.88). Diploma earners did not complete developmental math or English courses, and no diploma completer indicated disability status. Interestingly, all of the students who completed their Utility Technician diploma had completed a previous degree whereas only 17.6% of non-completers had done so. Diploma completers intended to change careers ($n = 2$), enter the job market ($n = 2$), or were unsure/undecided about their intentions for pursuing Utility Technician credentials ($n = 4$).

Employment and Earnings Impacts among IHUM Utility Technician Students

Of the 25 original IHUM cases, data related to employment and earnings was available for only 12 (48.0%) individuals. Credential completers among these 12 cases included only 4 of the 8 IHUM students who earned their diploma in a Utility Technician program. Average rates of employment in the year prior to enrollment among IHUM Utility Technician students were slightly lower for those who would complete their credential (50.0%) in relation to those who would not (62.5%). However, the average rate of employment in the six months after program completion was considerably higher (87.5%) for those who completed their diploma, relative to those who did not (68.8%). Although based on only four students who completed their Utility Technician diploma, average wages before program enrollment and after program completion are suggestive of a beneficial impact of credential completion on wage earnings (see Figure 54). Note that because wage earnings are based on so few cases, means, standard deviations, and test statistics are not provided and that the pattern reflected in Figure 54 should be interpreted cautiously.
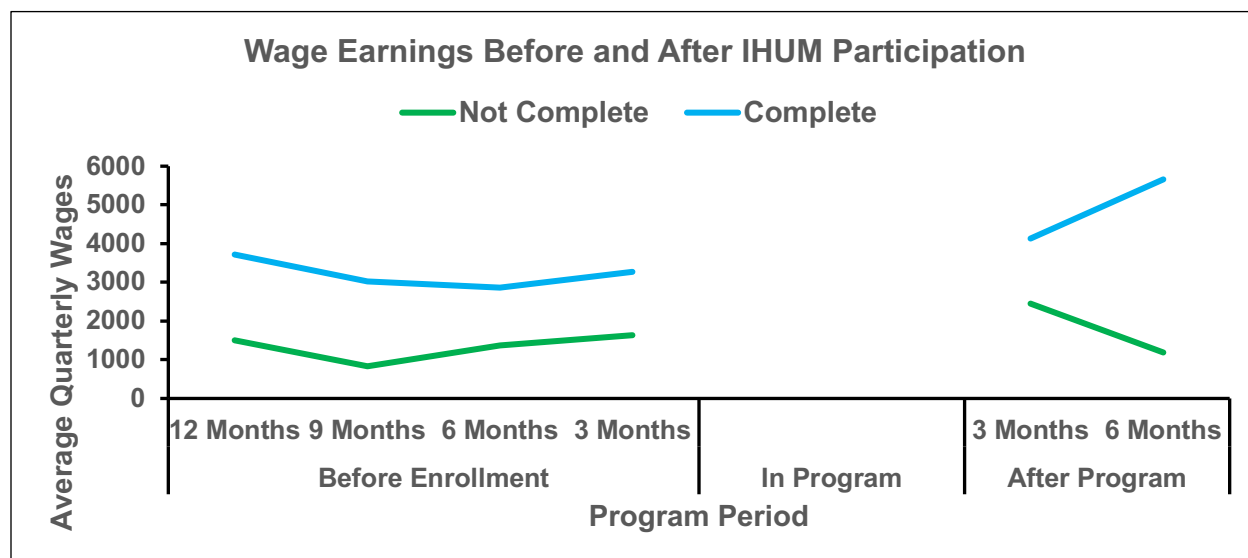

Figure 54. Average Wage Earnings for IHUM Utility Technician Students

Manufacturing Sector

Students pursuing credentials in Manufacturing programs ($N = 317$) were again predominately men (95.9%) with only 13 women pursuing credentials in Manufacturing programs. The majority of Manufacturing students were white (88.3%). Relative to the whole sample, disability rates were similar among Manufacturing students (4.7%). The proportions of Manufacturing students who had completed developmental math (4.4%) or English (1.3%) courses were slightly lower in comparison to the full sample. Finally, students in Manufacturing programs also tended to be older, on average ($M = 27.07$, $SD = 10.32$), and less likely to have earned a previous degree (1.9%) relative to the full sample.

