IDAHO DIVISION OF CAREER TECHNICAL EDUCATION

SUBJECT

Board Policy III.L. Prior Learning and III.Y. Advanced Opportunities – First Reading

REFERENCE

October 2014	The Board approved the first reading of amendments to Board Policy III.Y. replacing Tech Prep with Technical competency credit.
February 2015	The Board approved the second reading of amendments to Board Policy III.Y.
June 2018	The Board approved the first reading of amendments to Board Policy III.Y. establishing system-wide policy for awarding credit for AP exams.
August 2019	The Board approved the first reading of Board Policy III.L, which includes how PLA is administered and how different forms of credit are awarded to meet degree requirements.
October 2019	The Board approved the second reading of Board Policy III.L.
February 2020	The Board approved the first reading of Board Policy III.L. rewriting the majority of the existing policy, including the removal of continuing education from the policy, adding references to institution developed crosswalks identifying how credit will be award for identified exams.
April 2020	The Board approved the second reading of board Policy III.L.

APPLICABLE STATUTE, RULE, OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Sections III.E., III.L, III.Y., and V.R.

BACKGROUND/DISCUSSION

The Division of Career Technical Education ("Division") requests amendments to Board Policy III.Y. Advanced Opportunities and III.L. Prior Learning. The amendments to Policy III.Y would replace what is now referred to as technical competency credit with microcredentials. The Board finalized amendments to Board Policy III.E. in December 2022, clarifying the definition of microcredentials and the platform that is used to track them. The platform used for tracking microcredentials was originally developed to, in part, track competencies students mastered through secondary programs eligible for technical competency credits.

The Board replaced the advanced opportunity that had previously been referred to as Tech Prep in February 2015 with technical competency credit. Technical

competency credits are a sequence of courses delivered to secondary students that when combined meet the same skills and competencies (learning outcomes) as one or more postsecondary courses. Secondary schools enter into agreements with one or more postsecondary institutions allowing students who completed the identified courses and met the skills and competencies to be awarded a set number of postsecondary credits when they matriculated to the postsecondary institution that was a party to the agreement. The original intent of technical competency credit was to provide more opportunities to students in rural areas of the state who attended schools that were less likely to offer dual credit courses.

Because students do not earn technical competency credits until they matriculate it has been difficult to measure the use or effectiveness of this program. The Division has historically reported on the number of students who participate in the career technical courses/programs that are eligible to earn technical competency credit. However, due to difficulty in obtaining the data, they have not been able to report with confidence the number of students who have matriculated and been awarded postsecondary credits for the courses completed at the secondary level. At the time students matriculate to a postsecondary institution they may have forgotten or did not realize they should be awarded credits for their completion of technical competency credit programs at the secondary level or they matriculate to an institution that was not a party to the articulation agreement.

Through defining and recognition in Board policy of microcredentials and the Division's development of SkillStack®, the same skills and competencies identified in programs that may lead to technical competency may be awarded through badges and microcredentials in SkillStack®. This platform provides a record that travels with the student from secondary to postsecondary education and on into the workforce, eliminating the potential for lost opportunities or recognition of learned skills. When combined with the work institutions and Division staff have already completed on creating crosswalks for microcredentials leading to postsecondary credits, students can be provided with the greatest opportunity and flexibility in expanding their learning at the postsecondary level. Added to this is the portability of badges and microcredentials through SkillStack® by being able to provide potential employers with a record of skills and competencies of value that may not fit into a traditional certificate or degree.

Board policy III.L. Prior Learning currently allows institutions to award credit for prior learning based on non-credit courses, experiential learning or portfolios, which could include microcredentials. The policy does not call out or identify microcredentials in the same way as it identifies exams like CLEP or AP. By adding the reference to microcredentials to Board policy III.L. it heightens awareness of microcredentials and the potential for stacking them to award not only credits but certificates and degrees.

Additionally, Board policy III.L. limits the fees for awarding credit for prior learning to the operational costs of administering the prior learning assessment. By using

SkillStack® for the assessment and tracking of microcredentials there is no added cost to an institution and could therefore result in no additional cost to students.

IMPACT

Proposed amendments to Board policies III.L and III.Y will provide clarification on how microcredentials can be used to show how students are meeting the same outcomes that were previously referred to in technical competency credit eligible programs and highlight their use for evaluating credit for prior learning.

ATTACHMENTS

Attachment 1 – Board Policy III.L. – First Reading
Attachment 2 – Board Policy III.Y. – First Reading

BOARD STAFF COMMENTS AND RECOMMENDATIONS

Board staff recommends approval of these proposed policy amendments.

BOARD ACTION

I move to approve the first reading of amendments to Board policies III.L and III.Y. as provided in attachments 1 and 2.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

ATTACHMENT 1

Idaho State Board of Education
GOVERNING POLICIES AND PROCEDURES
SECTION: III. POSTSECONDARY AFFAIRS
SUBSECTION: L. Prior Learning ~~April 2020~~February 2024

This policy establishes the foundation by which institutions shall provide students with opportunities to demonstrate competencies through established assessment processes to earn credit for prior learning. This policy applies to the University of Idaho, Boise State University, Idaho State University, Lewis-Clark State College, College of Eastern Idaho, College of Southern Idaho, College of Western Idaho, and North Idaho College (hereinafter "institutions").

1. Definitions

   a. Crosswalk: An equivalency table that identifies how credit for prior learning articulates to direct course equivalencies and general education requirements as provided in Board Policy III.N General Education, or to microcredentials as defined in Board Policy III.E Certificates and Degrees.

   b. Prior Learning Assessment (PLA): The process by which an individual's prior learning is assessed and evaluated for purposes of granting college credit, certification, or advanced standing toward further education or training. There are four generally accepted approaches to PLA and, when properly conducted, all ensure academic quality:

      i. National standardized exams in specific disciplines, including but not limited to:
         a) College Level Examination Program (CLEP)
         b) DANTES Subject Standardized Test
         c) Excelsior College Exams (UExcel)
         d) Advanced Placement (AP)
         e) International Baccalaureate (IB)

      ii. Challenge exams for local courses at the student's college or university

      iii. Individualized assessments or experiential learning, particularly portfolio-based assessments whereby students demonstrate learning acquired through experiences including but not limited to:
         a) Work or employment
         b) Employer training programs
         c) Independent study
         d) Non-credit courses
         e) Volunteer or community service
         f) Travel
         g) Non-college courses or seminars

h) Apprenticeships

iv. Evaluated non-college or non-credit courses and programs, such as:
a) The National College Credit Recommendation Service (NCCRS)
b) The American Council on Education's ACECREDIT service and evaluations of corporate and military training
c) microcredentials pursuant to Board Policy III.E.

2. Standards

a. Institutional Policies

i. Each institution is responsible for determining how best to implement PLA and should do so within the context of its mission, culture, student needs, academic programs, and career technical education programs.

ii. Each institution will ensure students have access PLA methods as deemed appropriate by its faculty.

iii. Each institution will provide professional development for faculty members, administrators, and staff working with students to ensure transparency and consistency in evaluating and awarding credit through PLA.

iv. Institutional policies and procedures must include the awarding of credit for education, training or service completed by an individual as a member of the armed forces or reserves pursuant to Section 33-3727, Idaho Code

v. Each institution will track PLA data, including student demographics, credits earned, type of PLA awarded, and associated costs to students.

b. Student Eligibility

i. To be eligible to earn PLA credits, undergraduate students must be admitted and enrolled in a public Idaho college or university.

a. Awarding Credit

i. Credit is awarded when a student successfully demonstrates evidence of college-level learning. Credit will be identified on the student's transcript as credit for prior learning.

ii. PLA credit will count as course credit and may be applied toward a degree, certificate, or other credential.

iii. Each institution shall include in its written policy on PLA the maximum number of credits earned through PLA that can be counted toward a degree or certificate.

b. Transferability

i. Once recorded on a student's transcript, PLA credit is transferable among Idaho institutions on the same basis as if the credit had been earned as a regular student at the awarding institution.

c. Fees

i. Fees for credit for prior learning shall be assessed consistently with Board Policy Section V.R. and must be based on and reflect the operational costs of administering a PLA. Fees may not be based on the number of credits awarded and shall be made publicly available in a single online location. Fees for transcribing credit shall not be applied for the transcription of credit awarded through the assessment of prior learning. Transcription fees are allowed for Workforce Training courses pursuant to Board Policy Section V.R.

ii. To ensure transparency for prospective students and students seeking transfer between institutions each institution shall develop and publish in a central location on its website and in other materials clearly stated and understandable policies on credit for prior learning. This information must include the cost and the process for students to pursue credit for prior learning and how credit that is awarded may satisfy course and degree requirements.

3. Crosswalks

a. Each institution will make available to students crosswalks identifying how credit for AP exams, CLEP exams, or military training will be awarded for common indexed general education courses. Where applicable, institutions will work together to identify areas within the crosswalks where credit for AP exams, CLEP exams, and military training can be applied consistently across institutions for meeting general education requirements. Crosswalks for AP exams, CLEP exams, and military training will include how exams and training are articulated to general education requirements and common indexed courses as provided in Board Policy III.N. For AP and CLEP exams, crosswalks will include minimum scores necessary for awarding credit across all institutions and will adhere to the AP exam credit requirement established in Board policy III.Y. For military training, crosswalks will include how equivalent college credit will be awarded.

~~a.~~b. Each institution will make available to students crosswalks identifying how credits for microcredentials will be awarded. Crosswalks specific to

microcredentials shall be developed in collaboration with the Division of Career Technical Education to assure alignment with the microcredentials platform.

ATTACHMENT 2

Idaho State Board of Education
GOVERNING POLICIES AND PROCEDURES
SECTION: III. POSTSECONDARY AFFAIRS
SUBSECTION: Y. Advanced Opportunities ~~August 2018~~February 2024

Boise State University, Idaho State University, University of Idaho, Lewis-Clark State College, College of Eastern Idaho, North Idaho College, College of Southern Idaho, and College of Western Idaho are covered by these policies. Postsecondary programs intended for transfer come under the purview of the Board.

1. Purpose

The State Board of Education is committed to improving the educational opportunities available to Idaho citizens by creating a seamless system of public education. The purpose of this policy is to provide program standards for advanced opportunities for secondary students. To this end, the intent of Advanced Opportunities is:

a. For postsecondary institutions to provide educational programs and training to their respective service regions;
b. Support and enhance regional and statewide economic development;
c. Facilitate collaboration between all school levels, including public elementary and secondary schools;
d. Prepare secondary graduates for postsecondary programs;
e. Enhance postsecondary goals;
f. Reduce duplication and provide for an easy transition between secondary and postsecondary education; and
g. Reduce the overall cost of educational services and training to the student.

2. Definitions

The State Board of Education recognizes four advanced opportunities programs. They are: Advanced Placement®, dual credit, technical competency credit (formerly known as Tech Prep), and the International Baccalaureate program.

a. Advanced Placement® (AP)

The Advanced Placement® Program, administered by the College Board, is a series of courses in a variety of subjects. AP courses are not tied to a specific college curriculum, but rather follow national College Board curricula. While taking the AP exam is optional, students may earn college credit by scoring well on the national AP exams. Individual postsecondary institutions have the discretion to accept the scores from the AP exams to award college credit or advanced standing.

b. Dual Credit Courses

i. Dual credit courses are courses allowing high school students to simultaneously earn credit toward a high school diploma and a postsecondary degree or certificate. Dual credit is awarded to a student on his or her postsecondary and high school transcript for the successful completion of a single course. Postsecondary institutions work closely with high schools to deliver college courses that are identical to those offered on the college campus. Credits earned in a dual credit class become part of the student's permanent college record. Students may enroll in dual credit courses taught at the high school or on the college campus.

ii. Two types of postsecondary credit may be earned: *Academic* and *Technical*. Academic credits apply to postsecondary academic programs and some postsecondary technical programs. Technical credits generally only apply to postsecondary technical programs and are not applicable toward academic postsecondary programs. Students must work closely with their advisor(s) to ensure the credit earned in their dual credit course will apply to their intended postsecondary degree program.

c. ~~Technical Competency Credit (TCC)~~ Microcredentials

~~i. Technical Competency Credit (TCC) allows secondary students to document proficiency in the skills and abilities they develop in approved high school career technical programs to be evaluated for postsecondary transcription at a later date. In addition to the standards outlined in section 4.d below, additional policies of the transcribing postsecondary institution may also apply.~~

~~Technical Competency Credits are awarded for skills and competencies identified as eligible TCC through a TCC Agreement with at least one Idaho postsecondary institution. Eligible skills and competencies are included in approved high school career technical programs and approved by the postsecondary institution in advance. Students participating in a high school program approved for TCC are not considered postsecondary students until they matriculate to a postsecondary institution.~~ Microcredentials as defined in Board Policy III.E. Microcredentials replace technical competency credits (TCC). Students who have completed a secondary program previously approved for technical competency credits shall be awarded credit when they matriculate to the participating postsecondary institution in accordance with the TCC articulation agreement that was in place at the time they entered the TCC program.
~~ii.~~

d. International Baccalaureate (IB)

Administered by the International Baccalaureate Organization, the IB program provides a comprehensive liberal arts course of study for students in their junior and senior years of high school. IB students take end-of-course exams that may qualify for college-credit. Successful completion of the full course of study leads to an IB diploma.

3. Idaho Programs Standards for Advanced Opportunities Programs

All advanced opportunities programs in the state of Idaho shall be developed and managed in accordance with these standards which were designed to help school districts, colleges and universities plan, implement, and evaluate high quality advanced opportunities programs offered to high school students before they graduate. Students must work closely with their advisor(s) to ensure the credit earned in their Advanced Opportunities course will apply to their intended postsecondary degree program.

a. Dual credit Standards for Students Enrolled in Courses Taught at the High School

Curriculum

Curriculum 1 (C1**)**	Courses administered through a dual credit program are catalogued courses and approved through the regular course approval process of the postsecondary institution. These courses have the same departmental designation, number, title, and credits; additionally these courses adhere to the same course description and course content as the postsecondary course.
Curriculum 2 (C2)	Postsecondary courses administered through a dual credit program are recorded on students' official academic record of the postsecondary institution.
Curriculum 3 (C3)	Postsecondary courses administered through a dual credit program reflect the pedagogical, theoretical and philosophical orientation of the sponsoring faculty and/or academic department at the postsecondary institution.

Faculty

Faculty 1 (F1)	Instructors teaching college or university courses through a dual credit program must meet the academic requirements for faculty and instructors teaching at a postsecondary institution or provisions are made to ensure instructors are capable of providing quality college-level instruction through ongoing support and professional development.
Faculty 2 (F2)	The postsecondary institution provides high school instructors with training and orientation in course curriculum, student assessment criteria, course philosophy, and administrative requirements before certifying the instructors to teach the college/university's courses.
Faculty 3 (F3)	Instructors teaching dual credit courses are part of a continuing collegial interaction through professional development, such as seminars, site visits, and ongoing communication with the postsecondary institutions' faculty and dual credit program administration. This interaction addresses issues such as course content, course delivery, assessment, evaluation, and professional development in the field of study.
Faculty 4 (F4)	High school faculty is evaluated by using the same classroom performance standards and processes used to evaluate college faculty.

Students

Students 1 (S1)	High school students enrolled in dual credit courses are officially admitted as degree-seeking, non-degree or non-matriculated students of the sponsoring postsecondary institution.
Students 2 (S2)	High school students are provided with a student guide that outlines their responsibilities as well as guidelines for the transfer of credit.
Students 3 (S3)	Students and their parents receive information about dual credit programs. Information is posted on the high school's website regarding enrollment, costs, contact information at the high school and the postsecondary institution, grading, expectations of student conduct, and other pertinent information to help the parents and students understand the nature of a dual credit course.
Students 4 (S4)	Admission requirements have been established for dual credit courses and criteria have been established to define "student ability to benefit" from a dual credit program such as having junior standing or other criteria that are established by the school district, the institution, and State Board of Education Governing Policies and Procedures.
Students 5 (S5)	Prior to enrolling in a dual credit course, provisions are set up for awarding high school credit, college credit or dual credit. During enrollment, the student declares what type of credit they are seeking (high school only, college only or both high school and college credit). To earn college credit, the student must be enrolled at the postsecondary institution.

Assessment

Assessment 1 (A1)	Students enrolled in dual credit courses are held to the same course content standards and standards of achievement as those expected of students in postsecondary credit only courses.
Assessment 2 (A2)	Every course offered through a dual credit program is annually reviewed by postsecondary faculty from that discipline and dual credit teachers/staff to assure that grading standards meet those in on-campus sections.
Assessment 3 (A3)	Students enrolled in dual credit courses are assessed and awarded credit using the same methods (e.g. papers, portfolios, quizzes, labs, etc.) as their on-campus counterparts.

Program Administration and Evaluation

Admin & Evaluation 1 (AE1)	The dual credit program practices are assessed and evaluated based on criteria established by the school, institution and the State Board of Education to include at least the following: course evaluations by students, follow-up of the graduates who are college or university freshmen, and a review of instructional practices at the high school to ensure program quality.
Admin & Evaluation 2 (AE2)	Every course offered through a dual credit program is annually reviewed by faculty from that discipline and dual credit staff to assure that grading standards meet those in postsecondary sections.

Admin & Evaluation 3 (AE3)	Students enrolled in dual credit courses are assessed using the same methods (e.g. papers, portfolios, quizzes, labs, etc.) as their on-campus counterparts.
Admin & Evaluation 4 (AE4)	A data collection system has been established based on criteria established by the high school, institution and State Board of Education to track students enrolled in dual credit courses to provide data regarding the impact of dual credit programs in relation to college entrance, retention, matriculation from high school to college, impact on college entrance tests, etc. A study is conducted every 5 years on dual credit graduates who are freshmen and sophomores in a college or university.
Admin & Evaluation 5 (AE 5)	Costs for high school students have been established and this information is provided to students before they enroll in a dual credit course. Students pay a reduced cost per credit that is approved annually at the Board's fee setting meeting and defined in Board Policy V.R. Fees. .
Admin & Evaluation 6 (AE 6)	Agreements have been established between the high school and the postsecondary institution to ensure instructional quality. Teacher qualifications are reviewed, professional development is provided as needed, course content and assessment expectations are reviewed, faculty assessment is discussed, student's costs are established, compensation for the teacher is identified, etc.
Admin & Evaluation 7 (AE 7)	Postsecondary institutions have carefully evaluated how to provide services to all students regardless of where a student is located.

b. Dual Credit Standards for Students Enrolled in Courses at the College/University Campus

A.	The student is admitted by the postsecondary institution as a non-degree seeking student.
B.	The student is charged the part-time credit hour fee or tuition and additional fees as established by the institution.
C.	Instructional costs are borne by the postsecondary institution.
D.	Four (4) semester college credits are typically equivalent to at least one (1) full year of high school credit in that subject.
E.	As part of the enrollment process, institutions must ensure the student and the student's parent/guardian receive counseling that outlines the risks and possible consequences of enrolling in postsecondary courses, including but not limited to the impacts on future financial aid, and the consequences of failing or not completing a course in which the student enrolls. It is the responsibility of the postsecondary institution to provide advising for all students taking courses on the postsecondary campus.
F.	Students under the age of 16 who are enrolled in a secondary school may seek admission to enroll in courses provided on the postsecondary campus by submitting a petition to the high school principal's office and to the admissions office of the postsecondary institution.

c. Advanced Placement Standards

Advanced Placement (AP) courses are taught by high school teachers following the curricular goals administered by The College Board. These courses are academically rigorous and conclude with the optional comprehensive Advanced Placement exam in May. Students taking Advanced Placement courses accept the challenge of a rigorous academic curriculum, with the expectation of completing the complex assignments associated with the course and challenging the comprehensive Advanced Placement exam. The Advanced Placement examination is a national assessment based on the Advanced Placement curriculum, given in each subject area on a specified day at a specified time, as outlined by the College Board. Students and parents are responsible for researching the Advanced Placement policy of the postsecondary institution the student may wish to attend. Each institution shall publish their credit award policy, including course credit awarded, on their institutional webpage and report the policy annually to the Board office.

College/university credit is based on the successful completion of the Advanced Placement exam, and dependent upon institutional Advanced Placement credit acceptance policy. Each institution shall award academic credit for scores of 3, 4, and 5 on the AP exam. Institutions may choose to award more credit for scores of 4 or 5. Institutions shall strive to align Advanced Placement credit awards to courses that fulfill general education or program credit. Elective credit shall only be awarded when a general education or program credit is not available. The Board office shall review, no less than every three years, the validity of such credits awarded to assess student performance based on this policy.

Institutions may seek an exception to the score requirement in the policy if the institution has evidence that students are not performing adequately in the subsequent course or are in some way disadvantaged academically based on their placement within the Advanced Placement policy. Each institution's chief academic officer or designee shall present the evidence to the Board office. The Board office will convene a committee comprised of faculty, staff, and others to review the findings and render determination as to whether the minimum Advanced Placement score threshold should be increased.