Across all Manufacturing programs and student cohorts, Associate's degrees were most commonly completed (12.3%; $n = 39$). Smaller numbers of students completed program certificates (5.5%, $n = 17$) or diplomas (6.0%; $n = 19$).

Collapsing across Manufacturing programs and cohorts, those in the treatment cohorts were significantly older ($M = 29.34$, $SD = 11.51$), on average, than those in the control cohorts ($M = 26.11$, $SD = 9.64$), $t_{(150.62)} = 2.39$, $p = .018$, with the difference corresponding to slightly more than a quarter of a standard deviation ($g_{Hedges} = 0.32$). As shown in Table 96 below, treatment and control students differed significantly on only two demographic characteristics. Students in IHUM programs were significantly less likely to have completed a developmental math course and significantly more likely to have reported disability status.

Table 96. *Manufacturing: Treatment and Control Group Characteristics*

Demographic Characteristic	Control ($n = 223$)	Treatment ($n = 94$)	χ^2	ϕ
Female	4.0%	4.3%	a	.01
White	88.3%	88.3%	---	---
Disabled	2.2%	10.6%	*b	.18
Developmental Math	6.3%	0.0%	*b	.14
Developmental English	1.3%	1.1%	a	.01
Previous Degree	1.3%	3.2%	a	.06

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

The majority of Manufacturing students (57.1%) indicated that they were unsure or uncertain about their intentions to pursue credentials but the rate of uncertainty was consistent across IHUM and Non-IHUM students (see Table 97). Consistent with these findings, students' intentions for pursuing credentials in Manufacturing programs generally did not differ significantly across treatment and control cohorts. However, students in the control cohorts were significantly more likely than those in the treatment cohorts to be preparing to transfer to college/university, but the difference was not very large.

Table 97. *Manufacturing: Student Intentions for Pursuing Credentials*

Students' Intentions	Control (*n* = 223)	Treatment (*n* = 94)	χ^2	ϕ
Explore courses to decide on career	0.4%	1.1%	a	.04
Improve skills for current job	6.7%	3.2%	a	.07
Meet certification/licensure requirements	4.0%	3.2%	a	.02
Preparing for career change	10.3%	5.3%	a	.08
Preparing to enter job market	16.6%	17.0%	a	.01
Self-improvement	0.9%	2.1%	a	.05
Personal reasons	0.9%	2.1%	a	.05
Preparing to transfer	6.3%	1.1%	*b	.11
Undecided/other	53.8%	64.9%	3.32	.10

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Collapsing over programs, credential completion rates within Manufacturing programs differed across treatment and control cohorts. As shown in Table 98, students in the IHUM cohorts were significantly more likely to complete program certificates and diplomas than were students in the Non-IHUM cohorts. Although Associate's degrees were the most commonly completed credential, rates of completion did not differ across IHUM and Non-IHUM groups.

Table 98. *Manufacturing: Overall Credential Completion*

Credential	Control (*n* = 223)	Treatment (*n* = 94)	χ^2	ϕ
Associate's Degree	13.5%	9.6%	a	.05
Program Certificate	3.1%	10.6%	*b	.15
Program Diploma	3.6%	11.7%	*b	.16

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Tool and Die

Data were provided for multiple treatment cohorts (IHUM; $n = 88$) and multiple control cohorts (Non-IHUM; $n = 75$) pursuing Tool and Die credentials. Once again, IHUM cohorts enrolled in the fall semesters of 2015 and 2016, as well as in the spring semester of 2016. Contemporaneous cohorts of Non-IHUM students were not available limiting comparisons to Pre-IHUM groups that enrolled in the fall semesters of 2013 and 2014. As shown in Table 99 below, all cohorts in Tool and Die programs were small and inappropriate for isolated comparison purposes. In addition, lack of contemporaneous comparison groups suggested that combinations of groups could provide more valid comparisons than examining cohorts separately. To optimize subsample sizes for comparison purposes, cohorts were combined into Pre-IHUM (fall 2013/2014) and IHUM (fall 2015/2016, spring 2016) groups.

Table 99. *Tool and Die: Treatment and Control Cohorts*

Cohort Academic Term	Non-IHUM $n = 75$	IHUM $n = 88$	Comparison
Fall 2013	37	0	Pre-IHUM combined against IHUM combined
Fall 2014	38	0	
Fall 2015	0	31	
Spring 2016	0	28	Non-IHUM combined against IHUM combined
Fall 2016	0	29	

Students in the IHUM cohort were slightly, but significantly, older ($M = 29.27$, $SD = 11.76$), on average, than students in the Pre-IHUM cohort ($M = 25.95$, $SD = 9.58$) with regard to age, $t_{(160.69)} = 1.99$, $p = .048$. Aside from age, Pre-IHUM students did not differ from IHUM students on any of the demographic characteristics assessed (see Table 100).

Table 100. *Tool and Die: Pre-IHUM vs. IHUM Demographic Comparisons*

Demographic Characteristic	Pre-IHUM ($n = 75$)	IHUM ($n = 88$)	χ^2	ϕ
Female	4.0%	3.4%	a	.02
White	92.0%	88.6%	a	.06
Disabled	5.3%	11.4%	a	.11
Developmental Math	2.7%	0.0%	a	.12
Developmental English	0.0%	1.1%	a	.07
Previous Degree	0.0%	3.4%	a	.13

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

The majority of students pursuing Tool and Die program credentials were uncertain or undecided about their intentions for doing so, and the rate of uncertainty was significantly higher among

IHUM students than among Pre-IHUM students (see Table 101). Pre-IHUM students were also more likely to be preparing to enter the job market than IHUM students but the difference was not statistically significant. No other differences in intentions were observed between IHUM and Pre-IHUM students.

Table 101. *Tool and Die: Pre-IHUM vs. IHUM Student Intentions for Pursuing Credentials*

Students' Intentions	Pre-IHUM ($n = 75$)	IHUM ($n = 88$)	χ^2	ϕ
Explore courses to decide on career	0.0%	1.1%	a	.07
Improve skills for current job	8.0%	3.4%	a	.10
Meet certification/licensure requirements	6.7%	3.4%	a	.08
Preparing for career change	6.7%	3.4%	a	.08
Preparing to enter job market	26.7%	15.9%	2.84	.13
Self-improvement	1.3%	3.2%	a	.04
Personal reasons	2.7%	2.3%	a	.01
Preparing to transfer	4.0%	0.0%	a	.15
Undecided/other	44.0%	68.2%	9.66[*]	.24

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Rates of credential completion in Tool and Die programs differed before and after IHUM program implementation. As shown in Table 102 below, students in Tool and Die programs after IHUM implementation were significantly more likely to complete their certificates or diplomas than were students enrolled in Tool and Die programs before IHUM implementation. In fact, no students in the current sample completed certificates or diplomas in Tool and Die programs before IHUM implementation. Although certificate and diploma completion rates clearly favor IHUM students, rates of Associate's degree completion were nearly identical prior to and after IHUM implementation.

Table 102. *Tool and Die: Pre-IHUM vs. IHUM Credential Completion*

Credential	Pre-IHUM ($n = 75$)	IHUM ($n = 88$)	χ^2	ϕ
Associate's Degree	10.7%	10.2%	a	.01
Program Certificate	0.0%	8.0%	*b	.20
Program Diploma	0.0%	12.5%	*b	.25

Note: * $p < .05$; $\phi < .10$ reflects less than 1% overlap between the variable of interest and group membership.
[a] Proportions do not differ by Fisher's exact test. [b] Proportions differ significantly by Fisher's exact test.