Curriculum

Curriculum 1 (C1)	Postsecondary institutions evaluate AP scores and award credit reflecting the pedagogical, theoretical, and philosophical orientation of the sponsoring faculty and/or academic department at the institution.
Curriculum 2 (C2)	High school credit is given for enrollment and successful completion of an AP class.

Faculty

Faculty 1 (F1)	AP teachers shall follow the curricular materials and goals outlined by The College Board.

Faculty 2 (F2)	The AP teacher may attend an AP Institute before teaching the course.

Students/Parents

Students 1 (S1)	A fee schedule has been established for the AP exam. Students and their parents pay the fee unless other arrangements have been made by the high school.
Students 2 (S2)	Information must be available from the high school counselor, AP coordinator or other faculty members regarding admission, course content, costs, high school credit offered and student responsibility.

Assessment

Assessment 1 (A1)	Students are assessed for high school credit according to the requirements determined by the high school.

Program Administration and Evaluation

Admin & Evaluation 1 (AE1)	To evaluate the success of the programs and to improve services, the school district must annually review the data provided by The College Board.
Admin & Evaluation 2 (AE2)	The school district must carefully evaluate how to provide services to all students, regardless of family income, ethnicity, disability, or location of educational setting.

d. ~~Technical Competency Credit (TCC)~~Microcredential Standards

Career technical education programs in Idaho are delivered through comprehensive high schools, career technical ~~schools~~centers, and the technical college system. ~~Technical Competency Credit allows secondary career technical students the opportunity to earn secondary and postsecondary technical credits. Technical Competency Credit is offered through approved secondary career technical programs with an articulation agreement between the high school and a postsecondary institution. Technical Competency Credit is an advanced learning opportunity that provides a head start on a technical certificate or an applied science degree.~~Pursuant to Board Policy III.E. all microcredentials are tracked as digital badges through a platform approved and maintained by the Division of Career Technical Education. Idaho's educators may validate skills their students demonstrate proficiency in through the awarding of badges in the platform. Industry-relevant badges are awarded based on the validated skills. Program standards are developed for each badge through a collaborative process that engages industry, college/university faculty, secondary faculty, applicable agency staff and other stakeholders. As students provide evidence of the competencies for each skill, educators evaluate the competencies based on common assessments. Once all skills are validated for a particular badge, the information is entered into the platform and badges are issued. Microcredentials may be stacked and used toward credit for prior learning or the awarding of a certificate or degree.

~~**Curriculum**~~

~~Curriculum 1 (C1)~~	~~The high school career technical program must have competencies comparable with a postsecondary institution technical program and be identified as eligible for TCC consideration through a TCC Agreement (e.g., articulation agreement) with at least one Idaho postsecondary institution.~~
~~Curriculum 2 (C2)~~	~~Secondary and postsecondary educators must agree on the technical competencies, the student learning outcomes, and the level of proficiency to be demonstrated by the student.~~

~~Faculty~~

~~Faculty 1 (F1)~~	~~Secondary educators must hold appropriate career technical certification in the program area for which credit is to be awarded.~~

~~Students~~

~~Students 1 (S1)~~	~~Technical Competency Credit (TCC) students are high school students; they are neither enrolled in the postsecondary institution nor counted as dual credit students. Students may request transcription of TCCs onto a postsecondary transcript after demonstrating the required level of proficiency; they must follow the transcribing institution's TCC transcription policy and pay the transcription fee discussed in standard AE1. After completing a TCC course or sequence according to the articulation agreement, the credits must be transcribed within the time period required by the transcribing institution and in no instance longer than two years.~~
~~Students 2 (S2)~~	~~High school students are provided with a student guide that outlines their responsibilities, guidelines for credit transfer and information regarding how the technical credit will apply to postsecondary certificates and degree requirements. The student guide must include an explanation of the difference between technical and academic credit, how a career technical course is a part of a career technical program sequence, and how the courses may impact their academic standing when they fully matriculate after high school.~~
~~Students 3 (S3)~~	~~At the completion of the Technical Competency Credit program, the instructor shall identify students who have met program competencies.~~

~~Assessment~~

~~Assessment 1 (A1)~~	~~The students are assessed for postsecondary technical credit according to the requirements of the Technical Competency Credit agreement.~~

~~Program Administration and Evaluation~~

~~Admin & Evaluation 1 (AE1)~~	~~When the student requests the transcription of a TCC credit, they are assessed a transcription fee consistent with Board Policy Section V.R for qualifying TCC earned in high school.~~
~~Admin & Evaluation 2 (AE2)~~	~~TCC agreements between a secondary career technical program and a postsecondary institution must be reviewed annually by the institution.~~

COLLEGE OF EASTERN IDAHO

SUBJECT

Bachelor of Applied Science, Digital Forensics and Analytics

APPLICABLE STATUTE, RULE, OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Section III.G, Section III.N, and Section III.Z.
Idaho Code § 33-107(8) and Idaho Code § 33-2107A

BACKGROUND/DISCUSSION

College of Eastern Idaho (CEI) is proposing a new Bachelor of Applied Science (BAS) degree program in Digital Forensics and Analytics (DFA), which is designed to provide a new pathway for associate program alumni to complete an applied baccalaureate program primarily focused on digital forensics. Students in the program will be required to complete 43-44 total transfer or General Education Matriculation courses as required by Idaho State Board of Education Governing Policies & Procedures, Section III.N. Students will also complete a total of 120-121 total credits as required by Idaho State Board of Education Governing Policies & Procedures, Section III.E.

The program has been developed by request of local industry partners, community members, past graduates, and the CEI Board of Trustees. CEI students consistently remain in the state, highest among Idaho's public colleges, after completion and research shows a strong interest in a four-year degree program. As requested, the program would be offered face-to-face, as evening courses, in a practical format for working professionals to advance in their careers.

In 2022, the Board adopted amendments to Policy III.Z. to include five specific criteria for evaluating proposed baccalaureate degrees by the community colleges:

- "Demand: Proposed offerings must be to meet an urgent, local need based on where students who complete the offering will be employed rather than on where the students reside. The demand for the proposed offering needs to be clear, urgent, and compelling, as evidenced through data and industry input. Commitments of practical support (e.g. funding, internships, etc.) from industry stakeholders constitutes evidence of demand.
- "Specialization: The proposed offering must be based on the unique capability at the institution, founded on specialized instructional expertise and any infrastructure necessary for program delivery.
- "Non-competitiveness: The proposed offering must be non-competitive with other institutions' offerings within the identified service area (whether regional or statewide) and supported by other institutions within the service area. The Executive Director or designee may request written commitments from the presidents of other institutions within the service area expressing conceptual and, if necessary, practical support for the proposed program.

- "Collaboration: Alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions. High-demand programs must be offered through inter-institutional collaboration as described in this policy.
- Resources: The institution must have sufficient resources to develop and deliver the proposed offering."

IMPACT

Approval of the DFA BAS program would enable past associate degree graduates to have a bachelor's degree pathway, in-person, that was previously unavailable. The cybersecurity industry is in high demand. This four-year degree option provides an avenue that participants are likely to take, who were previously unlikely to continue past an associate degree. It is highly unlikely that participants would have completed another degree pathway as they are resistant to leaving the region and prefer face-to-face, hands-on instruction. There are also no similar programs in the region and this program is designed for working adults to attend in the evening. It is doubtful that this program will have any significant impact on an existing bachelor's degree program offered by Idaho's universities.

The proposed program will have adequate facilities and equipment and library resources to support the program. CEI will utilize local industry cybersecurity practitioners and experts to teach courses within the program (such as with Idaho National Laboratory). The program will not be funded using existing budgets and will follow CSI's applied baccalaureate budget model where differential tuition for upper division courses will offset the costs for program. CEI is actively seeking National Science Foundation (NSF) and other federal grants; however, the program will not be dependent on this type of funding. The program will require $32,148 - $46,565 of on-going funding over a four-year period.

ATTACHMENTS

Attachment 1 – Digital Forensics and Analytics BAS Proposal

BOARD STAFF COMMENTS AND RECOMMENDATIONS

CEI has identified a need in Region VI for an applied baccalaureate degree in Digital Forensics and Analytics based stakeholder interest provided through CEI's Cybersecurity and Technology Technical Advisory Committee. As stipulated in the program proposal, there are no other digital forensics and analytics baccalaureate programs in Idaho. The program indicates that the closest comparisons are broader Computer Science degrees with emphasis in Cybersecurity such as Boise State University's Bachelor of Science in Computer Science. Boise State's degree program covers traditional software development and mathematics theories which do not emphasize forensics and analytics skills. Idaho State University also offers a BAS in Industrial Cybersecurity Engineering and a BS in Computer Science. CEI offers an AAS in Information Assurance and Cybersecurity and an AAS in IT Services. These were provided in the proposal primarily for quantifying recent

graduate numbers and potential students. CEI indicates there are no computer science or cybersecurity baccalaureate programs offered face-to-face in Idaho Falls.

The proposed BAS in Digital Forensics and Analytics is consistent with CEI's Three-Year Plan for implementation Fall 2024. As provided in Board Policy III.Z, no institution has the statewide program responsibility for applied baccalaureate programs. Each institution has a service region program responsibility consistent with Board Policy III.Z to assess and ensure the delivery of all educational programs and services necessary to meet the educational workforce needs within its assigned service region. Staff notes that in 2018, Board Policy III.Z was amended to include community colleges in the Academic Service Regions to serve alongside the four-year institutions in sharing the responsibility for meeting undergraduate program needs. Consistent with Board Policy III.Z, CEI and Idaho State University are designated to serve undergraduate education needs in Region VI to include applied baccalaureate degree programs.

The program projects five to ten initial enrollments reaching 30 or more by year five and graduating 18 by year three. The program capacity is currently limited by CEI Computer Lab facilities and as such the overall program capacity will be approximately 20 students per cohort. CEI estimates that eight enrollments will be required for sustainability. If those minimums are not met for three consecutive years, the program will be evaluated for discontinuation.

In 2022, the Board approved amendments to Board Policy III.Z to include a set of minimum criteria by which the Board will evaluate proposals by the universities to offer new associate degrees and proposals by the community colleges to offer baccalaureate degrees. The program's responses are included with the proposal for the Board's review and consideration.

The proposal completed the program review process and was shared with the Council on Academic Affairs and Programs on November 2, 2023 and with the Committee on Instruction, Research, and Student Affairs on November 30, 2023. No concerns were raised by other institutions about this proposed program.

The Board should consider the workforce needs identified in the proposal and capacity to offer the proposed program in Region VI and determine whether it can be met through CEI or if the existing pathways offered by the other four-year institutions currently meet industry and student demand. The Board must also consider whether the proposal meets the criteria in Board policy for approving proposed baccalaureate programs at the community college level. If the Board determines the proposal does not meet these criteria but desires to approve the program anyway, then the Board must first waive this portion of policy.

BOARD ACTION

I move to approve the request by College of Eastern Idaho to create a new program that will award a Bachelor of Applied Science in Digital Forensics and Analytics in substantial conformance to the program proposal submitted as Attachment 1.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

Institutional Tracking No. _____

Idaho State Board of Education

FULL PROPOSAL FORM
Academic Degree and Certificate Program

Date of Proposal Submission: May 1, 2023

Institution Submitting Proposal:	College of Eastern Idaho
Name of College, School, or Division:	Career Technical Education
Name of Department(s) or Area(s):	Information Technology and Cybersecurity
Official Name of the Program:	Bachelor of Applied Science in Digital Forensics and Analytics
Implementation Date:	August 2024
CIP code (consult IR /Registrar):	
Method of Delivery: Indicate percentage of face-to-face, hybrid, distance delivery, etc.	Face-to-face

Indicate whether this request is either of the following:

[X] **New Program** (check all that apply)

[ ] **Expansion of Existing Program** (check all that apply)
- [ ] Basic Technical Certificate
- [ ] Intermediate Technical Certificate
- [ ] Advanced Technical Certificate
- [ ] Associate of Applied Science Degree
- [X] Bachelor of Applied Science

[ ] **Modification of Existing Program**
- [ ] Converting one program option to a stand-alone program
- [ ] Consolidating two or more programs into one program
- [ ] Adding certificate or degree to existing program
- [ ] Program expansion outside an institution's Designated service region

College Dean	Date 6/16/23
FVP/Chief Fiscal Officer	Date 6/19/23
Provost/VP for Instruction	Date 6.19.23
President	Date 6/19/23
Academic Affairs Program Manager, OSBE	Date 11/7/ 2023
Chief Financial Officer, OSBE	Date 11/08/2023
Chief Academic Officer, OSBE	Date 11/15/2023
SBOE/Executive Director or Designee Approval	Date

Before completing this form, refer to Board Policy Section III.G., Postsecondary Program Approval and Discontinuance. This proposal form must be completed for the creation of each new program. All questions must be answered.

Rationale for Creation or Modification of the Program

1. **Describe the request and give an overview of the changes that will result.**
   What type of substantive change are you requesting? Will this program be related or tied to other programs on campus? Identify any existing program that this program will replace. If this is an Associate degree, please describe transferability.

The new degree program request is for a Bachelors of Applied Science (BAS) in Digital Forensics and Analytics (DFA) offered at the College of Eastern Idaho (CEI). The DFA program is designed to take Associate of Applied Science (AAS) students in IT Services, Cybersecurity fields on to upper division courses in digital forensics, analytics, cybersecurity, policy, strategy, response, compliance, and additional general education courses required for a bachelor's degrees in the State of Idaho. Digital Forensics is the primary focus of the program with interdisciplinary additions in business and data analytics. This program is not designed to or intended to replace any existing programs as, according to the National Center for Education Statistics (NCES), no Bachelors of Applied Science in Cyber/Computer Forensics exist in Idaho (2023).
CIP CODE: https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=56&cipid=91562

2. **Need for the Program.**
   Describe evidence of the student, regional, and statewide needs that will be addressed by this proposal to include student clientele to be served and address the ways in which the proposed program will meet those needs.

   a. **Workforce and economic need:**
      Provide verification of state workforce needs that will be met by this program. Include job titles and cite the data source. Describe how the proposed program will stimulate the state economy by advancing the field, providing research results, etc.

The Governor's Cybersecurity Task Force indicates that multiple public and private organizations have experienced cybersecurity incidents in the last half-decade requiring improvements to our cybersecurity education and workforce investments (Idaho Department of Commerce, 2022). The task force specifically recommended investing in faculty, instructors, and infrastructure for colleges and universities in their second recommendation. According to Lightcast (2023), Eastern Idaho's current projected growth for forensics, analytics, and related positions averages 17% through 2030. This position estimate includes: Forensic Science Technicians at 10%, Computer Systems Analysts at 11%, Information Security Analysts at 16%, Data Scientists at 41%, Market Research Analysts and Marketing Specialists at 28%, and Computer Systems Analysts at 11%.

The positions examined would bring significant increases to income for graduates from the region of the state which will in turn generate higher income tax revenue. These salary benefits are in addition to the increased talent pool for Idaho private and public sector entities attempting to address cybersecurity, analytics, forensics, and incident response gaps in their organizations. Talent shortages and unfilled positions remain top issues facing technology executives and the cyber-industry (Gartner, 2021; Morgan, 2023).

   b. **Student demand:**
      What is the most likely source of students who will be expected to enroll (full-time, part-time, outreach, etc.). Provide evidence of student demand/ interest from inside and outside of the

institution.

New students in the DFA program are likely to originate from CEI or similar two-year technical programs meeting entry requirements. Students north of Idaho Falls will especially benefit from the program as commuting times and associated risks of winter travel can be problematic in rural Eastern Idaho. CEI estimates about half of graduates from the existing IT Services and Cybersecurity associate's programs go on to bachelor's programs within a few years of graduation. This is a conservative estimate as a 2023 survey of students indicated 80% were interested in continuing a bachelors face-to-face in Idaho Falls. Local employers on the Technical Advisory Committee (TAC) for the same associate programs indicate that careers frequently call for bachelor's degrees which drive students to pursue them for positions. Unfortunately, alumni from CEI frequently select out-of-state online colleges with flat-rate tuition once they enter the online 4-year degree market.

c. Societal Need:
Describe additional societal benefits and cultural benefits of the program.

The societal need for more trained forensics analytics cybersecurity workers is widely apparent as evidenced by recent ransomware attacks in Twin Falls, creation of the Idaho Cybersecurity Task Force, Idaho Cybersecurity Education Initiative, and lastly, the recent ransomware attack on Mountainview Hospital in Idaho Falls (Idaho Department of Commerce, 2022; Lyngass, 2023). Students in northern counties of Region 6, Madison and Clark specifically, are from designated Asset Limited, Income Constrained, Employed (ALICE) counties. This population will especially benefit from economic opportunities created through a bachelor's level education as they seek employment in the region from employers like the Idaho Nation Laboratory (INL), health providers, and public sector work. Additionally, the program has multiple practical components presenting opportunities for students to actively engage with their local industry and communities to strengthen cybersecurity awareness and posture.

3. Program Prioritization
Is the proposed new program a result of program prioritization?

Yes _X____ No _____

If yes, how does the proposed program fit within the recommended actions of the most recent program prioritization findings.

The program does meets program prioritization in multiple aspects:
1. The program is in high demand from local industry and business, as verified by TAC members.
2. CEI governance structure and partners have lent strong support for instruction and facilities.
3. Many students forgo continuing educational opportunities because their circumstances are limited by employment, family obligations, relocations, or are forced into online programs despite a preference for face-to-face instruction.
4. There are very limited Bachelor's options in Region 6 with the few offerings on a traditional schedule which will conflict with full-time work. CEI will focus on running evening classes.
5. The cost model planned will be modeled after CSI's, charging a tuition differential and not utilize any state CTE funding or personnel. It is anticipated the program will be fully self-supporting within three years, depending on enrollment.
6. CEI's spring review by NWCCU had no issues in findings. CEI holds an additional Nation Security Agency designation as a Center for Academic Excellence since 2021, adding to the rigor, integrity, and support opportunities for the college.

4. Credit for Prior Learning
Indicate from the various cross walks where credit for prior learning will be available. If no PLA

has been identified for this program, enter 'Not Applicable'.

The CEI IT Services AAS, formerly Computer Networking Technology, has a long history of aligning courses with common industry certifications and exams. As a result, industry certification and the associated standardized exams are frequently used to assess and offer prior learning credit. Additional mechanisms exist to allow for prior learning through our general CEI policy. Verified prior work experience, portfolios, and armed forces transcripts can also be used to award credit for students who have already gathered necessary knowledge and skills for course credit.

5. Affordability Opportunities
Describe any program-specific steps taken to maximize affordability, such as: textbook options (e.g., Open Educational Resources), online delivery methods, reduced fees, compressed course scheduling, etc. This question applies to certificates, undergraduate, graduate programs alike.

Various technical publishers, including Cengage, Pearson, and TestOut, have reduced cost options like Cengage Unlimited, which allow students a flat rate plan and allows access to their entire library of resources. These libraries frequently contain current editions and updates to technology materials which are absolutely vital to successful careers in industry making these optimum resources to use. CEI also utilizes Open Education Resources, flexible delivery, and affordable materials as often as possible to minimize student costs. There is a wide berth of free guides and white-pages online via vendor websites (e.g. technet.microsoft.com, cisco.com, technet.org, and juniper.net). Lastly, the tuition costs, even after upper division course fees, will be much lower than other options in the region.

Enrollments and Graduates

6. Existing similar programs at Idaho Public Institutions.
Using the chart below, provide enrollments and numbers of graduates for similar existing programs at your institution and other Idaho public institutions for the most past four years.

Instit.	Program Name	Fall Headcount Enrollment in Program				Number of Graduates from Program (Summer, Fall, Spring)			
		FY19	FY20	FY21	FY22 (most recent)	FY19	FY20	FY21	FY22 (most recent)
College of Eastern Idaho	Information Assurance and Cybersecurity AAS; IT Services AAS	14 21	19 19	11 16	19 26	4 14	7 8	5 6	15 7
Boise State University	Bachelor of Science in Computer Science	713	694	699	730	98	111	98	126

(Boise State University, 2023; CEI, n.d)

7. Justification for Duplication (if applicable).
If the proposed program is similar to another program offered by an Idaho public higher education institution, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. Describe why it is not feasible for existing programs at other institutions to fulfill the need for the proposed program.

As previously stated, there are no other digital forensics and analytics bachelor's programs in Idaho (i.e. CIP Code 43.0403) (National Center for Education Statistics, 2023). The closest comparisons in Idaho tend to be broader Computer Science degrees with emphasis in Cybersecurity which are included above for comparison. These degree programs tend toward traditional software development and mathematics theory with which do not emphasize forensics and analytics skills. Boise State has specifically been listed because it relates most with the Cybersecurity option, as opposed to industrial or Operational Technology Cybersecurity at ISU which is unrelated. CEI's existing associate's degrees are given to quantify recent graduate numbers and potential participants. There are no computer science or cybersecurity bachelor's programs currently offered face-to-face in Idaho Falls, forcing most CEI technology graduates to seek online bachelor's programs. Again, when CEI technology alumni enter the online-degree market, they tend to select per-term tuition, out-of-state, universities.

8. Projections for proposed program:
Using the chart below, provide projected enrollments and number of graduates for the proposed program:

Proposed Program: Projected Enrollments and Graduates First Five Years											
Program Name: Digital Forensics and Analytics											
Projected Fall Term Headcount Enrollment in Program						**Projected Annual Number of Graduates From Program**					
FY25 (first year)	FY26	FY27	FY28	FY29		FY26 (first year)	FY27	FY28	FY29	FY30	
5-10	13	19	25	30+		N/A	5	12	18	22	

9. Describe the methodology for determining enrollment and graduation projections.
Refer to information provided in Question #2 "Need for the Program" above. What is the capacity for the program? Describe your recruitment efforts? How did you determine the projected numbers above?

The program capacity is currently limited by CEI Computer Lab facilities. The overall program capacity will thus be, about 20 students per cohort depending on availability and lab space. The primary recruitment efforts will be added to existing CEI recruitment and AAS alumni. It is anticipated that the program will require a year or two to build momentum and approach capacity. We expect about 30 to 40 students taking upper division courses at any time after the program is more established. The projections above are based on CEI Cybersecurity and IT Services alumni who have, self-reported, continued their education. About 80% of CEI technology students indicated they would seek a bachelorette degree if offered face-to-face in Idaho Falls, which makes the above estimates quite conservative. Lastly, the program will have strong local demand because the INL currently requires a bachelor's for most

positions.

10. Minimum Enrollments and Graduates.

a. What are the minimums that the program will need to meet in order to be continued, and what is the logical basis for those minimums?

At the current CEI tuition rate, the minimum number of enrolled students required to run the program is estimated at 8 as it will initially depend on non-CTE, adjunct instructors. This figure is based on the current adjunct pay scale and tuition rate per credit at CEI.

b. If those minimums are not met, what is the sunset clause by which the program will be considered for discontinuance?

The sunset clause for program discontinuance is estimated to be three consecutive years without meeting minimum enrollments and to determined after in-depth program review and evaluations

11. Assurance of Quality.

Describe how the institution will ensure the quality of the program. Describe the institutional process of program review. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation.

CEI's Information Assurance and Cybersecurity AAS program currently holds an NSA Center of Academic Excellence in Cybersecurity Defense (CAE-CD) Program of Study (PoS) credential. The ITS AAS is planning to obtain the same PoS and the DFA BAS program is designed with the potential to obtain this specialized NSA accreditation if approved. CEI also has an established program evaluation and conducts program reviews on a three-year cycle. These will be done for the CDP BAS program in accordance with Northwest Commission on Colleges and Universities (NWCCU) accreditation which CEI successfully completed in the spring.

12. In accordance with Board Policy III.G., an external peer review is required for any new doctoral program.
Attach the peer review report as Appendix A.

Not applicable

13. Teacher Education/Certification Programs

All Educator Preparation programs that lead to certification require review and recommendation from the Professional Standards Commission (PSC) and approval from the State Board of Education.

Will this program lead to certification?

Yes_____ No__X___

If yes, on what date was the Program Approval for Certification Request submitted to the Professional Standards Commission? – N/A

14. Three-Year Plan:

If this is a new proposed program, is it on your institution's approved 3-year plan?

Yes__X___ No_____

If yes, proceed to question 15. If no:

a. Which of the following statements address the reason for adding this program outside of the regular three-year planning process.

Indicate (X) by each applicable statement:

	Program is important for meeting your institution's regional or statewide program responsibilities.
	The program is in response to a specific industry need or workforce opportunity.
	The program is reliant on external funding (grants, donations) with a deadline for acceptance of funding.
	There is a contractual obligation or partnership opportunity related to this program.
	The program is in response to accreditation requirements or recommendations.
	The program is in response to recent changes to teacher certification/endorsement requirements.

b. Provide an explanation for all statements you selected.

Educational Offerings: Curriculum, Intended Learning Outcomes, and Assessment Plan

15. Curriculum. Provide descriptive information of the educational offering.

a. Summary of requirements.

Provide a summary of program requirements using the following table.

Credit hours in required courses offered by the department (s) offering the program.	32 after completion of an AAS
Credit hours in required courses offered by other departments:	43
Credit hours in institutional general education curriculum	34
Credit hours in free electives	3
Total credit hours required for degree program:	120-121 (depending on science general)

b. Curriculum.

Provide the curriculum for the program, including credits to completion, courses by title and assigned academic credit granted.

DFA Program Description:

Bachelors of Applied Science (BAS) in Digital Forensics and Analytics (DFA) is designed for alumni from technology applied associate's programs to continue their practical skills education toward an advanced degree. The DFA program is focused on digital forensics, utilizing interdisciplinary additions from business and data analytics. The forensic courses focus on evidence collection, evaluation, and related incident response, risk planning and asset management, and implementation of best cybersecurity principles and practices. Business and analytics courses prepare students for common managerial responsibilities in data collection and presentation to stakeholders in organizations, legal counsel or

judicial teams, and other interests. Special focus in the DAF program is given to practical content through the use of internships and a culminating capstone experience.

Pre-Admission Requirement:

Bachelors Successful completion of an Associate of Applied Science Degree for a minimum of 60 credits for acceptance into the program. This includes completion of a minimum of 15 credits of general education coursework.

Courses:

Type	Course	Credits
	ITS or CSEC AAS Core CTE Total	45
GEM 1	ENG 101 - Writing and Rhetoric I	3
GEM 2	COMM 101 - Fund of Oral Communication	3
GEM 3	Any Gem 3 Math WoK Course	3
GEM 5	Any Gem 5 Education Humanistic & Artistic WoK	3
GEM 6	Any Gem 6 Social & Behavioral Wok	3
	Total AAS Credits	60

Type	Course	Credits
CTE	ITS or CSEC AAS Core CTE Total	45
AAS GE	Associate's General Education	15
GEM 1	ENG 102 - Writing and Rhetoric II	3
GEM 4	Any Gem 4 Science WoK Course with lab	4
GEM 4	Any 2nd GEM 4 Science WoK Course (Must be a new prefix)	3 or 4
GEM 5	Any 2nd GEM 5 Humanistic & Artistic WoK Course (Must be a new prefix)	3
GEM 6	Any 2nd GEM 6 Social and Behavioral Wok Course (Must be CRJ 103/Phil103)*	3
GE Elective	Any Gen. Ed. Elective (Recommended ENGL 203) *	3
GE Elective	BSN 101 - Introduction to Business*	3
GE Elective	BSN 115 - Introduction to Business Applications	3
GE Elective	BSN 255 - Leadership Development Skills*	3
Upper Div.	DFA 300 - Intro to Digital Forensics	3
Upper Div.	DFA 305 - Database Administration and Security	3
Upper Div.	DFA 310 - Data Analytics Internship	3
Upper Div.	DFA 315 - Database Management	3
Upper Div.	DFA 320 - Incident Planning and Response	3
Upper Div.	DFA 400 - Intro to Cyber Operations	3
Upper Div.	DFA 405 - Project Management	3
Upper Div.	DFA 410 - Forensics Internship	4
Upper Div.	DFA 415 - Device Forensics	3
Upper Div.	DFA 490 - Forensics Analytics Capstone	4
Upper Div.	Additional BAS credits	60-61
	Total	120

*Students who have already completed courses will not be required to retake them, but will be expected to complete an alternative course in the same area. Students must complete the

minimum 120 credit hours required for a bachelor's degree as defined by the Idaho State Board of Education and applicable laws and statutes.

Completion Requirements:
Requirements include 32 program credits, 9 business credits, and 19-20 credits of general education coursework (not completed as part of the AAS but required for bachelor's). Total Credit Hours Required for this Major: 120

c. Additional requirements.
Describe additional requirements such as comprehensive examination, senior thesis or other capstone experience, practicum, or internship, some of which may carry credit hours included in the list above.

The DFA program does carry a Forensics Capstone experience, in addition to analytics and forensics industry internships, which will require applying practical skills to follow industry best-practices, frameworks, and principles.

16. Learning Outcomes: Expected Student Learning Outcomes and Connection to Curriculum.

a. Intended Learning Outcomes.
List the Intended Learning Outcomes for the proposed program, using learner-centered statements that indicate what students will know, understand, and be able to do, and value or appreciate as a result of completing the program.

- Implement and practice ethically responsible standards and procedures
- Gather and evaluate the quality of forensic evidence sufficient for criminal judicial processes
- Analyze digital systems and data to determine business impact
- Assess business, legal, and technological risk
- Manage risks through data-driven assessment, planning, and applications
- Develop, lead, and communicate valid cybersecurity practices and solutions
- Apply digital forensics investigation tactics, techniques, and principles

17. Assessment plans.

a. Assessment Process.
Describe the assessment plan for student learning outcomes that will be used to evaluate student achievement and how the results will be used to improve the program.

The program will be assessed following existing CEI structure as set by the Academic Standards Committee and in accordance with NWCCU and CAE accreditation standards.

Resources Required for Implementation – fiscal impact and budget.
Organizational arrangements required within the institution to accommodate the change including administrative, staff, and faculty hires, facilities, student services, library; etc.

18. Physical Facilities and Equipment:
Describe the provision for physical facilities and equipment.

a. Existing resources.
Describe equipment, space, laboratory instruments, computer(s), or other physical equipment presently available to support the successful implementation of the program.

CEI currently has facilities with 9 computer labs, and about 1030 computers, and associated equipment to support the program and additional students.

b. Impact of new program.
What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated?

Increased use of facilities will require course scheduling and coordination so as to allow existing programs to remain unaffected. The program will also likely run in the evenings to allow allows students to work regular full-time positions while continuing their education. Additional outfitted computer labs and facilities would ease burdens due to additional courses and students.

c. Needed resources.
List equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. Enter the costs of those physical resources into the budget sheet.

Additional resources are not required to start the program.

19. Library and Information Resources:
Describe adequacy and availability of library and information resources.

a. Existing resources and impact of new program.
Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? Will there be an impact on existing programs of increased library usage caused by the proposed program? For off-campus programs, clearly indicate how the library resources are to be provided.

The existing library resources are sufficient to support the DFA BAS program and it is unexpected to have a significant impact on existing programs.

b. Needed resources.
What new library resources will be required to ensure successful implementation of the program? Enter the costs of those library resources into the budget sheet.

Not applicable

20. Faculty/Personnel resources

a. Needed resources.
Give an overview of the personnel resources that will be needed to implement the program. How many additional sections of existing courses will be needed? Referring to the list of new courses to be created, what instructional capacity will be needed to offer the necessary number of sections?

CEI intends to utilize local industry cybersecurity practitioners and experts to teach courses within the program. There are many international experts in the region because of the proximity to the INL willing to teach courses. One section of each upper division DFA courses will be offered per fiscal year, requiring 32 credits of adjunct pay, with the possibility of full-time faculty added as required and permissible.

b. Existing resources.
Describe the existing instructional, support, and administrative resources that can be brought to bear to support the successful implementation of the program.

CEI's AAS programs are funded via the Idaho CTE, providing for the first two years of education. Upper division courses cannot utilize CTE faculty in accordance with state policy. As such, existing additional resources available are services student counselling, disability, federal, taxing-district, administrative, and the planned Teaching and Learning Center are available to support the program.

c. Impact on existing programs.
What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained?

Existing programs will not be substantially affected as they are autonomous and operate separately from the DAF bachelor's degree, offering multiple sections of existing courses as part of the community college mission. Additional faculty may be required due to future growth, but are not required immediately.

d. Needed resources.
List the new personnel that must be hired to support the proposed program. Enter the costs of those personnel resources into the budget sheet.

CEI does not anticipate additional salaried positions required at the initial phases.

21. Revenue Sources

a. Reallocation of funds:
If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

The program will not be funded using existing budgets, which will prevent reallocation of funds. Following College of Southern Idaho's bachelor's model, the differential tuition for upper division courses will offset costs for the program.

b. New appropriation.
If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request.

N/A

c. Non-ongoing sources:

i. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends?

CEI is currently seeking National Science Foundation and other federal grants but does not depend on such sources for program funding.

ii. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds?

As previously indicated, the tuition differential for upper-division courses should be more than adequate

to fund the adjunct positions required for the program. If full-time faculty were funded as program enrollment increases, tuition would revert to established CEI tuition rates.

d. Student Fees:

i. If the proposed program is intended to levy any institutional local fees, explain how doing so meets the requirements of Board Policy V.R., 3.b.

CTE funds cannot be utilized for community college bachelor's programs. As such, the tuition differential will be calculated to offset the costs of the program due to additional adjunct faculty positions.

ii. Provide estimated cost to students and total revenue for self-support programs and for professional fees and other fees anticipated to be requested under Board Policy V.R., if applicable.

The expected average starting additional costs to students per upper division DFA course are about $200. (Based on the current tuition rates, adjunct pay schedule, and eight students per section). As program funding changes and/or course sizes increase, the tuition differential will drop substantially. The budget proposal sheet estimates this fee will drop $50 each fiscal year with enrollment growth.

22. Using the excel **budget template** provided by the Office of the State Board of Education, provide the following information:

- Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first **four** fiscal years of the program.
- Include reallocation of existing personnel and resources and anticipated or requested new resources.
- Second and third year estimates should be in constant dollars.
- Amounts should reconcile subsequent pages where budget explanations are provided.
- If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).
- Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

See attached budget and notes.

References

Boise State University. (2023). *Computer Science Department stats.* https://www.boisestate.edu/coen-cs/about/stats/

Lightcast. (2023). *Lightcast Q2 2023 data set*.

College of Eastern Idaho (CEI). (n.d.). *Cybersecurity and technology department.* Retrieved October 12, 2022, from https://cei.edu/programs-of-study/technology

Idaho Department of Commerce. (2022). *Governor's Cybersecurity Task Force Report.* https://gov.idaho.gov/wp-content/uploads/2022/05/2022-cybersecurity-tf-recommendations.pdf.

Gartner. (2021). *Gartner survey reveals talent shortages as biggest barrier to emerging technologies adoption*. https://www.gartner.com/en/newsroom/press-releases/2021-09-13-gartner-survey-reveals-talent-shortages-as-biggest-barrier-to-emerging-technologies-adoption

Lyngaas, S. (2023, May 31). *Cyberattack forces Idaho Hospital to send ambulances elsewhere.* https://www.cnn.com/2023/05/31/politics/idaho-hospital-cyberattack/index.html

Morgan, S. (2023). Cybersecurity Jobs Report: 3.5 Million Unfilled Positions In 2025. *Cybercrime Magazine*. https://cybersecurityventures.com/jobs/

National Center for Education Statistics (NCES). (2023). *IPEDS: Integrated Postsecondary Education Data System: Idaho Title IV degree-granting institutions.* https://nces.ed.gov/ipeds

Appendix A

College of Eastern Idaho

Cybersecurity and IT Services AAS
Technical Advisory Committee

Cybersecurity & Technology Dept.

Meeting Agenda

Date: April 21, 2023
Location: Yellowstone Training Center rm. 203; 3950 S. Yellowstone Hwy; Idaho Falls, ID, 83402
Time: 1:30pm – 2:30pm

CEI Personnel in attendance:
Rick Aman – CEI President
Joshua N. Duersch – Cybersecurity and Technology Department Chair
Don Casper – Information Technology Services Faculty
Don Williams – Information Assurance and Cybersecurity Lead Faculty
Jim Hammon – ITS Lead Instructor
Frankie Adams – Computer Technology & STEM Program Manager
Landon Meikle – Digital Media Instructor
Michell Shropshire – CEI Director of Grants

Attendees:
T.J. Rowe – Network and Security Specialist at IF Power
Brad Slaughter, Jared Bodel, & Mr. Miller – ECS
Cody Christensen
Larry Seymour – Snake River School District
Sam Kudla – Snake River School District
Virigina "Ginger" Wright – INL
Mark Stacey – Director for Strategy at Dragos - ICS cybersecurity company & Adjunct Professor at Boise State University for the Master of Science Cyber Operations and Resilience (CORe) program

Topics

1. CEI CSEC/ITS department will move to main campus this Summer 2023. WTCE will stay at YTC until 2024.
2. Don Casper is retiring – retirement party May 5th at noon (CEI Campus, Building 3, Room 306) - all are welcome to attend
3. We are in the process of creating a CEI Bachelor of Applied Science – Digital Forensics and Analytics – for potentially for the 2024-2025 catalog

https://myeitc.sharepoint.com/:x:/s/CnTDepartment/EQE350oLLb9JkT1R1M_I97kBudPQNr5KYGdsdEgVws-Ang?e=EEHWod

a. Add Incident Response & Planning
    i. Use neutral, not subjective language
    ii. Potentially do Eng. Spec. topics instead
b. BSN:261 – Check legal for chain of custody, court admissibility, etc.
c. Check machine learning & AI in analytics courses
d. TAC members in agreement that there is an industry need for a DFA BAS at CEI

4. AWS vs AZ
    a. Entry point I.T.
    b. Kubernetes
5. Increase VMware & RHEL students over summer
6. Message from Workforce Training – Frankie
    a. Workforce training is available for non-academic training from a 1 week excel course to an advance Python program thru "Just-in-time" training programs available for your company needs
    b. Contact Frankie for more information - frankie.adams@cei.edu

Appendix B

National Centers of Academic Excellence in Cyber Defense
9800 Savage Road
Ft. Meade, MD 20755-6804

22 Sep 2021

College of Eastern Idaho
. David Oliver
1600 S 25th E
Idaho Falls, Idaho, 83402

. David Oliver:

I am pleased to inform you that College of Eastern Idaho has been designated as a National Center of Academic Excellence in Cyber Defense (CAE-CD) for the validated program(s) of study through academic year 2026.

Your ability to meet the increasing demands of the program criteria will serve the nation well in contributing to the protection of the National Information Infrastructure. The National Cyber Strategy, September 2018, addresses the critical shortage of professionals with cybersecurity skills and highlights the importance of higher education as a solution to defending America's cyberspace. "A highly skilled cybersecurity workforce is a strategic national security advantage." "The United States Government will continue to invest in and enhance programs that build the domestic talent pipeline, from primary through postsecondary education." Education is the key to promoting these ideals.

Certificates will be presented at a designation ceremony of your choice. Details on each ceremony location will be detailed at a later time. We appreciate your participation in this program and look forward to seeing you in the future.

Sincerely,

\s\

Karen Leuschner
National CAE Program Manager, NSA

Program Resource Requirements. CEI - Budget for BAS, Digital Forensics and Analytics

- Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first **four** fiscal years of
- Include reallocation of existing personnel and resources and anticipated or requested new resources.
- Second and third year estimates should be in constant dollars.
- Amounts should reconcile subsequent pages where budget explanations are provided.
- If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).
- Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

I. PLANNED STUDENT ENROLLMENT

	FY 2024		FY 2025		FY 2026		FY 2027	
	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments	2	8	2	13	2	19	3	25
B. Shifting enrollments	0	0	0	0	0	0	0	0
Total Enrollment	2	8	2	13	2	19	3	40

II. REVENUE

	FY 2024		FY 2025		FY 2026		FY 2027	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Reques	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2. Institution Funds	$17,108.00	$0.00	$8,358.19	$0.00	$0.00	$0.00	$3,315.35	$0.00
3. Federal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
4. New Tuition Revenues from Increased Enrollments	$13,440.00	$0.00	$21,840.00	$0.00	$31,920.00	$0.00	$42,000.00	$0.00
5. Student Fees	$1,600.00	$0.00	$1,950.00	$0.00	$1,900.00	$0.00	$1,250.00	$0.00
6. Other (i.e., Gifts)								
Total Revenue	$32,148	$0	$32,148	$0	$33,820	$0	$46,565	$0

Ongoing is defined as ongoing operating budget for the program which will become part of the base.
One-time is defined as one-time funding in a fiscal year and not part of the base.