Assessing Differential Completion among IHUM Tool and Die Students

Among students enrolled in IHUM Tool and Die programs, the Associate's degree completion rate reflects only nine individual students. Similarly, certificate completions ($n = 7$) and diploma completion ($n = 11$) reflect small numbers of actual individuals. In addition, some students completed more than a single credential. Specifically, of the 88 IHUM students, five completed both a certificate and diploma and an additional five completed both a diploma and an Associate's degree. Given the overlap in credential completions and the fact that the actual number of individuals who completed credentials is rather small, comparative information contrasting groups is omitted in favor of descriptive information about the subsample who completed any Tool and Die credential in an IHUM program.

Students who completed credentials ($n = 17$) were white men who did not complete developmental math or English courses and who had also not completed a previous degree. Completers were older ($M = 28.65$, $SD = 11.59$), on average, than the rest of the sample and most (94.1%) reported no disability status. Interestingly, those who earned Tool and Die credentials were overwhelmingly (82.4%) unsure or undecided about their intentions for doing so with only a minority of the group preparing to enter the job market (11.8%) or preparing to change careers (5.9%).

Employment and Earnings Impacts among IHUM Tool and Die Students

Of the 88 cases pursuing credentials in IHUM Tool and Die programs, data related to employment and earnings was available for only 31 (35.2%) individuals. Credential completers among these 31 cases included only 9 of the 17 IHUM students who earned any credentials in a Tool and Die program. Average rates of employment in the year prior to enrollment among IHUM Tool and Die students were similar for both those who would complete their credential (80.6%) and those who would not (76.1%). However, the average rate of employment in the six months after program completion was not only higher for both groups but also substantially higher (100%) for those who completed any credential, relative to those who did not (86.4%). Although based on only nine students who completed Tool and Die credentials, average wages before program enrollment and after program completion are again suggestive of a beneficial impact of credential completion on wage earnings (see Figure 55). Note that because wage earnings are based on so few cases, means, standard deviations, and test statistics are not provided and that the pattern reflected in Figure 55 should be interpreted cautiously.
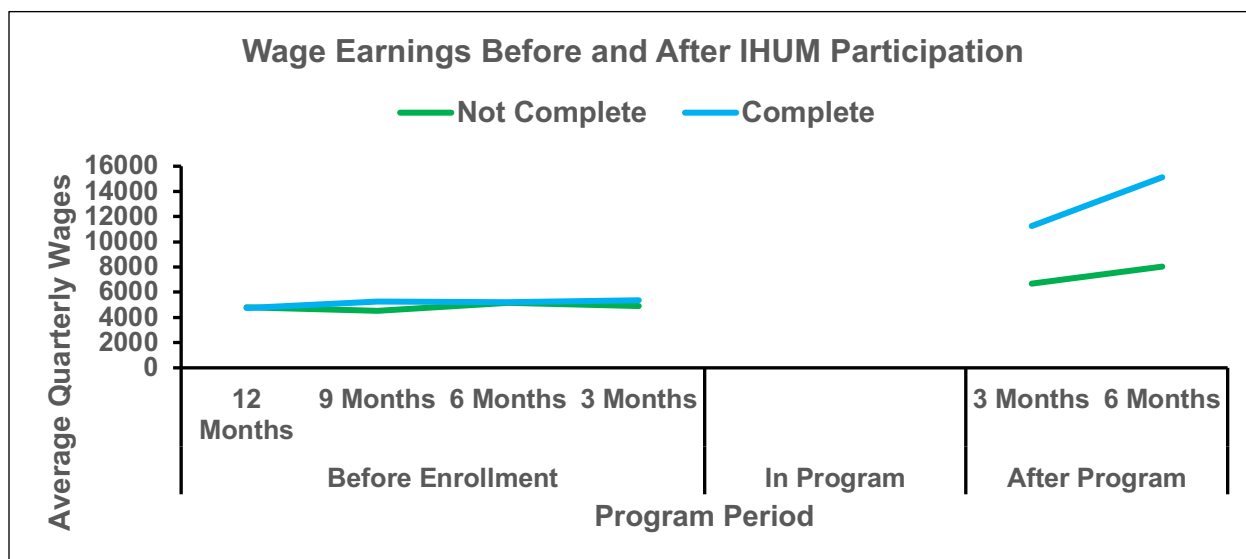
Figure 55. Average Wage Earnings for IHUM Tool and Die Students