III. EXPENDITURES

	FY 2024		FY 2025		FY 2026		FY 2027	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs								
1. FTE	2.0	0.00	2.0	0.00	2.0	0.00	3.0	$0.00
2. Faculty	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
3. Adjunct Faculty	$ 28,000.00	$0.00	$28,000.00	$0.00	$ 28,000.00	$0.00	$ 42,000.00	$0.00
4. Graduate/Undergrad Assistants	0	$0.00	0	$0.00	0	$0.00	0	$0.00
5. Research Personnel	0	$0.00	0	$0.00	0	$0.00	0	$0.00
6. Directors/Administrators	0	$0.00	0	$0.00	0	$0.00	0	$0.00
7. Administrative Support Personnel	0	$0.00	0	$0.00	0	$0.00	0	$0.00
8. Fringe Benefits	2948.19	$0.00	2948.19	$0.00	2948.19	$0.00	3365.35	$0.00
9. Other:								
Total Personnel and Costs	$30,948	$0	$30,948	$0	$30,948	$0	$45,365	$0

	FY 2024		FY 2025		FY 2026		FY 2027	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures								
1. Travel	$1,000.00	$0.00	$1,000.00	$0.00	$1,000.00	$0.00	$1,000.00	$0.00
2. Professional Services	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
3. Other Services	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
4. Communications	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
5. Materials and Supplies	$200.00	$0.00	$200.00	$0.00	$200.00	$0.00	$200.00	$0.00
6. Rentals	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
7. Materials & Goods for Manufacture & Resale	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
8. Miscellaneous								
Total Operating Expenditures	$1,200	$0	$1,200	$0	$1,200	$0	$1,200	$0

	FY		FY		FY		FY	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay								
1. Library Resources	$0.00	$0.00	0	$0.00	$0.00	$0.00	$0.00	$0.00
2. Equipment	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Capital Outlay	$0	$0	$0	$0	$0	$0	$0	$0

	FY 2024		FY 2025		FY 2026		FY 2027	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
D. Capital Facilities Construction or Major Renovation								
E. Other Costs								
Utilites	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Maintenance & Repairs	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Other								
Total Other Costs	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL EXPENDITURES:	$32,148	$0	$32,148	$0	$32,148	$0	$46,565	$0
Net Income (Deficit)	$0	$0	$0	$0	$1,672	$0	$0	$0

Budget Notes (specify row and add explanation where needed; e.g., "I.A.,B. FTE is calculated using…"):

I.A.B.	Most of the students will be part time although some may be full time. We used a cohort model calculation for FTE based core DFA courses rounded up. Comes to about 10 to 1.
11.5	Estimates student fee will drop $50 each fiscal year with enrollment growth.

College of Eastern Idaho
BAS, Digital Forensics and Analytics
Responses to Five Criteria per Board Policy III.Z.

1) Demand - Proposed offerings must meet an urgent, local need based on where students who complete the offering will be employed rather than on where the students reside. The demand for the proposed offering needs to be clear, urgent, and compelling, as evidenced through data and industry input. Commitments of practical support (e.g. funding, internships, etc.) from industry stakeholders constitutes evidence of demand.
CEI's Cybersecurity and Technology Technical Advisory Committee (TAC) has indicated that there is strong interest in the digital forensics and analytics bachelor's degree. The TAC has already supported associates level internships and has expressed support for the upper division as well. Bachelor's degrees are important for students in Eastern Idaho as they act as a filter for most of the INL and related managerial positions. The hiring pool the INL has drawn to the area has drawn more credentialed talent to the region. Job growth in the region is also raising the bar for students coming out of associates programs and is also expected to increase the number of positions in this space across the board.

   To quantify the regional growth, according to Lightcast (2023), forensics, analytics, and related positions average 17% increase through 2030. This estimate includes: Forensic Science Technicians at 10%, Computer Systems Analysts at 11%, Information Security Analysts at 16%, Data Scientists at 41%, Market Research Analysts and Marketing Specialists at 28%, and Computer Systems Analysts at 11%. Lastly, in the spring of 2023 a survey of existing CEI technology students found that 80% would be "committed to continuing" if the bachelor's degree was available in Idaho Falls. The proposal's enrollment estimates for the Digital Analytics and Forensics program are very conservative on comparison.

2) Specialization - The proposed offering must be based on the unique capability at the institution, founded on specialized instructional expertise and any infrastructure necessary for program delivery.

   As indicated in the proposal form, the CIP code 43.0403 or Cyber/Computer Forensics and Counterterrorism has zero programs in Idaho, according to the National Center for Education Statistics (NCES) (2023). Digital Forensics is the primary focus of the program with interdisciplinary additions from business and data analytics. Also, in a broader sense, there are no Computer Science Bachelor's degrees offered fully in Idaho Falls. There is, however, a large talent pool from the INL and the University programs associated with it in Idaho Falls. These area industry experts, researchers, and academics are uniquely capable of providing an advanced experience that students could not receive elsewhere. We have already had great success with the cybersecurity associate's program which relies on these experts in an adjunct capacity each term.

3) Non-Competitiveness - The proposed offering must be non-competitive with other institutions' offerings within the identified service area (whether regional or statewide) and supported by other institutions within the service area. The Executive Director or designee may request written commitments from the presidents of other institutions within the service area expressing conceptual and, if necessary, practical support for the proposed program.

   As previously indicated, there are no digital forensics bachelors in the state, and no, loosely related, Computer Science Bachelor's offered in Region 6. This degree does not compete with any of Idaho's Universities or their programs.

4) Collaboration - Alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions. High-demand programs must be offered through inter-institutional collaboration as described in this policy.

   We have been working collaboratively with the Idaho Cybersecurity Education Initiative group across the state with the other colleges and universities since 2020. We have also been working very closely with university professors at all of the state institutions on a large number of collaborative projects. We have created transfer or dual-enrollment agreements ISU, BSU, and LCSC. Other institutions do have other STEM programs but none of this nature.

5) Resources - The institution must have sufficient resources to develop and deliver the proposed offering.

   CEI intends to lean on existing facilities and capabilities to deliver the program with few extra needs. We also have numerous TAC connections, INL, and university partnerships that we can leverage to meet the needs for the program. We do not anticipate significant difficulties meeting the delivery requirements of the program.

Larry Seymour
922 West hwy 39
Blackfoot Idaho 83221

November 6th, 2023
seymlarr@snakeriver.org
(208)-684-5661

Dear Joshua N Duersch
College of Eastern Idaho

I am writing to express my wholehearted support for the proposal to establish new BAS (Bachelor of Applied Science) programs at the College of Eastern Idaho. As an active member of the community and an advocate for higher education, I believe that introducing such programs will have a profound positive impact on our region, our students, and our local workforce.

The need for a Cyber Security BAS and Operations Management BAS programs in our area is evident, as the ever-evolving job market increasingly demands a more specialized and educated workforce. By offering these BAS programs, the College of Eastern Idaho would empower students to bridge the gap between their existing knowledge and the advanced skills necessary for success in today's job market.

Here are some key reasons why I believe these programs are essential:

Increased Access to Higher Education: The introduction of BAS programs will expand educational opportunities for local students. It will enable them to obtain a bachelor's degree right here in our community without having to relocate, thereby making higher education more accessible and affordable.

Supporting Local Employers: BAS programs will equip students with practical skills and knowledge tailored to the needs of local employers. This will, in turn, boost our regional economy and support the growth of local businesses.

Retaining Talent: By offering these BAS programs, the College of Eastern Idaho can help retain our talented students in the region. Graduates are more likely to stay and contribute to the local workforce if they have access to relevant educational opportunities.

I am confident that the College of Eastern Idaho has the expertise and resources to develop and maintain high-quality BAS programs. This initiative aligns perfectly with the institution's mission of providing affordable and accessible education to our community.

I am willing to support this effort in any way possible, through volunteer work and promoting the program among prospective students. Please consider my endorsement for the proposed BAS programs, and I hope to see it become a reality for the benefit of our community.

Thank you for your dedication to advancing education in our region, and I look forward to witnessing the positive impact these programs will have on our community and its future leaders.

Sincerely,

Larry Seymour
Technology Director
Computer Support Instructor
Snake River School District

College of Eastern Idaho
1600 South 25th East • Idaho Falls, Idaho 83404-5788 • 208.524.3000 • www.cei.edu

November 16, 2023

To: Idaho State Board of Education
Re: Support for College of Eastern Idaho's two BAS degrees

Dear State Board of Education Members:

As the Chair of the Board of Trustees for College of Eastern Idaho (CEI) I am writing to express our support for these two proposed Applied Bachelor's Degrees (BAS) for our institution. As an elected five-member board, we firmly believe that these two, four-year technical degrees will significantly enhance the capacity of CEI to serve the workforce needs of our community.

I acknowledge the concerns raised by our university partners regarding potential competition between community college-level BAS degrees with these applied bachelor's programs. However, we believe that the proposed BAS degrees at CEI are designed to complement, rather than compete with existing university programs. These degrees are specifically tailored to meet the practical and applied learning needs of individuals seeking career advancement in technical fields.

Our College has received widespread support from local industries for the proposed BAS degrees. This endorsement from local employers underscores the demand for these programs and their potential to address the critical workforce needs of our region.

The Board of Trustees wholeheartedly endorses the proposed Applied Bachelor's Degrees for the College of Eastern Idaho. We are confident these additions to CEI's degree base will enhance workforce development and will contribute to the economic vitality of our region. We urge you to grant your endorsement and acceptance of these BAS degrees.

Sincerely,

Park Price
Board Chair, College of Eastern Idaho

COLLEGE OF EASTERN IDAHO

SUBJECT

Bachelor of Applied Science, Operations Management

APPLICABLE STATUTE, RULE, OR POLICY

Idaho State Board of Education Governing Policies and Procedures, Section III.G. and Section III.Z.
Idaho Code § 33-107(8) and Idaho Code § 33-2107A

BACKGROUND/DISCUSSION

The College of Eastern Idaho (CEI) has been approached, and supported by, business and governmental agencies in Region VI regarding the establishment of a Bachelor of Applied Science degree to be offered in educational Region VI as specified in Board policy III.Z.2.2. The program will allow those students having successfully completed an Associate of Applied Science degree to continue their studies to finish a Bachelor of Applied Science degree in Region VI beginning in the fall of 2025.

The intent to offer a bachelor's degree was communicated to the SBOE in CEI's three-year plan submitted in the spring of 2022. This program is based entirely on the proposal approved by the Board in 2018 allowing College of Southern Idaho to create a Bachelor of Applied Science to meet local needs as supported by the attached letters of support.

The program has been approved by the college's Academic Standards Committee, the President's Advisory Committee and the College of Eastern Idaho's Board of Trustees.

In 2022, the Board adopted amendments to Policy III.Z. to include five specific criteria for evaluating proposed baccalaureate degrees by the community colleges:

- "Demand: Proposed offerings must be to meet an urgent, local need based on where students who complete the offering will be employed rather than on where the students reside. The demand for the proposed offering needs to be clear, urgent, and compelling, as evidenced through data and industry input. Commitments of practical support (e.g. funding, internships, etc.) from industry stakeholders constitutes evidence of demand.
- "Specialization: The proposed offering must be based on the unique capability at the institution, founded on specialized instructional expertise and any infrastructure necessary for program delivery.
- "Non-competitiveness: The proposed offering must be non-competitive with other institutions' offerings within the identified service area (whether regional or statewide) and supported by other institutions within the service area. The Executive Director or designee may request written commitments

from the presidents of other institutions within the service area expressing conceptual and, if necessary, practical support for the proposed program.

- "Collaboration: Alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions. High-demand programs must be offered through inter-institutional collaboration as described in this policy.
- Resources: The institution must have sufficient resources to develop and deliver the proposed offering."

IMPACT

The program would allow the completion of an Applied Bachelor's degree for students having completed an Associate of Applied Science degree in Idaho Falls. This program is not currently offered in Region VI by any other institution in the state. A bachelor's degree is often the minimum degree required by local employers such as the Idaho National Laboratory. The coursework would provide instruction to students needing a bachelor's degree, but unable to travel outside of Region VI to attend classes due to employment and family obligations. This degree also allows learners who are ready to move into management, but need requisite skills to do so, to acquire those skills locally and at a lower price point than a university degree.

The proposed program will have adequate facilities and equipment and library resources to start and support the program. CEI will primarily utilize adjunct faculty to teach courses with some capacity to accommodate program growth in the short-term. However, CEI may need to add additional faculty to support future growth. The program will follow CSI's applied baccalaureate budget model where differential tuition for upper division courses will offset the costs for program. Should this funding model not be successful, the program will revert to CEI's tuition model. The program will require $14,348 - $16,565 on-going funding over a four-year period resulting in a projected net income of $5,897 - $7,906 over a four-year period.

ATTACHMENTS

Attachment 1 – Operations Management BAS Proposal
Attachment 2 – Institution Responses for Operations Management Proposal
Attachment 3 – CEI Responses to Comments

BOARD STAFF COMMENTS AND RECOMMENDATIONS

CEI has identified a need in Region VI for an applied baccalaureate degree in Operations Management based on local industry demand from entities such as Idaho National Laboratory, Naval Nuclear Lab, Elevation Labs, and Basic American Foods. Letters of support are provided in the program proposal. Currently, College of Southern Idaho is the only other community college in Idaho with a Bachelor of Applied Science. CSI's degree is also in Operations Management, currently offered in Region IV. This program was originally approved

under the title Advanced Food Technology. The title was modified in 2021. While the proposed program shares many aspects of CSI's program, CEI represents there is strong local demand in Region VI and is supported by local industry. While not listed in the proposal, Idaho State University provides that they offer multiple pathways for BAS majors. Additionally, ISU offers a Project Management certificate which includes curriculum in Operations and Supply Chain Management, Project Management, and Productivity and Quality Management that is available to students. ISU also has a certificate in Supply Chain Management with courses in operations/supply chain management, purchasing, and logistics.

The proposed applied baccalaureate degree in Operations Management is consistent with CEI's Three-Year Plan for implementation Fall 2024. As provided in Board Policy III.Z, no institution has the statewide program responsibility for applied baccalaureate programs. Each institution has a service region program responsibility consistent with Board Policy III.Z to assess and ensure the delivery of all educational programs and services necessary to meet the educational workforce needs within its assigned service region. Staff notes that in 2018, Board Policy III.Z was amended to include community colleges in the Academic Service Regions to serve alongside the four-year institutions in sharing responsibility for meeting undergraduate program needs. Consistent with Board Policy III.Z, CEI and Idaho State University are designated to serve undergraduate education needs in Region VI to include applied baccalaureate degree programs.

CEI projects 24 initial enrollments in the program, reaching 72 by year five and graduating 24 by year four. The college estimates that eight enrollments will be required for sustainability and to break even for classes taught by adjuncts. If those minimums are not met, the program will undergo an in-depth evaluation to determine where improvements can be made for program continuance.

In 2022, the Board approved amendments to Board Policy III.Z to include a set of minimum criteria by which the Board will evaluate proposals by the universities to offer new associate degrees and proposals by the community colleges to offer baccalaureate degrees. The program's responses are included with the proposal for the Board's review and consideration.

The proposal completed the program review process and was shared with the Council on Academic Affairs and Programs on November 2, 2023 and with the Committee on Instruction, Research, and Student Affairs on November 30, 2023.

Idaho State University, Lewis-Clark State College, Boise State University, and University of Idaho have shared concerns about the program proposal, including claims that the proposal is not fully responsive to the Board's criteria for baccalaureate degree offerings by community colleges set forth in Board Policy III.Z. Particularly, institutions have raised concerns around collaboration efforts and impacts to system-ness, specialization of the degree, duplication of existing

programs offered by institutions, and unnecessary competition. Concerns from the institutions are in Attachment 2. CEI has provided responses to those observations, which are included in Attachment 3 for the Board's review.

The Board should carefully consider all concerns and observations raised by the other institutions, as well as responses to these concerns from CEI, to determine whether the need for the proposed program in Region VI can be met solely by CEI based on workforce needs and capacity identified in the proposal. The Board must also consider whether the proposal meets the criteria in Board policy for approving proposed baccalaureate programs at the community college level. If the Board determines proposal does not meet these criteria but the Board desires to approve the program anyway, then the Board must first waive this portion of policy.

BOARD ACTION

I move to approve the request by College of Eastern Idaho to create a new program that will award a Bachelor of Applied Science in Operations Management in substantial conformance to the program proposal submitted as Attachment 1.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

Institutional Tracking No. _____

Idaho State Board of Education

FULL PROPOSAL FORM

Academic Degree and Certificate Program

Date of Proposal Submission: May 1, 2023

Institution Submitting Proposal:	College of Eastern Idaho
Name of College, School, or Division:	Career Technical Education
Name of Department(s) or Area(s):	Business
Official Name of the Program:	Bachelor of Applied Science in Operations Management
Implementation Date:	August 2024
CIP code (consult IR /Registrar):	52.0201
Method of Delivery: Indicate percentage of face-to-face, hybrid, distance delivery, etc.	Face-to-face

Indicate whether this request is either of the following:

[X] **New Program** (check all that apply)

[ ] **Expansion of Existing Program** (check all that apply)

- [ ] Basic Technical Certificate
- [ ] Intermediate Technical Certificate
- [ ] Advanced Technical Certificate
- [ ] Associate of Applied Science Degree
- [X] Bachelor of Applied Science

[ ] **Modification of Existing Program**

- [ ] Converting one program option to a stand-alone program
- [ ] Consolidating two or more programs into one program
- [ ] Adding certificate or degree to existing program
- [ ] Program expansion outside an institution's Designated service region

College Dean — 6/16/23 — Date

Academic Affairs Program Manager, OSBE — 11/7/ 2023 — Date

VP/Chief Fiscal Officer — Byron S. Miles — 6/19/23 — Date

Chief Financial Officer, OSBE — 11/08/2023 — Date

Provost/VP for Instruction — Lori D Barber — 6.19.23 — Date

Chief Academic Officer, OSBE — TJ Bliss — 11/20/23 — Date

President — 6/19/23 — Date

SBOE/Executive Director or Designee Approval — Date

Before completing this form, refer to Board Policy Section III.G., Postsecondary Program Approval and Discontinuance. This proposal form must be completed for the creation of each new program. All questions must be answered.

Rationale for Creation or Modification of the Program

1. **Describe the request and give an overview of the changes that will result.** What type of substantive change are you requesting? Will this program be related or tied to other programs on campus? Identify any existing program that this program will replace. If this is an Associate degree, please describe transferability.

The program as requested by local business and industry will allow students transitioning from an AAS degree to continue to a Bachelors with no loss of credit or having to leave the area. This will support technical program student in high demand as a pathway to a Bachelor's degree without online learning or travel for classes.

2. **Need for the Program**. Describe evidence of the student, regional, and statewide needs that will be addressed by this proposal to include student clientele to be served and address the ways in which the proposed program will meet those needs.

   a. **Workforce and economic need:** Provide verification of state workforce needs that will be met by this program. Include job titles and cite the data source. Describe how the proposed program will stimulate the state economy by advancing the field, providing research results, etc.

   Many local employers (such as the INL) require a Bachelor's degree, but the pathways are extremely limited without having to travel and the class schedules are not always conducive to those working full-time.

   b. **Student demand.** What is the most likely source of students who will be expected to enroll (full-time, part-time, outreach, etc.). Provide evidence of student demand/ interest from inside and outside of the institution.

We anticipate that the students will be those currently working at the INL, but wishing to progress in their careers and need a Bachelor's degree to do so. We would also anticipate those place-bound to the area by familial or employment barriers. We would also recruit from the large rural population to the north of Idaho Falls for whom travelling elsewhere is problematic and in winter impossible on many days.

   c. **Societal Need**: Describe additional societal benefits and cultural benefits of the program. The addition of the program would have a direct economic advantage for those who might have bene unable to continue their education otherwise. This is particularly true in Madison and Clark Counties which are designated ALICE counties.

3. **Program Prioritization**
   Is the proposed new program a result of program prioritization?

   Yes___X__ No_____

   If yes, how does the proposed program fit within the recommended actions of the most recent program prioritization findings.

The program does meet the program prioritization standards is several ways:

1. It is in demand through local business and industry
2. We would follow the same cost model as the one used by CSI charging a tuition differential and not utilize any state CTE funding or personnel.
3. Many students forgo the opportunity to obtain and additional degree because their circumstances are limited by employment and family obligations or are forced into online learning programs when they would prefer face-to-face.
4. There are very limited opportunities to obtain a Bachelor's degree in region 6 and the few that are offered are mostly on a traditional schedule, while we will focus on running evening classes.
5. We have a robust assessment process to maintain program quality that was recently reviewed by the NWCCU with no findings.
6. We have an excellent governance structure and partners willing to qualified faculty needed for the program.

4. Credit for Prior Learning

Indicate from the various cross walks where credit for prior learning will be available. If no PLA has been identified for this program, enter 'Not Applicable'.

We have a general published policy on CPL and we are willing to examine classes not currently included for PLA as needed.

5. Affordability Opportunities

Describe any program-specific steps taken to maximize affordability, such as: textbook options (e.g., Open Educational Resources), online delivery methods, reduced fees, compressed course scheduling, etc. This question applies to certificates, undergraduate, graduate programs alike.

We will utilize OER resources when available for the courses whenever possible and if not focus on reducing costs to students. We also, while charging a stipend for upper level classes will still be more affordable than other institutions in the area/

Enrollments and Graduates

6. **Existing similar programs at Idaho Public Institutions.** Using the chart below, provide enrollments and numbers of graduates for similar existing programs at your institution and other Idaho public institutions for the most past four years.

Instit.	Program Name	Fall Headcount Enrollment in Program				Number of Graduates From Program (Summer, Fall, Spring)			
CSI	**Advanced Food Technology BAS**	FY 20 2	FY 21 5	FY 22 1	FY 23 (most recent)	FY 20 0	FY 21 1	FY 22 3	FY 23 (most recent)
CSI	**Operations Management BAS (name change)**				17				2

7. **Justification for Duplication** (if applicable). If the proposed program is similar to another program offered by an Idaho public higher education institution, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. Describe why it is not feasible for existing programs at other institutions to fulfill the need for the proposed program.