Industrial Automation

Consistent with the Tool and Die program sample presented above, the Industrial Automation sample also included small groups of students. The full sample of Industrial Automation students ($N = 154$) included three Non-IHUM cohorts that entered programs in either fall 2015 ($n = 56$), spring 2016 ($n = 48$), or fall 2016 ($n = 44$). Unfortunately, only a single cohort of IHUM students ($n = 6$) who entered their program in fall 2016 was available for comparison purposes. Although the Non-IHUM comparison groups are small, combining them could yield a reasonable control cohort. However, there is no additional information available for IHUM students leaving a treatment group too small for comparison purposes. Analysis of IHUM students pursuing credentials in Industrial Automation is necessarily limited to descriptive information.

Students enrolled in Industrial Automation IHUM programs were considerably older ($M = 30.33$, $SD = 7.31$), on average, than students in other IHUM programs. Most Industrial Automation students were men (83.3%), and white (83.3%), and none had completed developmental math courses, developmental English courses, or previous degrees. Students were equally likely to be pursuing Industrial Automation credentials to change careers (33.3%) or enter the job market (33.3%). Remaining students were either unsure about their intentions (16.7%) or preparing to transfer to college/university (16.7%). Half of the students seeking Industrial Automation credentials completed their program certificate. For comparison purposes, demographic (see Table 103), student intention (see Table 104), and credential completion (see Table 105) percentages are provided for the combined Non-IHUM group but statistical test and effect size information is omitted due to the exceptionally small IHUM group.

Table 103. *Industrial Automation: Student Demographics*

Demographic Characteristic	Non-IHUM (*n* = 148)	IHUM (*n* = 6)
Female	4.1%	16.7%
White	86.5%	83.3%
Disabled	0.7%	0.0%
Developmental Math	8.1%	0.0%
Developmental English	2.0%	0.0%
Previous Degree	2.0%	0.0%

Table 104. *Industrial Automation: Student Intentions*

Students' Intentions	Non-IHUM (*n* = 148)	IHUM (*n* = 6)
Explore courses to decide on career	0.7%	0.0%
Improve skills for current job	6.1%	0.0%
Meet certification/licensure requirements	2.7%	0.0%
Preparing for career change	12.2%	33.3%
Preparing to enter job market	11.5%	33.3%
Self-improvement	0.7%	0.0%
Personal reasons	0.0%	0.0%
Preparing to transfer	7.4%	16.7%
Undecided/other	58.8%	16.7%

Table 105. *Industrial Automation: Credential Completion*

Credential	Non-IHUM (*n* = 148)	IHUM (*n* = 6)
Associate's Degree	14.9%	0.0%
Program Certificate	4.7%	50.0%
Program Diploma	5.4%	0.0%

Assessing Differential Completion among IHUM Industrial Automation Students

Among students enrolled in IHUM Industrial Automation programs, the certificate completion rate reflects only 3 out of 6 individual students. As with IHUM Tool and Die program students above, characteristics of degree completers are presented for descriptive purposes only. Students who completed Industrial Automation certificates were white men who did not enroll in their programs immediately after high school (average enrollment age = 29.33). Certificate earners did not complete developmental math courses, developmental English courses, or previous degrees, and no credential completer indicated disability status. Credential completers intended to either change careers (*n* = 2) or enter the job market (*n* = 1).