   This program, while sharing many aspects of the program at CSI has strong local demand and is supported by local demand since the INL currently requires a Bachelor's for most positions.

8. **Projections for proposed program:** Using the chart below, provide projected enrollments and number of graduates for the proposed program:

Proposed Program: Projected Enrollments and Graduates First Five Years											
Program Name:											
Projected Fall Term Headcount Enrollment in Program						**Projected Annual Number of Graduates From Program**					
FY24 (first year)	FY25	FY26	FY27	FY28		FY24 (first year)	FY25	FY26	FY27	FY28	
24	30	44	60	72		0	6	16	24	36	

9. Describe the methodology for determining enrollment and graduation projections. Refer to information provided in Question #2 "Need for the Program" above. What is the capacity for the program? Describe your recruitment efforts? How did you determine the projected numbers above?

This data is based on experience and conversations with local business and industry.

10. Minimum Enrollments and Graduates.

a. What are the minimums that the program will need to meet in order to be continued, and what is the logical basis for those minimums?

8 This is our break even point for classes taught by adjuncts.

b. If those minimums are not met, what is the sunset clause by which the program will be considered for discontinuance?

While it is not anticipated that this will be an issue, we will access data on the program enrollments, outcomes and graduation rates. The program will also become a part of our program review cycle that does an in-depth evaluation of all programs on a rotating basis.

11. Assurance of Quality. Describe how the institution will ensure the quality of the program. Describe the institutional process of program review. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation.

We have an established outcome review process that will be implemented when the program starts. This requires all teaching the classes to evaluate the course learning outcomes at the end of each semester and record that data for year end review by the faculty, chairs and the program dean. We are also anticipating obtaining secondary accreditation from an outside entity. This will most likely be through the Accreditation Council for Business Schools and Programs. This secondary accreditor follows the Baldridge model of quality improvement and is recognized by the Council for Higher Education Accreditation (CHEA).

12. In accordance with Board Policy III.G., an external peer review is required for any new doctoral program. Attach the peer review report as **Appendix A**.

Not a doctoral program. All classes offered will be at the undergraduate level.

13. Teacher Education/Certification Programs All Educator Preparation programs that lead to certification require review and recommendation from the Professional Standards Commission (PSC) and approval from the State Board of Education.
Will this program lead to certification?

Yes_____ No__X___

If yes, on what date was the Program Approval for Certification Request submitted to the Professional Standards Commission?

14. Three-Year Plan: If this is a new proposed program, is it on your institution's approved 3-year plan?

Yes X No _____

If yes, proceed to question 15. If no:

a. Which of the following statements address the reason for adding this program outside of the regular three-year planning process.

Indicate (X) by each applicable statement:

	Program is important for meeting your institution's regional or statewide program responsibilities.
	The program is in response to a specific industry need or workforce opportunity.
	The program is reliant on external funding (grants, donations) with a deadline for acceptance of funding.
	There is a contractual obligation or partnership opportunity related to this program.
	The program is in response to accreditation requirements or recommendations.
	The program is in response to recent changes to teacher certification/endorsement requirements.

b. Provide an explanation for all statements you selected.

Educational Offerings: Curriculum, Intended Learning Outcomes, and Assessment Plan

15. Curriculum. Provide descriptive information of the educational offering.

a. Summary of requirements. Provide a summary of program requirements using the following table.

Credit hours in required courses offered by the department (s) offering the program.	42 after completion of an AAS, AA, or AS or some ATC programs.
Credit hours in required courses offered by other departments:	37
Credit hours in institutional general education curriculum	24
Credit hours in free electives	N/A
Total credit hours required for degree program:	120-130 (depending on gen eds taken)

b. Curriculum. Provide the curriculum for the program, including credits to completion, courses by title and assigned academic credit granted.

See other attachments

c. Additional requirements. Describe additional requirements such as comprehensive examination, senior thesis or other capstone experience, practicum, or internship, some of which may carry credit hours included in the list above.

There is an industry internship or practicum built into the curriculum.

16. Learning Outcomes: Expected Student Learning Outcomes and Connection to Curriculum.

a. Intended Learning Outcomes. List the Intended Learning Outcomes for the proposed program, using learner-centered statements that indicate what students will know, understand, and be able to do, and value or appreciate as a result of completing the program.

Bachelor of Applied Science: Operations Management
The program is designed for those with an Associate's degree in a technical field to continue their studies to complete a Bachelors of Applied Science degree. The program will address the general education requirements of the State Board of Education and add additional curriculum to expand their opportunities for advancement in their careers.
Learning outcomes:
Develop effective communication skills by:

- Being able to clearly and concisely present data in a technical presentation.
- Demonstrating respect for others and constructively managing co-workers and direct reports.
- Committing to the highest standards of integrity and ethics by providing leadership and guidance.
- Demonstrating the ability to work both in groups and independently on work and school projects.
- Articulate an understanding the connections and collaborations between company departments for productive operation.

Develop critical thinking skills by:

- Applying the skills learned in science, math, and field-specific classes to analyze and troubleshoot challenges in industry.
- Summarizing and critically discussing current affairs in industry.
- Managing and applying business related skills to the basic understanding of legal and ethical issues in a business environment.

Develop management knowledge by:

- Demonstrating an understanding of supervisory and management roles and the nature of leadership.
- Identifying and describing human behavior in an organizational setting.
- Interpreting the importance of corrective actions and continuous improvement in order to stay be productive in business.

17. Assessment plans.

a. Assessment Process. Describe the assessment plan for student learning outcomes that will be used to evaluate student achievement and how the results will be used to improve the program.

The program will be assessed using the existing assessment structure as designed by the Academic Standards Committee and recently assessed by the NWCCU standards.

Resources Required for Implementation – fiscal impact and budget.
Organizational arrangements required within the institution to accommodate the change including administrative, staff, and faculty hires, facilities, student services, library; etc.

In compliance with SBOE policy the program will be self-supporting with a fee for the 3rd and 4th year

classes as is the current practice with other institutions in the state. We do not anticipate any other changes in the near-term as we will mostly use adjunct faculty to teach that classes and not use any CTE supported faculty.

18. Physical Facilities and Equipment: Describe the provision for physical facilities and equipment.

There are no anticipated physical facilities or equipment required to begin the program.

Existing resources. Describe equipment, space, laboratory instruments, computer(s), or other physical equipment presently available to support the successful implementation of the program.

We currently have sufficient space in the evenings despite being badly constrained during the day. The program will benefit from the same resources available for all general education classes and access to resources.

a. Impact of new program. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated?

As previously stated we have sufficient resources at present to accommodate the new program with classes running in the evening. Due to the cohort nature of many programs the classes generally run on a traditional daytime schedule and the college has sufficient resources in the evenings and weekends.

b. Needed resources. List equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. Enter the costs of those physical resources into the budget sheet.

No additional resources needed at present.

19. Library and Information Resources: Describe adequacy and availability of library and information resources.

a. Existing resources and impact of new program. Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? Will there be an impact on existing programs of increased library usage caused by the proposed program? For off-campus programs, clearly indicate how the library resources are to be provided.

Current library databases are sufficient although a statewide consortium for these services could lower costs to each institution.

b. Needed resources. What new library resources will be required to ensure successful implementation of the program? Enter the costs of those library resources into the budget sheet.

N/A

20. Faculty/Personnel resources

a. Needed resources. Give an overview of the personnel resources that will be needed to implement the program. How many additional sections of existing courses will be needed? Referring to the list of new courses to be created, what instructional capacity will be needed to offer the necessary number of sections?

The program will mainly be taught using adjunct faculty**.** We have some capacity to accommodate the growth in the short-term. As the program grows we will need to possibly add additional faculty, but that will not be needed at this time.

b. Existing resources. Describe the existing instructional, support, and administrative resources that can be brought to bear to support the successful implementation of the program.

We have outstanding student resources in campus between the Center for New Directions, Disability and Counselling services and our planned Teaching and Learning Center

c. Impact on existing programs. What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained?

We will use the college's existing resources and processes for course-level, program-level and institutional-level outcomes and program review. These resources were the source of recent praise by the visiting team from the NWCCU for our seven-year onsite visit.

d. Needed resources. List the new personnel that must be hired to support the proposed program. Enter the costs of those personnel resources into the budget sheet.

We do not anticipate that we will need any additional faculty initially. We will use adjuncts to teach the classes due to legislation that governs community colleges offering Bachelor's degrees.

21. Revenue Sources

a) **Reallocation of funds:** If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

The program with the differential salary will pay the costs of the program, consequently we do any impact on existing budgets.

b) **New appropriation**. If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request.

N/A

c) **Non-ongoing sources**:
   i. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends?

Although we are always seeking grant funding when we can this is outside of the scope of grants we are aware of at present.

ii. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds?

Similar to what the College of Southern Idaho does we would charge a tuition differential to students in the program and we anticipate that would be sufficient to fund the program. Since we intend to staff with adjuncts the relative costs of the program will be minor and the breakeven point for classes will be lower and allow us to expand more readily than with full-time faculty.

Should the program not succeed then the tuition differential would no longer be charged and we would revert to our tuition set by the legislature.

d) **Student Fees**:

i. If the proposed program is intended to levy any institutional local fees, explain how doing so meets the requirements of Board Policy V.R., 3.b.

Since current SBOE policy precludes the use of CTE funds for Bachelors programs at the community college we will establish a funding model similar to that used by CSI for their BAS programs.

ii. Provide estimated cost to students and total revenue for self-support programs and for professional fees and other fees anticipated to be requested under Board Policy V.R., if applicable.

We anticipate that through the use of adjunct faculty and the tuition differential that the program will be self-sustaining with a minimal of costs on the admissions side of the college.

22. Using the excel **budget template** provided by the Office of the State Board of Education, provide the following information:

- Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first **four** fiscal years of the program.
- Include reallocation of existing personnel and resources and anticipated or requested new resources.
- Second- and third-year estimates should be in constant dollars.
- Amounts should reconcile subsequent pages where budget explanations are provided.
- If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).
- Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

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Include reallocation of existing personnel and resources and anticipated or requested new resources.
Second and third year estimates should be in constant dollars.
Amounts should reconcile subsequent pages where budget explanations are provided.
If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).
Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

	FY 2024		FY 2025		FY 2026		FY 2027	
	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments	2	20	2	24	3	28	3	30
B. Shifting enrollments	4	15	4	18	0	0	0	0
Total Enrollment	6	35	6	42	3	36	3	40

	FY 2024		FY 2025		FY 2026		FY 2027	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Request	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2. Institution Funds	$10,200.00	$0.00	$10,200.00	$0.00	$12,000.00	$0.00	$12,000.00	$0.00
3. Federal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
4. New Tuition Revenues from Increased Enrollments	$9,625.00	$0.00	$11,550.00	$0.00	$9,900.00	$0.00	$11,000.00	$0.00
5. Student Fees	$420.00	$0.00	$504.00	$0.00	$432.00	$0.00	$480.00	$0.00
6. Other (i.e., Gifts)								
Total Revenue	$20,245	$0	$22,254	$0	$22,332	$0	$23,480	$0

Ongoing is defined as ongoing operating budget for the program which will become part of the base.
One-time is defined as one-time funding in a fiscal year and not part of the base.

	FY 2024		FY 2025		FY 2026		FY 2027	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs								
1. FTE	2.0	0.00	4.0	0.00	5.0	0.00	6.0	0.00
2. Faculty	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
3. Adjunct Faculty	$ 10,200.00	$0.00	$10,200.00	$0.00	$ 12,000.00	$0.00	$ 12,000.00	$0.00
4. Graduate/Undergrad Assistants	0	$0.00	0	$0.00	0	$0.00	0	$0.00
5. Research Personnel	0	$0.00	0	$0.00	0	$0.00	0	$0.00
6. Directors/Administrators	0	$0.00	0	$0.00	0	$0.00	0	$0.00
7. Administrative Support Personnel	0	$0.00	0	$0.00	0	$0.00	0	$0.00
8. Fringe Benefits	$2,948.19	$0.00	$ 2,948.19	$0.00	3363.35	$0.00	3365.35	$0.00
9. Other:								
Total Personnel and Costs	$13,148	$0	$13,148	$0	$15,363	$0	$15,365	$0

	FY 2024		FY 2025		FY 2026		FY 2027	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures								
1. Travel	$1,000.00	$0.00	$1,000.00	$0.00	$1,000.00	$0.00	$1,000.00	$0.00
2. Professional Services	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
3. Other Services	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
4. Communications	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
5. Materials and Supplies	$200.00	$0.00	$200.00	$0.00	$200.00	$0.00	$200.00	$0.00
6. Rentals	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
7. Materials & Goods for Manufacture & Resale	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
8. Miscellaneous	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Operating Expenditures	$1,200	$0	$1,200	$0	$1,200	$0	$1,200	$0

	FY 2024		FY 2025		FY 2026		FY 2027	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay								
1. Library Resources	$0.00	$0.00	0	$0.00	$0.00	$0.00	$0.00	$0.00
2. Equipment	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Capital Outlay	$0	$0	$0	$0	$0	$0	$0	$0

	FY 2024		FY 2025		FY 2026		FY 2027	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
D. Capital Facilities Construction or Major Renovation	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E. Other Costs								
Utilites	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Maintenance & Repairs	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Other								
Total Other Costs	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL EXPENDITURES:	$14,348	$0	$14,348	$0	$16,563	$0	$16,565	$0
Net Income (Deficit)	$5,897	$0	$7,906	$0	$5,769	$0	$6,915	$0

Budget Notes (specify row and add explanation where needed; e.g., "I.A.,B. FTE is calculated using…"):

I.A.B.	Most of the students will be part time although some may ber full time we used a 10 to 1 ration of enrollments and rounded up

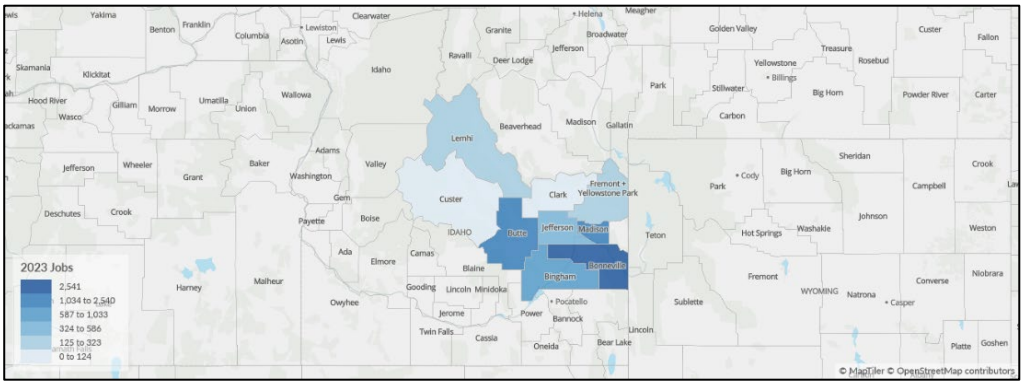
College of Eastern Idaho - BAS, Operations Management

Responses to Five Criteria per Board Policy III.Z.

1) Demand

Proposed offerings must meet an urgent local need based on where students who complete the offering will be employed rather than where the students reside. The demand for the proposed offering needs to be clear, urgent, and compelling, as evidenced through data and industry input. Commitments of practical support (e.g., funding, internships, etc.) from industry stakeholders constitute evidence of demand.

College of Eastern Idaho has firm demand requests from local industry, including the INL, Naval Nuclear Lab, Elevation Labs, Basic American Foods, and other employers for skills this degree would offer. Furthermore, these industries have confirmed the market for employee positions for which these degrees would educate or train. Data from Lightcast (retrieved online on 8/21/2023) shows that the need for all managerial positions in Idaho Falls has increased by 100% since 2001, and the projections indicate that the growth will continue unabated through 2033. The growth rate in the Idaho Falls MSA is double that of the anticipated growth in Pocatello—the Lightcast forecast of employment in the ten counties of Region 6, including Bonneville. Bingham, Clark, Custer, Fremont, Jefferson, Teton, Butte, Madison, and Lemhi Counties demonstrate that there is anticipated demand for 590 new management positions between 2023 and 2030. According to Lightcast, the most significant growth will occur in Bonneville (272), Madison (174), and Jefferson (61) counties. The only two counties in Region 6 that do not show anticipated double-digit growth are the largely rural Butte and Clark counties. The other counties show anticipated growth of 11-22% in business and management employment. Further, this growth rate does not account for the "greying workforce" and the positions needed to fill the retiring populations.



Occupations	
Code	
13-1199	Business Operations Specialists, All Other
11-9199	Managers, All Other
11-1021	General and Operations Managers

13-1111	Management Analysts
11-1011	Chief Executives
13-1082	Project Management Specialists

Timeframe

2023 – 2030

Datarun

2023.3 – Employees

County	County Name	2023 Jobs	2030 Jobs	2023 - 2030 Change	2023 - 2030 % Change
16019	Bonneville	2,541	2,813	272	11%
16023	Butte	1,047	1,048	1	0%
16065	Madison	1,034	1,208	174	17%
16051	Jefferson	324	385	61	19%
16081	Teton	249	303	54	22%
16043	Fremont	146	163	18	12%
16059	Lemhi	125	139	14	12%
16037	Custer	74	82	9	12%
16033	Clark	14	16	1	9%
	Total	5,554	6,159	605	11%

When examining data from all of the counties in Idaho, Region 6 has four of the counties in the state where the growth rates are in the top 15 counties for growth in the fields for which this applied degree would train learners.

County	County Name	2023 Jobs	2030 Jobs	2023 – 2030 Change	2023 - 2030 % Change
16001	Ada	15,641	17,202	1,561	10%
16999	[Idaho, county not reported]	2,185	2,863	678	31%
16027	Canyon	3,555	4,054	498	14%
16055	Kootenai	3,281	3,584	303	9%
16019	Bonneville	2,541	2,813	272	11%
16065	Madison	1,034	1,208	174	17%
16005	Bannock	1,618	1,770	153	9%
16017	Bonner	807	912	106	13%
16083	Twin Falls	1,619	1,725	106	7%
16057	Latah	689	754	65	9%
16051	Jefferson	324	385	61	19%
16013	Blaine	715	769	54	8%
16081	Teton	249	303	54	22%
16031	Cassia	463	512	50	11%

16041	Franklin	292	336	44	15%
16069	Nez Perce	605	647	43	7%
16011	Bingham	587	625	38	7%
16053	Jerome	405	442	37	9%
16085	Valley	254	288	34	14%
16075	Payette	315	349	34	11%
16067	Minidoka	341	371	30	9%
16045	Gem	179	208	29	16%
16021	Boundary	174	200	25	14%
16049	Idaho	211	234	23	11%
16079	Shoshone	226	248	22	10%
16047	Gooding	211	232	21	10%
16029	Caribou	160	179	18	11%
16007	Bear Lake	85	104	18	21%
16073	Owyhee	105	123	18	17%
16039	Elmore	374	392	18	5%
16043	Fremont + Yellowstone Park	146	163	18	12%
16059	Lemhi	125	139	14	12%
16087	Washington	111	126	14	13%
16061	Lewis	73	86	13	18%
16077	Power	135	148	13	9%
16009	Benewah	126	138	11	9%
16063	Lincoln	63	73	10	16%
16071	Oneida	52	61	9	17%
16037	Custer	74	82	9	12%
16015	Boise	83	90	8	9%
16003	Adams	50	56	7	14%
16035	Clearwater	99	104	5	5%
16025	Camas	19	22	3	16%
16023	Butte	1,047	1,048	1	0%
16033	Clark	14	16	1	9%
		41,463	46,186	4,724	11%

The growth for demand in these counties, while not numerically greater, does have growth rates almost double the 10% anticipated growth in Ada County.

Finally, Region Six also contains three ALICE counties, Madison, Clark, and Lemhi, where approximately 40% of the families fall into the category of ALICE (Asset Limited, Income Constrained, Employed). These counties are not in close geographic proximity to any of the major public educational centers of the state except Idaho Falls. CEI is the closest public educational institution. Moreover, we remain well poised to deliver the educational services needed to help many of those constituents obtain a credential to move into the workforce at a living wage salary. (https://www.unitedforalice.org/state-overview/idaho)

2) Specialization

The proposed offering must be based on the unique capability of the institution, founded on specialized instructional expertise and any infrastructure necessary for program delivery.

CEI has planned for this opportunity for several years, and we have the capacity to develop and operationalize the program with industry support. Specifically, the INL, an organization that requires a bachelor's degree for most mid- and upper-level jobs, has expressed interest in this training for a portion of its workforce. This applied degree is designed to utilize an associate of applied science as the foundation for the first two years of the degree. Typically, traditional bachelor's degrees do not accept applied credits into their programs. Transferring applied credits into this degree gives learners with applied credits a path to a bachelor's, providing them with upward mobility for their careers without starting from a beginning level. It gives applicable value to previous experience and learning.

The college's proximity and agreements with the Idaho National Laboratory (INL) afford the college the unique advantage of having access to the knowledge and expertise of the employees at a world-class lab. The college also has strong relationships with many local companies that serve as subcontractors to the INL operations and the other fast-growing needs of Eastern Idaho. Not relying on INL alone, CEI has partnerships with other industries listed above that have conveyed their need for graduates of an operations management degree. CEI recently signed an agreement with Mountain View Hospital, and this degree could serve their needs too. The conversations confirming industry needs have occurred through formal venues such as Technical Advisory Committee (TAC) meetings. All of CEI's CTE programs have TACs to guide the evolution of curriculum and skills/outcomes for courses and programs. CEI has hired faculty and administration with the knowledge and skills to teach at the bachelor's level, with the anticipation of offering this degree. These hires include the Dean of CTE, Dr. Chuck Bohleke, who has fifteen years of leadership experience in running business programs as well as multiple degrees in business, management, and international business. He has provided instruction at the undergraduate and graduate levels for other institutions. Dr. Bohleke has taught many of the proposed classes and will be instrumental in the course development of the program. Other hires include those with advanced degrees in the field and/or those with extensive work history in the business industry. Although the college is small in comparison to other institutions, we have experienced an unprecedented growth rate of 80% in total headcount, including through the COVID pandemic, since 2011, as per data from the SBOE website.

https://boardofed.idaho.gov/resources/fall-2022-postsecondary-headcount/

The low tuition cost of CEI's upper division credits leading to the operations management bachelor's degree opens up opportunities for more low-income students to attend college. While this degree is not designed to attract seniors right out of high school, it does provide the eventual opportunity for more conduits to a bachelor's degree than the traditional route. According to a 2023 Department of Labor & U.S. Census report, Bonneville County has 35,988 (14.9%) people with some college and no degree. The operations management BAS has the possibility to attract that population with some college and no degree to complete their applied bachelor's close to home, at a low cost and on a schedule that won't interfere with their work during the day. Most of these classes will be offered in the evening to accommodate working schedules and not in the traditional daytime schedules.

TheU.S. Bureau of Labor Statistics (https://www.bls.gov/ooh/management/home.htm) lists management occupations as growing faster than the average demand for new jobs across the country from 2021 to 2031.

Overall employment in management occupations is projected to grow 8% from 2021 to 2031, faster than the average for all occupations; this increase is expected to result in about 883,900 new jobs over the next decade. In addition to new jobs from growth, opportunities arise from the need to replace workers who leave their occupations permanently. About 1.1 million openings each year, on average, are projected to come from growth and replacement needs.

The median annual wage for this group was $102,450 in May 2021, which was the highest of all the major occupational groups and more than the median annual wage for all occupations of $45,760. Offering this applied operations degree provides a local, inexpensive conduit to a better life for employees and well-trained employees for industry who need it.

BLS employment projections, wages, and other data for related occupations not shown are available on the Data for Occupations Not Covered in Detail page. Information highlighting physical demands, cognitive and mental requirements, and other qualifications for workers in this group is available in a BLS Occupational Requirements Survey (ORS) profile.

Finally, CEI is committed to serving our students, our regional industry partners, and our community. This specialized applied degree does just that and helps CEI meet its mission of providing open access to affordable, quality education that meets the needs of students, regional employers, and the community.

3) Non-Competitiveness

The proposed offering must be non-competitive with other institutions' offerings within the identified service area (whether regional or statewide) and supported by other institutions within the service area. The Executive Director or designee may request written commitments from the presidents of other institutions within the service area expressing conceptual and, if necessary, practical support for the proposed program.

CEI does not serve the same regions as other institutions, with ISU being in Region 5 and CSI being in Region 4. While our program is modeled after the program at CSI (with their permission) CEI serves radically different markets with differing needs and employment opportunities than other institutions. Although Idaho Falls has a university center served by two other institutions they do not offer an Applied Bachelor's completion program in Idaho Falls. Thus, CEI's proposed operations management degree would meet the current high demand for those with the technical experience provided by an Associate of Applied Science degree and allow seamless transfer without losing credits; specifically, loss of applied credits presents a significant barrier to many place-bound students with relevant experience. Moreover, the needs of employers in Eastern Idaho cannot be negated with a 2.8% unemployment rate in Eastern Idaho (https://lmi.idaho.gov/regional-info/) That unprecedented low unemployment presents worker shortages at a time when the need for advanced skills is rising. A path to a local, low-cost degree that values previously attained applied credits and/or relevant work experience in the form of credit for prior learning is needed in Region Six.

Most traditional "academic" bachelor's degrees are not designed to accommodate credits from an applied degree. Moreover, CEI is an evolution of a technical school; as such, many constituents in our region have an applied degree or advanced technical certificate. CEI is fully prepared to examine the extensive and applied work history of learners who don't have a formalized degree and give appropriate credit for that rich experience, with a rigorous faculty-led process to ensure those credits are valid and sound. As mentioned above, this degree is not designed to attract the traditional student. As such, CEI is not competing, specifically, with ISU.

Employment that would result from the technical and durable skills provided by this degree would also be in demand beyond Region Six, such as in Boise with Micron. While the program does duplicate the curriculum offered through CSI, they are in a different region, and Region 6 represents the epicenter of the expected explosive growth in this field. Moreover, a recent survey of students found that 90% would prefer to work on their degrees in Idaho Falls rather than traveling to Pocatello.

4) Collaboration
Alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions. High-demand programs must be offered through inter-institutional collaboration as described in this policy.

We have communicated with and have permission from CSI to offer this program. The outcomes have changed slightly to meet the local needs of Region Six, but those outcomes remain largely the same. ISU does not have a comparable program at present in Region 6. They do have a Bachelor's completion program through the College of Technology in Pocatello, but the circumstances of many students do not allow them to commute. CEI will continue to seek additional partners for articulations that will allow students to continue their graduate studies upon completion of their undergraduate degree.

CEI has had preliminary conversations with ISU. Ideally, CEI would collaborate with ISU, as our program grows, to offer classes at University Place in Idaho Falls. CEI would also consider joint appointments with faculty from ISU as a point of collaboration. CEI is on a timeline to offer this degree to meet local industry demands, and learner demands, and to better serve our community. This degree could be offered by fall 2024, providing a local, low-cost credential, which has been requested by stakeholders across our region. At this time no other institution is planning to offer an applied baccalaureate that will transfer in applied credits and/or credit for prior learning.

Finally, as has already been stated, this degree is offered locally, in our region, at a low cost. The BAS in Operations Management is simply not available for learners who want a local option and would like their previous experience and credits to move them more quickly to a degree.

5) Resources
The institution must have sufficient resources to develop and deliver the proposed offering.

CEI has the faculty, staff, and local talent to successfully implement this degree. We have a wealth of resources from our relationships with our local communities to deliver a high-quality, unique program. It is not anticipated that we will need extra personnel that cannot be hired locally over the first few years of the program.

While the cost of living in Eastern Idaho has risen it has not reached the levels of many other parts of the state, making it an attractive location for many seeking a more relaxed lifestyle than can be afforded in larger metropolitan areas. As such a rich pool of prospective instructors are moving into the area. Eastern Idaho also benefits from the follow-on effect of hiring at the largest employers, such as INL, the Idaho Cleanup Project, and major hospitals in the area. Also fueling growth in region six: the high level of healthcare, services, and goods easily purchased at the growing retail sector in the area, which serves as an economic hub of Eastern Idaho and a gateway to national parks, national monuments, and state parks. This growth brings a wealth of potential faculty and staff to instruct and administer the degree, as well as more prospective students.

CEI has become extraordinarily efficient over the course of the transition from a technical college to a comprehensive community college. CEI will continue this efficiency as we grow and attract an even greater number of learners, with varying levels of education. The growth of the community and the growth of the college both culminate in CEI having the expertise to deliver this specialized degree. Additionally, CEI has the initial start-up resources and the demand from industry and learners to support a BAS in operations management in Region Six.

Other industries that could benefit from a BAS in operations management are agriculture, hospitality, medical, and retail businesses. As the region continues to grow, the projected need for operations managers in all of these sectors remains high. Additionally, the declining rates of the primary and secondary-age residents that impact much of the country have not manifested in our area; without intentional and strategic foresight, those declines could further exacerbate the lack of management-trained workers in Region Six.

Operations Management, Bachelor of Applied Science

The program is designed for those with an Associates degree in a technical field to continue their studies to complete a Bachelors of Applied Science degree. The program will address the general education requirements of the State Board of Education and add additional curriculum to expand their opportunities for advancement in their careers. This program can only be entered after completing an Associates degree and not for new students without the degree or advanced technical certificate.

Pre-Admission Requirement - **Successful completion of an Associate of Applied Science Degree** for a minimum of 60 credits for acceptance into the program. Students having completed an Advanced Technical Certificate will need to meet all of the requirements to finish their AAS. This includes completion of a minimum of 15 credits of general education coursework.

Post-Admission Requirements include 36 Credits of Program Elective, BSN 115 (3 Credits) and 21 credits of general education coursework (not completed as part of the AAS Degree).

Learning outcomes:

Develop effective communication skills by:

- Being able to clearly and concisely present data in a technical presentation.
- Demonstrating respect for others and constructively managing co-workers and direct reports.
- Committing to the highest standards of integrity and ethics by providing leadership and guidance.
- Demonstrating the ability to work both in groups and independently on work and school projects.
- Articulate an understanding the connections and collaborations between company departments for productive operation.
- Develop critical thinking skills by:
- Applying the skills learned in science, math, and field-specific classes to analyze and troubleshoot challenges in industry.
- Summarizing and critically discussing current affairs in industry.
- Managing and applying business related skills to the basic understanding of legal and ethical issues in a business environment.

Develop management knowledge by:

- Demonstrating an understanding of supervisory and management roles and the nature of leadership.
- Identifying and describing human behavior in an organizational setting.
- Interpreting the importance of corrective actions and continuous improvement in order to stay be productive in business.

Pre-Admission Requirement - **Successful completion of an Associate of Applied Science Degree** for a minimum of 60 credits for acceptance into the program. This includes completion of a minimum of 15 credits of general education coursework.

Post-Admission Requirements include 36 Credits of Program Electives*, BSN 215 (3 Credits) and 21 credits of general education coursework (not completed as part of the AAS Degree).

Post-Admission Requirements

BSN 201	Business Communication*	3
ENGL 102	Writing and Rhetoric II* (if not taken previously)	3
GEM 4	Any Gem 4 Science Course with lab	4
GEM 4	Any 2nd Gem 4. Science Course	3 or 4
GEM 3	Any GEM 3 Math Course (if not taken previously)	3
BSN 101	Introduction to Business (or any other similar course)	3
BSN 115	Intro to Information Science (or any other similar course)	3
BSN 216	Business Statistics	3
BSN 217	Advanced Business Statistics	3
BSN 261	Legal Environment of Organizations	3
BSN 320	Operations Project Management	3
BSN 370	Operational Planning & Scheduling	3
BSN 385	Industry Internship Experience	3
BSN 400	Ethical Leadership	3
BSN 410	Cost Analysis & Control	3
BSN 420	Operations & Supply Chain Management	3
BSN 430	Business Law & Human Resources	3
BSN 440	Human Performance Improvement	3
BSN 450	Quality Management	3
BSN 480	Operations Management Projects	3
BSN 201	Business Communication*	3

ENGL 102	Writing and Rhetoric II* (if not taken previously)	3
GEM 4	Any Gem 4 Science Course with lab	4
Total:		61-62

Total Credit Hours Required for this Major: 121-122

Students having already completed a course in their prior degree will not be required to retake classes already passed successfully, but will be expected to complete a course from the same area as an alternate. To complete the minimum 120 hours required for a Bachelors degree as defined by the Idaho State Board of Education and applicable laws and statutes.

COMM 233
Interpersonal Communication
3 Credits
Communication concepts and skills applied to relationship management: communication process, listening, selfdisclosure, perception, conflict.

ENGL-102 Writing and Rhetoric II (3 Credits)

GEM STAMPED: GEM 1: WRITTEN COMMUNICATION

Provides instruction in critical reading and writing of expository and argumentative prose, including summaries, analysis, and research. The class will emphasize academic inquiry and research as well as explore issues from multiple perspectives. Teaches careful reasoning, argumentation, and rhetorical awareness of purpose, audience, and genre with a focus on critically evaluating, effectively integrating, and properly documenting sources.

Requisites: Complete ENGL 101 and pass with a grade of C- or higher - Must be completed prior to taking this course.

Locations: Idaho Falls Main Campus, Rexburg, Salmon, Id, Online, Idaho Falls, Ammon, Blackfoot, Idaho Digital Learning Academy

Offered: All Sessions

BSN-101 Introduction to Business (3 Credits)

GENERAL EDUCATION ELECTIVE

A survey of business subject areas for both business and non-business students. Topics covered will include business operation and organization, financial management, marketing, accounting, and labor relations. Career exploration will also be covered.

Requisites: None

Locations: Idaho Falls Main Campus, Online, Salmon, Id, Sugar City

Offered: All Sessions

BSN 115 - Introduction to Information Science

General Education Elective

3 Credits

This is a course for students to develop hands-on skills in productivity software typically used in business, and basic business research and business writing. This course includes instruction on standard business formats and applications, research utilizing the Internet and academic databases, and vocabulary associated with computers and information technology.

BSN-201 Business Communication (3 Credits)

GENERAL EDUCATION ELECTIVE

This course introduces organizational communication theory and research and development communication competence in business and professional settings including: verbal and nonverbal communication in professional contexts, communication skills for developing and maintaining professional relationships, identifying cultural differences in the workplace, small group and leadership communication, professional presentations for targeted audiences, and self-assessments of professional communication skills.

Requisites: Complete COMM-101 and pass with a grade of C- or higher - Must be completed prior to taking this course.

Locations: Idaho Falls Main Campus, Online

Offered: Fall/Spring Only

BSN-216 Business Statistics (3 Credits)

GEM STAMPED: GEM 3: MATHEMATICAL WAYS OF KNOWING

Descriptive statistics, probability, confidence intervals, hypothesis testing including one and two sample z/t-tests, chi-square and ANOVA. Emphasis on statistical software to analyze data for business decision making.

Requisites: Complete MATH 108 and pass with grade of C- or higher or Appropriate Placement - Must be completed prior to taking this course.
Complete ENGL-101 and pass with a grade of C- or higher - Must be completed prior to taking this course.
Complete BSN-`115 and pass with minimum grade C- - Must be completed prior to taking this course.

Locations: Idaho Falls Main Campus, Online, Salmon, Sugar City

Offered: Fall Only

BSN 217 - Advanced Business Statistics
General Education Elective
3 Credits
Linear and multiple regression, forecasting and statistical process control. Emphasis on use of statistical software; written and oral communication of statistical information in a business setting.

Prerequisites: MATH 108

BSN 261 - Legal Environments of Organizations
General Education Elective
3 Credits
This is a study of the legal environment of business organizations. We will learn about law and ethics, the court systems, trials and resolving disputes, the Constitution, torts, contracts, and employment discrimination.

BSN 320 Operations Project Management
Operations Project Management This course helps develop the competencies and skills needed for planning and controlling projects and understanding interpersonal issues that drive successful project outcomes. This course guides students through the skills and behaviors required to successfully launch and lead projects in a supervisory or managerial role. Program admission required.
Credits 3 Credits
Prerequisite
Instructor Permission Required

BSN 370 Operational Planning

This course examines the design and efficient use of office, production and other spaces, including location, planning, design, and maintenance considerations that will aid supervisors and managers. Program admission required.
Credits 3 Credits
Prerequisite
Instructor Permission Required.

BSN 385 Industry Internship Experience
This course allows the student to apply learning to real-life career possibilities. Students will utilize a current job in industry or a temporary work experience/internship opportunity to advance their knowledge and understanding aided by a real-world working context. Written learning objectives agreed upon by the student, the department, and the employer will be the basis for evaluating, grading and granting of credit. Maybe repeated for up to 6 hours per bachelor's degree. Program admission required.

Credits 3 Credits

Semester Contact Hours 96 (32-hours per credit)

Prerequisite: Instructor Permission Required

BSN 400 Ethical Leadership

This course offers an interdisciplinary approach to leadership ethics that helps promote ethical decision-making and action through skill development, self-assessment, and application exercises. The course also examines what it means to be an effective and caring leader that promotes the common core values of an organization. Program admission required.

Credits 3 Credits

Prerequisite: Instructor Permission Required

BSN 410 Cost Analysis and Control

This course will examine cost analysis and control measures needed for supervisors and managers to make effective planning and control decisions in the workplace. Program admission required.

Credits 3 Credits

Prerequisite: Instructor permission required

BSN 420 Production and Supply Chain Management

This course provides insight into the role of supply chain management, focusing on managing the flow of materials, goods, services, information and cash via the processes, technologies, and facilities that link primary suppliers through to ultimate customers. Program admission required.

Credits 3 Credits

Semester Contact Hours Lecture

Prerequisite

Instructor permission required

BSN 440 Human Performance Management

This course is designed to explore the field of human performance improvement and focuses on the concepts and principles of human performance technology (HPT), human performance technology models, training needs assessment and knowledge management. Program admission required.

Credits 3 Credits

Prerequisite Instructor permission required

BSN 450 Quality Management

The course introduces students to the concepts, tools, and techniques used in Total Quality Management, quality cultures, effective team structures, measurement of quality productivity, and competitiveness in an industrial environment. Program admission required.

Credits 3 Credits

Prerequisite Instructor permission required

BSN 480 Operational Management Projects

Students will pursue projects provided through industry employers and/or created by the student with the guidance and support of the instructor that will aid students in demonstrating supervisory and managerial proficiency in their disciplinary interests. Program admission required.
Credits 3 Credits
Semester Contact Hours Clinical 96 (32-hours per credit)
Prerequisite Instructor permission required

To: Idaho State Board of Education

From:

Re: support for the Operations Management Bachelors of Applied Science

This letter is a letter in support of the request to the Idaho State Board of Education by the College of Eastern Idaho to begin offering an Operations Management Bachelor's of Applied Science. This program would be a needed addition to the curriculum as it fills a need within our Eastern Idaho communities as an avenue for incumbent employees and future employees to obtain additional education in the Idaho Falls area and allow students currently enrolled in Associates of Applied Science programs an avenue to finish the degree and advance in their opportunities requiring additional skills and knowledge and thus reduce much of the current labor shortage in the area.

Signature: Karen Hayes

Organization: 208 Capital Holdings LLC

Position: Chief Operating Officer

To: Idaho State Board of Education

From:

Re: support for the Operations Management Bachelors of Applied Science

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Signature: Erica Floyd

Organization: Farm Bureau Insurance

Position: CSR

To: Idaho State Board of Education

From: Heidi Oyola, Director of Human Resources at Idaho Steel Products, Inc.

Re: support for the Operations Management Bachelors of Applied Science

This letter is a letter in support of the request to the Idaho State Board of Education by the College of Eastern Idaho to begin offering an Operations Management Bachelor's of Applied Science. This program would be a needed addition to the curriculum as it fills a need within our Eastern Idaho communities as an avenue for incumbent employees and future employees to obtain additional education in the Idaho Falls area and allow students currently enrolled in Associates of Applied Science programs an avenue to finish the degree and advance in their opportunities requiring additional skills and knowledge and thus reduce much of the current labor shortage in the area.

Signature: Heidi Oyola

Organization: Idaho Steel Products, Inc.

Position: Director of Human Resources

To: Idaho State Board of Education

From:

Re: support for the Operations Management Bachelors of Applied Science

This letter is a letter in support of the request to the Idaho State Board of Education by the College of Eastern Idaho to begin offering an Operations Management Bachelor's of Applied Science. This program would be a needed addition to the curriculum as it fills a need within our Eastern Idaho communities as an avenue for incumbent employees and future employees to obtain additional education in the Idaho Falls area and allow students currently enrolled in Associates of Applied Science programs an avenue to finish the degree and advance in their opportunities requiring additional skills and knowledge and thus reduce much of the current labor shortage in the area.

Signature: _____
Michael Patten

Organization: BBSI

Position: HR Consultant

College of Eastern Idaho
1600 South 25th East • Idaho Falls, Idaho 83404-5788 • 208.524.3000 • www.cei.edu

November 16, 2023

To: Idaho State Board of Education
Re: Support for College of Eastern Idaho's two BAS degrees

Dear State Board of Education Members:

As the Chair of the Board of Trustees for College of Eastern Idaho (CEI) I am writing to express our support for these two proposed Applied Bachelor's Degrees (BAS) for our institution. As an elected five-member board, we firmly believe that these two, four-year technical degrees will significantly enhance the capacity of CEI to serve the workforce needs of our community.

I acknowledge the concerns raised by our university partners regarding potential competition between community college-level BAS degrees with these applied bachelor's programs. However, we believe that the proposed BAS degrees at CEI are designed to complement, rather than compete with existing university programs. These degrees are specifically tailored to meet the practical and applied learning needs of individuals seeking career advancement in technical fields.

Our College has received widespread support from local industries for the proposed BAS degrees. This endorsement from local employers underscores the demand for these programs and their potential to address the critical workforce needs of our region.