Employment and Earnings Impacts among IHUM Industrial Automation Students

Data related to employment and earnings was available for all of the 6 original IHUM Industrial Automation students. Although limited in the information such a comparison provides, average rates of employment in the year prior to enrollment among IHUM Industrial Automation students were slightly lower for those who would complete their credential (66.7%) in relation to those who would not (100%). However, the average rate of employment in the six months after program completion was equal across completers and non-completers, with 100% of students being employed. Comparison of the limited information regarding earnings before program enrollment suggests higher average wages among students who would eventually not complete their credentials. However, as shown in Figure 56, post-program wages are suggestive of a crossover in earnings consistent with beneficial impact of credential completion on wage earnings (see Figure 56). Note that because wage earnings are based on so few cases, means, standard deviations, and test statistics are not provided and that the pattern reflected in Figure 56 should be interpreted cautiously.
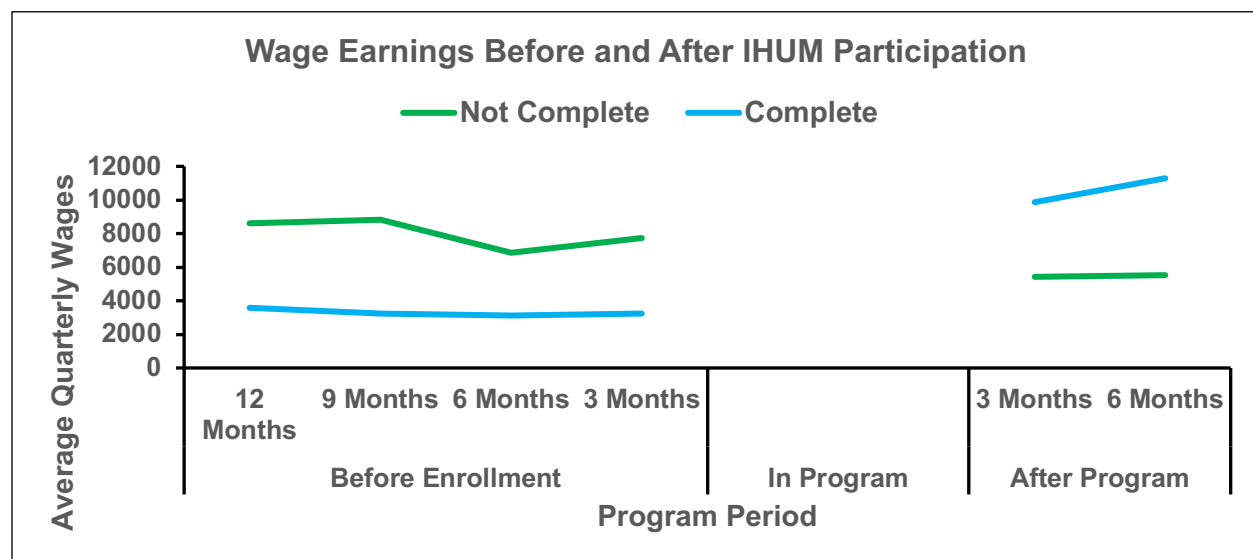

Figure 56. Average Wage Earnings for IHUM Industrial Automation Students

CONCLUSIONS

In general, the implementation of the Information Technology, Healthcare, Utilities, and Manufacturing Network was very successful for students, faculty, employer partners, and each participating community college. Below is an overview of each area

Program Implementation

Milestone Completion. All participating community colleges completed all time sensitive milestones, strategies, and priorities by the end of Fiscal Year 4, Quarter 2 (March 31, 2018) as required by the grant; exceptions include milestones that were ongoing and were not expected to be completed until the grant ended on September 30, 2018. Review of progress made (e.g., quarterly/annual reports, survey results) found that community colleges continued to make progress throughout the four years of the grant. Although community colleges faced some challenges in implementing program objectives, all of the community colleges were successful in their implementation of IHUM signature programs.

EMSI Career Coach. A hallmark of the IHUM Project was the EMSI Career Coach; grant funds were used to purchase a subscription to EMSI Career Coach to be used by each community college. The career analytics tool was designed to help advisors/students search/find information related to local data on wages, expected job growth and opportunities, education/training needed to enter a chosen career/job, and links to community colleges providing the education and training. While EMSI Career Coach was available to the community colleges during the grant, the continuation of EMSI Career Coach at each community college after the grant ended was contingent on the funds being available. Several of the community colleges indicated that the EMSI Career Coach would not be sustained after the grant ended.