The Board of Trustees wholeheartedly endorses the proposed Applied Bachelor's Degrees for the College of Eastern Idaho. We are confident these additions to CEI's degree base will enhance workforce development and will contribute to the economic vitality of our region. We urge you to grant your endorsement and acceptance of these BAS degrees.

Sincerely,

Park Price
Board Chair, College of Eastern Idaho

Boise State University
Comments regarding CEI's BAS in Operations Management proposal

While the revised proposal and revised responses to the five questions in Policy III.Z when a higher education institution proposes "a degree program outside of its traditional offerings" are more complete, there are a few points that need to be clarified as the staff and Board members carefully consider this proposal and others similar to it.

1. Collaboration and Systemness:

Community colleges' offering four-year degrees weakens the *systemness* of public higher education in Idaho. Indeed, it could hurt effective and efficient postsecondary education in Idaho, cannibalizing limited resources available to postsecondary education and duplicating degree offerings in the same region. The collaboration requirement in Policy III.Z states that " Alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions. High-demand programs **must be offered** through inter-institutional collaboration as described in this policy."

Rather than shifting their focus to a four year degree, the State would benefit most from additional focus on the transfer experience from community college to four-year universities. One of the arguments for having baccalaureate degrees at community colleges is eliminating the need and hurdle to transfer, however, co-admit and co-enrollment options can help eliminate this hurdle and help students transition into four-year institutions. In Idaho, we made substantial progress on collaborating with our co-admit and co-enrollment agreement, signed by all eight institutions as well as our extensive collaborative financial aid agreement. We recognize that much can still be done in collaboration on this front. Admitting and enrolling students in community colleges and universities at the same time, for example, can help with the hurdle of transferring. Moreover, in this specific case, Idaho State University (ISU) has a campus in Idaho Falls where students would not need to travel to another city. Finally, it is mentioned in the proposal that this proposal is time sensitive given the expected high demand for the program; however, Idaho State University reports that it is currently offering much of this curriculum and also has the flexibility to adapt its programming to attend to the needs of CEI students if a collaborative understanding of those students needs could be developed. It is not clear in the responses whether the time sensitivity needs have been discussed or addressed in meetings with ISU regarding this degree program.

Our community colleges are vital partners and provide incredible mission-driven value for students and the state. Our partnership with them, as we work together to improve transfer to our universities and to increase the achievement of associates degree completion through "transfer back," is critical as well. We seek all opportunities to partner with community colleges that benefit students. A good example of such a partnership and systemness is the 80/40 transfer pathway from CWI into two of Boise State's more flexible degree programs: Bachelor of Applied Science (BAS), and BA in Interdisciplinary Professional Studies. In this pathway,

students can take 80 credits in CWI (or another Idaho community college) and complete their degree program at Boise State after taking 40 upper division credits.

2. Specialization

In the responses, it is mentioned that “This applied degree is designed to utilize an associate of applied science as the foundation for the first two years of the degree. Typically, traditional bachelor’s degrees do not accept applied credits into their programs.” This statement applies to Bachelor of Science (BS) or Bachelor of Arts (BA) degree programs. However, many of our 4-year institutions are offering a variety of Bachelor of Applied Science (BAS) degrees where this statement does not apply. The aforementioned 80/40 transfer pathways into eligible 4-year degree programs from Boise State University is an example of this although many BAS transfers are on 60/60 transfer pathways, which include (up to a limit) applied credits.

COMMENTS FROM IDAHO STATE UNIVERSITY

Idaho State University recognizes that community colleges fill a unique niche in Idaho's higher education landscape and are supportive of their role and mission — including the granting of Bachelors of Applied Science degrees in fields where the career and technical education focus of community colleges positions them in unique ways to provide Bachelors degree level training that is not otherwise available.

Operations Management BAS

However, in the case of the BAS in Operations Management, this is not the case. It is our position that CEI's proposed degree, if approved, would constitute a wasteful duplication of programming resulting in the inefficient use of taxpayer resources — as ISU currently has several different programming options to allow students with an AAS degree to qualify for and obtain the types of operations management positions that CEI's degree seeks to prepare students to secure. In short, there is nothing unique about CEI's proposal that merits the development of this program — including its focus on admitting AAS degree holders into an operations management focused-curriculum, which is something that ISU can and currently does do. We also believe that any market demand for the type of programming CEI is proposing should serve as the catalyst for open and collaborative engagement between both CEI and ISU rather than through wasteful competition. ISU has expressed that it would welcome CEI's collaboration on strengthening ISU's existing pathways for the matriculation of AAS students into Bachelors level business education and reducing potential hurdles to such matriculation. In addition, ISU has expressed to CEI that it is open to discussing a variety of options for inter-institutional collaboration, including co-admitting students, co-teaching Bachelor level curriculum, revenue sharing, and co-program design. While ISU currently feels that its own BAS and traditional Bachelors degrees successfully attend to the needs of the students CEI is seeking to attract into its proposed program, we nevertheless recognize that benefits could be had if both institutions engaged in more robust collaboration related to this type of programming, and have expressed this openness to CEI. This is, in our opinion, the model that the SBOE has asked us to embrace, and we stand ready to do so with any other state institution so inclined.

While the above represents our general concern related to the Operations Management BAS proposal, as well as our preferred solution for navigating the needs of the students that CEI's proposal targets, there are several points of clarification that the Board should be made aware of.

First, the Board set several criteria for the creation of these degrees that in ISU's perspective have not been adequately satisfied. The first of these, related to *Specialization* has been mentioned. According to the Board proposal guidelines for the creation of BAS degrees, "The proposed offering must be based on the unique capability of the institution, founded on specialized instructional expertise and any infrastructure necessary for program delivery." The type of operations management curriculum that CEI is developing is not unique to it, or frankly to any institution. Rather, it is a fairly generic business administration/operations management curriculum. Moreover, there is no justifiable "specialized instructional expertise" or "infrastructure" at CEI in place to justify this (with the exception of Dean Chuck Bohleke). In fact, if the proposed budget is any indication, a significant amount of faculty for this program are likely to be adjunct faculty and the program will not be AACSB accredited — as opposed to ISU's AACSB accredited business programs. (As their website attests, "AACSB accreditation is known, worldwide, as the longest-standing, most recognized form of specialized accreditation that an institution and its business programs can earn"). CSI's Operations Management program, focused primarily on operations management in the food processing industry, is a much more compelling example of an offering uniquely tied to the capabilities, expertise, and

infrastructure of an Idaho Community College. Despite their overt similarities, CEI's program is not unique in an analogous way.

Because of the nature of CEI's curriculum and a lack of understanding of the nature of ISU's curriculum and responsibilities, the Board's second criteria, *Non-Competitiveness*, cannot be met. The Board's requirement is that "the proposed offering must be non-competitive with other institutions' offerings within the identified service area (whether regional or statewide) and supported by other institutions within the service area." CEI's proposal states that CEI does not serve the same regions as other institutions indicating that ISU serves Region V while CSI serves Region IV. This is only true for CTE and/or community college offerings. The proposal fails to understand that ISU's mission related to undergraduate education extends throughout regions IV, V, and VI for graduate, undergraduate, and applied baccalaureate needs. The proposal also suggests the markets are radically different with unique needs and employment opportunities. According to REDI, our markets are the same from the Southern border (Utah) to its northern border (Montana) along the I-15 corridor with INL being one of our biggest employers in the region. We have the same constituents, the same industry partners, and the same population to serve, especially in Idaho Falls. Moreover, the proposal states that ISU does not offer a BAS in Idaho Falls. ISU has offered a BAS since the late 1980's and BAS majors have enrolled in business classes on the Idaho Falls campus to complete the degree. The majority of ISU's BAS majors take upper division credits, similar to the courses in the CEI proposal, to complete the BAS without "losing credits." The ISU BAS is a true 2 + 2 pathway that uses credits earned from the BAS and stack on the remaining general education courses plus 36 upper division credits. Most students completing the BAS at ISU are working in their field while earning their degree and can do it at their own pace. Therefore, the statement that "ISU does not have a comparable program in Region VI" is incorrect. ISU has broad experience in offering BAS degrees to recipients of "applied degrees." The CEI proposal is based on the argument that this type of degree does not exist and explicitly states that CEI is not competing with ISU since this type of degree does not exist. It does, and if the appetite for meaningful collaboration exists, we can look at delivery models to increase accessibility to students through a variety of ways — online courses, hybrid courses or additional in-person course offerings in Idaho Falls.

The third criteria, already alluded to but in this case meriting additional comment, is *Collaboration*. Specifically, the Board asked that "alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions." High-demand programs must be offered through inter-institutional collaboration as described in this policy. Regrettably, CEI did not initiate any conversations with ISU to discuss collaboration, nor do we have any evidence that alternative approaches to meeting the demand were considered. In addition to the pathways mentioned above (either BAS or traditional bachelors related to business), ISU also has a certificate in Project Management which includes curriculum in Operations and Supply Chain Management, Project Management, and Productivity and Quality Management open to anyone with a high school degree and having taken business statistics. We will also have a certificate in Supply Chain Management on the books as of Fall 2024 with courses in operations/supply chain management, purchasing, and logistics. We would be happy and able to create a two plus two agreement and degree program in Operations or Supply Chain Management with CEI using these courses as a foundation for that degree.

Of final note related to the CEI BAS in Operations Management Proposal, it appears that the curriculum only requires 30 upper-division credits, but the standard of 36 upper-division credits

to earn the bachelor's degree tends to be expected by most accreditors. This may be an issue worth consideration as it relates to the degree structure.

Lewis-Clark State College
Responses

CEI: BAS Operations Management **(oppose)** creates duplication, lack of system-ness, unnecessary competition. LC State, ISU, and BSU already offer BAS options that have direct pathways. In our opinion, CEI should work with ISU to ensure a solid pathway for students who seek such a degree. The 4 year business programs have significantly higher costs with accreditation fees and standards which impacts 4 year institutions competitiveness, strictly on price point. A student may get confused between the difference (BS vs BAS) assuming they are the same, of which they are not.

CEI: BAS Digital Forensics and Analytics **(we support this regional specific necessary degree)**

CWI: BAS Business Administration **(oppose)** creates duplication, lack of system-ness, unnecessary competition. LC State, ISU, and BSU already offer BAS options that have direct pathways. In our opinion, CWI should work with BSU to ensure a solid pathway for students who seek such a degree. The 4 year business programs have significantly higher costs with accreditation fees and standards which impacts 4 year institutions competitiveness, strictly on price point. A student may get confused between the difference (BS vs BAS) assuming they are the same, of which they are not.

Response to Proposed Bachelor of Applied Science in Operations Management

Proposed by the College of Eastern Idaho. Response Submitted by the University of Idaho. Revised November 3, 2023.

With this response, the University of Idaho (UI) is submitting comments on the College of Eastern Idaho's (CEI's) proposed Bachelor of Applied Science in Operations Management (BAS Operations Management). Our comments are revised per CEI's responses and additional information provided in reply to earlier comments from other institutions, including UI. While CEI's service region overlaps with Idaho State University's and not with UI's, we still wish to express concerns about whether the proposal adequately addresses SBOE Policy III.Z's criteria for baccalaureate degrees at community colleges. The comments below address three of the five criteria outlined in III.Z.

Criterion	CEI Response	UI Concern
Specialization	The proposal does not make claims about "unique capability at the institution" in terms of operations management expertise, as required by III.Z.	The operations management degree is not a particular specialization for CEI as distinct from offerings of the three four-year institutions with statewide reach: • ISU – BBA Management, with Operations Management Emphasis • Boise State – course in operations management • UI – BS Operations and Supply Chain Management.
Non-Competitiveness	CEI's October 10th, 2023, comments acknowledge ISU's relevant degree programs but contend that ISU lacks the mechanisms to honor credits earned by applied associate's degree holders.	During the November 2nd, 2023, Council of Academic Affairs and Programs (CAAP) meeting, ISU emphasized that it does have mechanisms and intent to honor credits earned by applied associate's degree holders.
Collaboration	CEI's October 10th, 2023, comments note ongoing conversations with ISU and UI on collaboration in other degree pathways.	During the November 2nd, 2023, CAAP meeting, ISU emphasized its interest in collaboration. UI hopes that CEI will collaborate with each four-year institution when collaboration could benefit students. We also hope that SBOE will encourage such collaborations.

College of Eastern Idaho
1600 South 25th East • Idaho Falls, Idaho 83404-5788 • 208.524.3000 • www.cei.edu

October 10, 2023

CEI provides this statement as a response to ISU's, UI's, and BSU's written concerns about our proposed BAS degrees (Operations Management, Cyber Digital Forensics & Analytics).

Introduction

According to the January 2023 Hechinger Report four out of five community college students say they plan to transfer to a university to complete their degree. However, according to the same report, in reality only one in six transfers. Research demonstrates that learners become lost "in a process for which...universities often offer little guidance, causing students to waste time and money earning credits that don't count toward a bachelor's degree."

Research also shows that little has been done to remedy this mounting problem. According to John Fink, senior research associate at the Community College Research Center at Teachers College, Columbia University, "We screw transfer students, and we especially screw the ones that don't have access to the social and educational capital they need to navigate" the complicated process. Many of CEI's students have the reduced social and educational capital spoken about by Fink. Moreover, recent findings by a post-secondary consulting firm, HCM, suggest that "Such dismal outcomes and rife inefficiency should be a wake-up call to us all."

Offering bachelor's degrees at community colleges is not a novel concept. The American Association of Community Colleges notes that "more than 20,000 students earned bachelor's degrees from community colleges in 2019. Compared to their four-year college counterparts, these students are far more likely to be first-generation college-goers and come from low-income households." The opportunity to complete a four-year degree at College of Eastern Idaho, which has flexibility and low cost inherent in the degree, provides an as-of-now, non-existent conduit for learners in Idaho Falls (Presently there are 24 states that have some form of bachelor's degree offered in their states).

Furthermore, the Governor expects the go-on rate from high school to college to rise from the present 42% to 60% with the onset of the Launch program starting in 2024. No single institution has the current capacity to meet that demand to produce the highly skilled workers the state needs to maintain economic viability in the future.

Regarding Specialization Concerns

The learners CEI intends to serve with these BAS degrees are not the target audience for the four-year institutions. In fact, since the inception of CEI in 2017, there have been approximately 8,000 constituents with some college and no degree in Bonneville County. As this number is roughly the same as six years ago, these potential learners have not

enrolled in a four-year institution to complete their degree. From surveys CEI has conducted, these stakeholders indicate they need evening classes, with face-to-face options, and that they prefer a faculty member in the classroom, as opposed to distance-ed options. In short, learners from low-income backgrounds, with access to fewer resources, who need flexible face-to-face offerings have largely been unserved by the four-year institutions in Idaho Falls. The two proposed CEI BAS degrees represent a viable, specialized, and relevant solution for these learners.

Of note, College of Eastern Idaho holds the same National Security Agency Center of Academic Excellence as the Idaho Universities in cyber security. This designation ensures the depth of instruction for the Cyber Forensics BAS will be of the highest quality due to this external accreditation.

CEI has diligently worked with industry partners to understand their needs for skilled workers at all levels. Basic American Foods, Elevation Labs, Idaho Falls & Bonneville County Police & Fire Services, INL, the Sheriff's office, the FBI, and more have all expressed their support for these industry-relevant and specific BAS degrees. Currently, no niche degree offering exists in either cyber forensics or operations management in Idaho Falls that addresses the needs of these employers. The learners leaving CEI with the skills these BAS degrees provide would find living-wage jobs, while simultaneously filling the demand of local employers. It's a win-win-win for learners, industry, and the community.

Non-Competitiveness Concerns

CEI learners desire degree offerings in Idaho Falls, with flexibly scheduled classes, and with broader options than online or distance education. Both BAS degrees will be offered face-to-face, in the evening. Eventually, as the demand grows, the offerings will also be provided online, with real-time faculty support when needed. While some of the classes proposed in these degrees are currently offered by distance-ed or online by four-year institutions, as mentioned above, the learners CEI seeks to serve have expressed interest in evening, face-to-face classes. Moreover, most bachelor completion programs offered online by the Idaho four-year institutions are for learners who hold an associate degree, ***not*** an applied associate degree. BSU does accept applied associate degree holders into their cyber-applied bachelor's program, but only in an online format for those learners who wish to stay in Idaho Falls. CEI contends that learners in our region should have face-to-face, evening options. Also, CEI's proposed degrees will be at a significantly lower price point than the four-year institutions' tuition. Both degrees are practitioners' degrees, not the traditional academic, theoretical degree. Thus, CEI is not competing with any four-year institution in Idaho Falls, as these industry-specific degrees remain unavailable to learners in our region.

Collaboration Concerns

CEI welcomes collaboration with all four-year institutions and has been an excellent partner. At a time when space on the CEI campus is in short supply, we provide an office in a well-trafficked student building for UI, ISU, LCSC, and other institutions to have their advisors work with CEI students about all things transfer.

I personally have been involved in many discussions over the past six years about collaboration opportunities with Idaho State University (ISU) and have asked for degree completions in Idaho Falls. Unfortunately, the lack of action in moving forward with bringing face-to-face degree completions to Idaho Falls has been one driving force for CEI to create these degrees. Further, CEI has welcomed collaboration, specifically in a nursing pathway, but ISU has yet to create that pathway to bachelor's completion for our AAS nursing students. Also, CEI has held discussions with ISU about moving their BAS in Cyber Physical Systems Engineering Technology to the Idaho Falls location, but after several years of discussions, there has been no progress in that collaboration.
CEI invites the sharing of faculty, space, and revenue in Idaho Falls in both proposed BAS degrees with any four-year institution willing to partner. We have had ongoing conversations with stakeholders from ISU and UI about collaboration in other degree pathways that will provide more degree completion opportunities in Idaho Falls.

Resource Concerns
Several universities expressed concern that the Operations Management degree would not be AACSB accredited. This degree does not need AACSB-accredited faculty or programming, hence the applied nature of the degree. Given the applied nature of this degree, adjunct faculty working in the field are a benefit. This is not a business degree, but a technical supervision degree aimed at practitioners who wish to move into supervisory roles without starting over as a freshman. Further, ISU's BAS is also not AACSB accredited and not taught by AACSB faculty.

The reality is that very few employers seek someone with the credentials from an AACSB-accredited institution. Most positions that require AACSB credentialing are in higher education as faculty at research universities and not in business and industry. The need we hope to fill is to allow local community members to obtain a degree that helps them advance in employment, thereby obtaining a higher quality of life. Region six as designated by the SBOE contains two ALICE counties with a substantial proportion of the populace making less than the federal poverty designation. Both of CEI's proposed BAS degrees would target this population.

It was suggested that CEI did not understand ISU's curriculum and regional responsibilities. CEI fully understands ISU's curriculum and responsibilities. However, ISU has no conduit by which to transfer AAS credits into their BBS or BS Business degree at this time. Further, the classes that are available in Idaho Falls in these degree pathways are either online or distance learning. As already mentioned, CEI proposes to offer classes in both degrees face-to-face and in the evening.

CEI will transfer any AAS credits into these BAS degrees. Also, CEI will consider credit for prior learning as credits toward degree completion, where appropriate, and with qualified faculty providing the measure for that credit. Thus, students with an AAS or with industry-relevant experience will not be required to start over on their way to a bachelor's degree. CEI is working with the Education Design Lab to create micro-credentials in concert with business and industry. CEI is considering how these stackable credentials feed directly into the proposed BAS degrees.

CEI has started a taskforce to contemplate four-week terms and competency-based education. When CEI implements these practices, BAS learners will have more term-start-dates, which provides an even timelier path to a degree. Also, CEI has a number of qualified faculty on campus to teach classes in both BAS degree pathways. Where additional faculty are needed, CEI intends to hire industry experts and in some instances, these industry experts are provided free of charge. Industry partners use this "donated time" as professional development for their employees. We are also working with an industry partner to utilize portions of their curriculum for the operations management degree. This curriculum has "simternships" embedded in their materials and augments didactic learning with hands-on training in real time.

CEI is responsible to serve industry in our region and that is exactly what these degrees will do. Of note, The World Economic Forum estimates that 42% of jobs are expected to require different skills by 2024 and over one billion workers will need to be reskilled by 2030. CEI intends to be an integral part of helping workers in region six obtain those new skills. CEI can provide these industry-specific degrees at a much lower price point than university tuition. Additionally, and perhaps most importantly, it is the directive of CEI's locally elected five-member board of trustees that CEI offer these degrees which are strategic to CEI's future.

Conclusion

CEI has tremendous respect for our university colleagues and friends. We understand that community colleges offering applied baccalaureate degrees represents a significant education evolution in the state. However, community colleges in 24 states currently offer these degrees with great success for learners. Jeremy Wright-Kim, an education professor at Fairleigh Dickinson University and researcher on community college baccalaureate programs stated that if community college baccalaureates represent a "more financially, geographically accessible four-year credential, that is not mission creep...It's just an evolution of [community colleges] foundational commitment to community needs." Also, Wright-Kim's research demonstrates that in most instances, students who enroll in a community college bachelor's degree are never going to attend a university.