Marketing Efforts. Community colleges joined efforts with state (IWD and Iow@Works) and local agencies to promote community colleges and their programs and to increase participant referrals. A statewide effort, Enhance Iowa, a workforce solution funded by the grant, was developed by the Project to facilitate individuals' return to school leading to employment in an IHUM sector. Enhance Iowa also promoted the community colleges, provided a link to the EMSI Career Coach, provided information about obtaining necessary funding to attend school, and provided information aimed at veterans, TAA eligible students, and displaced workers.

Simulation. Grant funds were used to update/enhance and/or develop simulation centers at each of the community colleges. Simulation centers provided students with the opportunity to learn using state-of-the-art equipment while gaining real world, hands-on experiences. It also allowed students to see and practice uncommon clinical situations and gain that experience that they may otherwise not get. In some cases, simulation was used to teach students how to troubleshoot computer systems and hardware failure.

The Iowa Community College Simulation Network (ICCSN) was set up by IHUM Project Leads as a way for community colleges offering Healthcare programs, to come together and discuss

simulation and best practices. Participants of the ICCSN found the network be helpful with several reporting that they implemented practices that were shared during their meetings.

Challenges. The majority of the community colleges experienced varied challenges during the implementation of the IHUM Project. Challenges included: finding qualified staff, problems with equipment, not having enough funds, employers/businesses not being supportive of the apprenticeships, and delays in remodeling. Overall, community colleges were able to overcome challenges to implementation.

Accomplishments/Strengths. The IHUM Project met their goal for number of students enrolled in their signature programs. A total of 7,030 unique participants were served during the four-year grant. The total number reflects a 102.6% achievement of their projected goal. Accomplishments and strengths included:

- *Expansion and/or enhancement to community college infrastructure.* Expansion and/or enhancement to infrastructure provided community colleges with opportunities to collaborate on building the training capacity required to meet the state's industry demand for highly qualified workers while providing training to Iowans with skills needed to engage in Iowa's workforce. Enhancements included addition/enhancement of simulation laboratories/workspaces used to provide real world experiences, purchase/upgrading of equipment, enhancement of curriculum to align with standards and practice, increased/targeted recruitment and retention efforts, student career planning, more work-based experiences (e.g., internships, apprenticeships, clinicals) and most importantly, programs that will continue to be sustained long after the grant ends on September 30, 2018.

- *Student Satisfaction.* Overall, students were satisfied with their academic program, educational experience, quality of courses offered, overall quality of instruction, interactions with other students in their field of study, availability of faculty members, access to labs, study areas, and preparation for employment in their field of study and third party certifications/board exams.

- *Student Career and Educational Services.* Comprehensive student services such as guided registration and enrollment, guided financial aid assistance, financial assistance, assistance obtaining public benefits, and financial literacy instruction, advising, tutoring, were considered to be a strength.

Program Outcomes

Comparing IHUM and Non-IHUM Students. In general, IHUM and non-IHUM students did not vary greatly in terms of demographics, intentions for pursuing credentials, and overall credential completion. In terms of demographic characteristics, students in the treatment group were more likely to be female, less likely to be white, and less likely to have enrolled in a developmental math course. Students in the treatment group were more likely to report their intent to transfer to a 4-year institution of higher learning and were less likely to be undecided in their intention for pursuing credentials.

Assessing Differential Completion among IHUM Students. In general, rates of degree/credential completion did not vary significantly as a function of students' demographic characteristics. Depending on the specific IHUM program, differential rates of degree completion were tied to at least one intention for pursing credentials (e.g., meeting certificate/licensure requirements, preparing for a career change, preparing to transfer, preparing to enter job market, pursuing their degrees for personal reasons).

Employment and Earnings Impacts among IHUM Students. In general, the proportions of students employed prior to enrollment were very similar between groups who would eventually complete or not complete their degrees. However, employment rates demonstrated an approximate increase that ranged between 8% to 20% in the six months after the end of the program among students who completed their degrees. For example, students that completed their Associate's degree were significantly more likely than those who did not complete their degrees to be employed six months later.

Consistent with the higher likelihood of employment following degree completion, students that earned degrees also earned more income, on average, than did students who did not differ in average income three months prior to program enrollment. In general, those students who completed degrees were already earning moderately more than their peers only three months after their program and significantly more than their peers within six months.

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