CEI has created two specific applied baccalaureate degrees in concert with industry and our community. There is demand from learners in our region for bachelor-degree completions that value prior learning experience and transfer applied credits into bachelor-level degrees. Learners have requested face-to-face, in-person, and evening options, which CEI can accommodate. These degrees are squarely within CEI's mission, as well as the State Board of Education's mission.

- Specialization – AACSB guidelines standard 6 specifies that no more than half of the program requirements may be met through transfer. All three transfer institutions are AACSB accredited therefore forcing students to take additional credits at the institution. A course in Operations Management at BSU hardly constitutes a program.
- Non-competitiveness -While an assertion from ISU about taking applied credits into their academic business bachelor's degree is perhaps comforting, it does not equal to true transferability. Most likely, if applied credits were taken into the academic bachelor's degree, they would end up in the elective bucket and not as major credits. Again, rule six of AACSB accreditation precludes starting as a junior without retaking classes. The one program that would take applied credits into the major portion of the degree at ISU is through the College of Technology. It also requires classes that meet in Pocatello or by tele-course to the ISU facilities at University Place in Idaho Falls. These programs are intended for full-time students and not for working adults.
- Collaboration – CEI fully intends to collaborate. as we already have, to meet with all of the state institutions. We met fairly regularly with department personnel from ISU. We also have met with personnel from BSU and U of I. Admittedly, these discussions sometimes rise to the level of Provosts and School Deans.

COLLEGE OF WESTERN IDAHO

SUBJECT

Bachelor of Applied Science in Business Administration

APPLICABLE STATUTE, RULE, OR POLICY

Idaho State Board of Education Governing Policies & Procedures, Section III.G. and III.Z.
Idaho Code § 33-107(8) and Idaho Code § 33-2107A

BACKGROUND/DISCUSSION

College of Western Idaho (CWI) proposes to launch its inaugural Bachelor of Applied Science (BAS) degree in Business Administration. The program is designed to meet the needs of currently underserved students and increase the number of Idahoans with a bachelor's degree (currently less than 30% of Idahoans over the age of 25 hold a bachelor's degree). By creating a new pathway for adult learners in the Treasure Valley who do not fit the traditional mode of college student and by building a flexible, multi-modality bachelor's program that incorporates Career Technical Education (CTE) courses into the curriculum, we can provide an affordable pathway for Idaho's workforce to gain needed skills to advance in their careers. The target audience for this degree may not have the needed GPA or ACT scores to enter a more academically competitive program. Students will enjoy online programs with multiple entry points, but with a local presence to provide additional support and face-to-face options.

Research demonstrates that adult learners, particularly first-generation students, are primarily concerned with cost and with academic support as they consider returning to school. CWI's teams of dedicated advisors, coaches, tutors, and qualified faculty are ready and capable of guiding such adult learners through a bachelor's degree that will enable them to advance in their jobs and support their families.

Idaho's workforce would also benefit from additional skills and training to advance our state's economy. This program is aligned with in-demand jobs. By offering an affordable, accessible, flexible pathway to complete a BAS degree, CWI can support local businesses and corporations who need workers trained not only in technical skills, but also in the 'softer' skills of business and customer service. This program has the support of local businesses and corporations and CWI's locally elected Board of Trustees.

In 2022, the Board adopted amendments to Policy III.Z. to include five specific criteria for evaluating proposed baccalaureate degrees by the community colleges:

- "Demand: Proposed offerings must be to meet an urgent, local need based on where students who complete the offering will be employed rather than

on where the students reside. The demand for the proposed offering needs to be clear, urgent, and compelling, as evidenced through data and industry input. Commitments of practical support (e.g. funding, internships, etc.) from industry stakeholders constitutes evidence of demand.

- "Specialization: The proposed offering must be based on the unique capability at the institution, founded on specialized instructional expertise and any infrastructure necessary for program delivery.
- "Non-competitiveness: The proposed offering must be non-competitive with other institutions' offerings within the identified service area (whether regional or statewide) and supported by other institutions within the service area. The Executive Director or designee may request written commitments from the presidents of other institutions within the service area expressing conceptual and, if necessary, practical support for the proposed program.
- "Collaboration: Alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions. High-demand programs must be offered through inter-institutional collaboration as described in this policy.
- Resources: The institution must have sufficient resources to develop and deliver the proposed offering."

IMPACT

By supporting a low-cost bachelor's degree at CWI, the State Board of Education will be serving the needs of Idaho businesses and students, especially currently underserved community college graduates who would benefit significantly from a highly affordable opportunity to advance their education.

The proposed program will utilize existing space; however, will need to expand library resources for student access to journals, magazines, and newspapers for upper-level research in Business topics. CWI will also need to expand their tutoring services to provide sufficient student support. The program will require investment in one to two new full-time faculty in the areas of business administration, human resources, and/or organizational leadership; program director, six adjunct faculty, and a dedicated advisor. As provided in the proposal, CWI Board of Trustees is providing discretionary funds to initiate the program. CWI has developed a five-year ROI plan to demonstrate enrollments, attrition, revenue and expenses for the roll-out of the program. Total financial impact ranges from $326,415 - $597,112 in on-going funds and $3,000-$533,000 of one-time funding over a four-year period.

ATTACHMENTS

Attachment 1 – Business Administration BAS Proposal
Attachment 2 – Institution Responses for Business Administration Proposal

BOARD STAFF COMMENTS AND RECOMMENDATIONS

CWI has identified a need in Region III for an applied baccalaureate degree in Business Administration. This program aims to serve non-traditional students and

working adults who currently hold an academic associate or associate of applied science degree that will provide opportunities to upgrade or enhance their skills and credentials with less time and financial investment. This program builds on existing academic and CTE programs in Bookkeeping and Accounting, Marketing, and Administrative Specialization programs at CWI. This includes opportunities to earn credit for prior learning for any of the required courses except for one, which is a seminar. The proposed program will be offered 60% online, 20% face-to-face and 20% hybrid.

The proposed applied baccalaureate degree in Business Administration is consistent with CWI's Three-Year Plan for implementation Fall 2025. Currently no institution has the statewide program responsibility for applied baccalaureate programs in Business or Business Administration. Each institution has a service region program responsibility consistent with Board Policy III.Z to assess and ensure the delivery of all educational programs and services necessary to meet the educational workforce needs within its assigned service region. Staff notes that in 2018, Board Policy III.Z was amended to include community colleges in the Academic Service Regions to serve alongside the four-year institutions in sharing responsibility for meeting undergraduate program needs. Consistent with Board Policy III.Z, CWI and Boise State University are designated to serve undergraduate education needs in Region III to include applied baccalaureate degree programs.

Currently, all four-year public postsecondary institutions offer an academic baccalaureate degree in Business or Business Administration as follows:

Insti.	Title	CIP Code	Award	Locations	Regional/ Statewide	Delivery Methods
BSU	Business Administration	52.0101	BBA	Boise	Regional	face-to-face
BSU	Bachelor of Applied Science	30.9999	BAS	Boise	Regional	Face-to-face
BSU	Bachelor of Applied Science	30.9999	BAS	Online	Regional	Online
BSU	Cyber Operations	43.0404	BAS	Online	Regional	Online
ISU	General Business	52.0101	BBA	Idaho Falls, Pocatello	Regional	face-to-face
ISU	General Business (Online)	52.0101	BBA	Online	Regional	Online | Web/video
ISU	General Business: Online Degree Completion	52.0101	BS	Online	Regional	Online
LCSC	Business Administration	52.0201	BA/BS	Lewiston	Regional	face-to-face
UI	Business Administration	52.0305	B.B.A.	Online	Regional	Online

Boise State University offers an online and in-person/hybrid Bachelor of Applied Science that provides students with CTE credits and flexible options. Students in the program may select from several business and management certificates or minor options. Additionally, Boise State's BAS degree program also provides a pathway for students with an Intermediate Technical Certificate and Advanced Technical Certificate that qualifies students for admission.

The proposed CWI program projects 25 initial enrollments in year one, reaching 150 enrollments by years four and five and graduating 75 students by year four. These numbers are based on a 25-student cohort model. CWI estimates a minimum of 25 enrollments per cohort to maintain program sustainability. If those minimums are not met within three years, the program will be evaluated for improvement or discontinuation.

In 2022, the Board approved amendments to Board Policy III.Z to include a set of minimum criteria by which the Board will evaluate proposals by the universities to offer new associate degrees and proposals by the community colleges to offer baccalaureate degrees. The program's responses are included with the proposal for the Board's review and consideration.

The proposal completed the program review process and was shared with the Council on Academic Affairs and Programs on November 2, 2023 and with the Committee on Instruction, Research, and Student Affairs on November 30, 2023.

Boise State University, University of Idaho, and Lewis-Clark State College have articulated concerns and observations regarding the proposed program's alignment with the Board's criteria for baccalaureate degree offerings by community colleges set forth in Board Policy III.Z (Attachment 2). Specifically, these institutions have raised concerns about duplication of existing programs, lack of demand for proposed program, collaboration, specialization of degree, and unnecessary competition. CWI updated their proposal to provide responses to some of those observations after initial submission but did not provide separate responses to concerns that were raised.

The Board should carefully consider the concerns and observations raised by the other institutions. Staff recommends the Board also consider the workforce needs identified in the proposal and capacity to offer the proposed program in Region III and determine whether it can be met through CWI or if the existing pathways offered by the other four-year institutions currently meet industry and student demand. The Board must also consider whether the proposal meets the criteria in Board policy for approving proposed baccalaureate programs at the community college level. If the Board determines the proposal does not meet these criteria but desires to approve the program anyway, then the Board must first waive this portion of policy.

BOARD ACTION

I move to approve the request by the College of Western Idaho to offer a Bachelor of Applied Science in Business Administration as provided in Attachment 1.

Moved by _____ Seconded by _____ Carried Yes _____ No _____

Idaho State Board of Education

Institutional Tracking No. *Revised 11/17/2023/ps*

FULL PROPOSAL FORM

Academic Degree and Certificate Program

Date of Proposal Submission:	09/15/2023			
Institution Submitting Proposal:	College of Western Idaho			
Name of College, School, or Division:	School of Social Sciences and Public Affairs			
Name of Department(s) or Area(s):	Business			
Official Name of the Program:	Business Administration			
Implementation Date:	Fall 2024			
Degree Information:	Degree Level: Bachelors	Degree Type: Applied Science		
CIP code (consult IR /Registrar):	52.0201 – Business Administration and Management, General			
Method of Delivery: Indicate percentage of face-to-face, hybrid, distance delivery, etc.	Face-to-face: 20%; Hybrid: 20%; Online: 60%			
Geographical Delivery:	Location(s)	Boise, Nampa, and/or online	Region(s)	III
Indicate (X) if the program is/has: (Consistent with Board Policy V.R.)	☐ Self-Support fee	☐ Professional Fee	☐ Online Program Fee	
Indicate (X) if the program is: (Consistent with Board Policy III.Z.)	☐ Regional Program Responsibility	☐ Statewide Program Responsibility		

Proposed Action

- [x] **New program offering**
  - [x] Undergraduate program
  - [ ] Graduate program
  - [ ] Undergraduate certificate (30 credits or more)
  - [ ] Graduate certificate (30 credits or more)
- [ ] **New branch campus or change in location**
- [ ] **Modification of Existing Academic Programs**
  - [ ] Converting one program option to a stand-alone program
  - [ ] Consolidating two or more undergraduate programs into one
  - [ ] Consolidating two or more graduate programs into one
  - [ ] Splitting an existing program into two or more programs
  - [ ] Program expansion outside an institution's Designated Service Region as defined in Board Policy III.Z.
  - [ ] Adding certificate or degrees to existing programs

Christina K Smerick Digitally signed by Christina K Smerick Date: 2023.09.27 09:01:23 -06'00'

College Dean Date

Vice President for Research (as applicable) Date

Graduate Dean/other (as applicable) Date

Mary Jo Hawks 9-27-23

FVP/Chief Fiscal Officer Comptroller Date

Academic Affairs Program Manager, OSBE Date 11/30/23

Chief Financial Officer, OSBE Date 11/20/23

Provost/VP for Instruction Date

Chief Academic Officer, OSBE Date

President 9/27/2023 Date

SBOE/Executive Director or Designee Approval Date

Before completing this form, refer to Board Policy Section III.G., Postsecondary Program Approval and Discontinuance. This proposal form must be completed for the creation of each new program. All questions must be answered.

Rationale for Creation or Modification of the Program

1. **Describe the request and give an overview of the changes that will result.** What type of substantive change are you requesting? Will this program be related or tied to other programs on campus? Identify any existing program that this program will replace. If this is an Associate degree, please describe transferability.

Our intent with this proposal is to institute the inaugural Bachelor of Applied Science (BAS) degree in Business Administration at the College of Western Idaho. This transformative initiative will expand upon the foundational knowledge imparted by our Associate of Arts (AA) in Business degree, integrating practical components from our Associate of Applied Science (AAS) in Career Technical Education (CTE) for Bookkeeping and Accounting, Marketing, and Administrative Specialist programs.

Policy III.Z.2.b.iv – 3) Non-Competitiveness: *This academic venture reflects our commitment to substantive change—a change that encompasses a new pathway not available in existing educational offerings and designed to match evolving industry standards and workforce demands. The distinction between a BAS and a Bachelor of Business Administration (BBA) is critical. Our BAS program focuses on those who wish to blend their vocational skills with theoretical business knowledge, a niche not currently addressed by existing programs. Thereby, we ensure all students can find a path that meets their needs. CWI aims to fill an existing gap in the market, not to overshadow or compete with our partner 4-year institutions' programs.*

The meaningful differences between CWI's BAS and programs that already exist are 1) the target market, 2) the cost of the degree, and 3) the flexibility for the student.

Our 4-year partners are esteemed AACSB-accredited research institutions seeking tomorrow's leaders for their excellent programs; CWI is looking to "give a leg up" to working professionals who don't fit the traditional college student mold and are not looking for an Executive MBA. In any undertaking, cost is always a significant factor. CWI can offer our niche target market a pathway that will provide them with a possibly heretofore denied financial prize—an increased salary—because they lacked a degree. Our ACBSP accreditation, which we can apply for after running the program for two years, focuses on teaching excellence and practical instruction, not research, and is thus especially suited to our niche market student.

Policy III.Z.2.b.iv – 2) Specialization: *Finally, CWI is very flexible in its course offerings, instruction modalities, and can be more adaptable regarding things like graduation rates that our 4-year partners must focus on; frequently, the strong labor market entices our niche students to improve their work situations before they can "complete." However, it's important to consider the broader context. Community colleges, including CWI, often serve non-traditional students, part-time students, working adults, and those with family commitments which can extend their time to graduation. These factors can significantly impact completion rates.*

The process for ratifying this program adheres to CWI's stringent policies regarding curricular amendments and new program development, which mandate a rigorous faculty approval process through the Curriculum Committee. The BAS program's inception began with a comprehensive internal review led by Dr. Liza Long, Ph.D. in Organizational Leadership. Subsequent course development was spearheaded by Richard Sotto, MBA, Chair of the Business Department, in collaboration with our business faculty, all of whom hold master's level degrees or higher in their respective fields.

Prior to presentation for committee review, an exhaustive development phase ensured that the proposed courses and the program structure met our institution's high standards for academic excellence. The Curriculum Committee then undertook a thorough examination and robust debate of the program, which

culminated in its approval in September following a constructive and meticulous evaluation.

For detailed information about the composition, charter, and procedural framework of the CWI Curriculum Committee, please contact CWI Provost, Denise Aberle-Cannata.

2. **Need for the Program**. Describe evidence of the student, regional, and statewide needs that will be addressed by this proposal to include student clientele to be served and address the ways in which the proposed program will meet those needs.

   a. **Workforce and economic need:** Provide verification of state workforce needs that will be met by this program. Include job titles and cite the data source. Describe how the proposed program will stimulate the state economy by advancing the field, providing research results, etc.

Policy III.Z.2.b.iv – 1) Demand: *The CWI BAS program is designed in response to verified workforce needs in Idaho, as substantiated by robust labor market data. It specifically addresses the demand for sales manager positions, which are expected to grow by 28% over the next decade and have a low risk of automation. Similarly, the program will positively impact account manager positions, which are projected to grow by 9%. These job titles, critical to the state's economy, have the support of data from Burning Glass.*

The program's alignment with high-demand jobs is a strategic response to current workforce gaps and an investment in Idaho's economic future. By fostering an educated workforce, the program aims to energize the state's economy by advancing fields such as technology, healthcare, education, agriculture, and energy. Graduates are poised to contribute to business innovation and competitiveness, even potentially catalyzing the creation of new job titles and sectors. CWI's BAS emphasis on vocational and practical skills is expected to have immediate business applications, bolstering Idaho's economic resilience and growth. This symbiotic relationship between vocational education and economic development marks the BAS program as a vital catalyst for the state's prosperity.

In "How they Pay: The Voices of Adult Learners on College Affordability, and How Institutions Are Responding;" CAEL, 2023, it is noted that almost half (49%) of adult learners rely on ***3 or more funding sources.*** *The average loan debt of surveyed adult learners is $20,576. Pell Grant recipients whose awards cover less than half of their expenses have an average loan debt of $28,629. 49% of CWI students are Pell Grant recipients.*

In alignment with Idaho Launch, this program aligns with CIP/SOC codes pertaining to high-demands jobs in our state.

   b. **Student demand.** What is the most likely source of students who will be expected to enroll (full-time, part-time, outreach, etc.). Provide evidence of student demand/ interest from inside and outside of the institution.

Policy III.Z.2.b.iv – 1) Demand: *The primary source of students for the BAS program is expected to be CWI's existing CTE graduates, working adults, and first-generation college students seeking to advance their careers without the disruption of transferring to a four-year institution or who's current ACT/SAT scores may not facilitate admission to some 4-year institutions. Evidence of demand comes from the observed preferences of Idaho students for low-cost, flexible, and accessible educational offerings. CWI's own market analysis aligns with these preferences, as does the strong desire for online programs with various entry points throughout the year, as evidenced by the policy brief from the Education Commission of the States (ECS).*

Only 30.7% of adults over the age of 25 in Idaho have bachelor's degrees. CWI is poised to reach a market that is underserved by four-year institutions: workers who need higher education to advance in the workplace. Many CWI CTE graduates have the training for gainful employment but lack the soft skills for advancement into management roles in their workplace. As many are first-generation college students and working adults, they are most comfortable remaining in an educational system they are already familiar with. Having a baccalaureate option at the community college level also eliminates the need to transfer. Nationally, community college students lose an average of 37% of their earned credits in the process of transferring to another institution. [Source: Education Commission of the States (ECS). Policy Brief, 2020, https://www.ecs.org/wp-content/uploads/Community-College-Bachelors-Degrees.pdf]

According to the American Association of Community Colleges, compared to their four-year college counterparts, community college bachelor's degree students are far more likely to be first-generation college goers and come from low-income households and underrepresented racial and ethnic backgrounds. (Source: https://www.bestcolleges.com/news/analysis/2022/01/13/earning-your-bachelors-degree-community-college/)

The design of CWI's BAS program, offering both online and face-to-face options, maximizes choice and accessibility, thereby appealing our target student market. This flexibility, coupled with the economic benefits of a local degree completion option, is expected to resonate strongly with the institution's current student body and the wider community of potential working professionals looking to elevate their socio-economic status through higher education. The program is thus not only in alignment with but is a direct response to the articulated needs and preferences of our student community.

Policy III.Z.2.b.iv – 2) Specialization: *Overwhelmingly, Idaho students want a low-cost, flexible, online program with several entry points throughout the year. CWI specifically designed the courses for this degree to be offered in an 8-week online format, which will allow students to complete courses on a part-time basis with near-full-time results (12 credits per traditional semester). However, we will also offer a face-to-face option to maximize choice for students.*

c. **Societal Need**: Describe additional societal benefits and cultural benefits of the program.

Policy III.Z.2.b.iv – 2) Specialization: *Due to CWI's affordability and commitment to serving all students, Idaho citizens who may not have considered continuing their education due to cost, time, and anxiety will have the opportunity to continue their education to a baccalaureate degree with the excellent support structures CWI provides our students. Most CWI students are first generation students who chose a community college because of the cost, flexibility, program offerings that are focused career readiness, and the students' academic preparedness. Additionally, 49% of CWI students receive Pell Grants (for comparison, only 21% of Boise State University students are Pell Grant recipients) [source: USED IPEDS data]. Our students are not able to afford a traditional 4-year degree program. Idaho is behind other states in terms of having a highly skilled, educated work force, and providing more avenues for Idahoans to complete their bachelor's degree strengthens the state.*

3. Program Prioritization

Is the proposed new program a result of program prioritization?

Yes_____ No__x___

If yes, how does the proposed program fit within the recommended actions of the most recent program prioritization findings.

4. Credit for Prior Learning

Indicate from the various crosswalks where credit for prior learning will be available. If no PLA has been identified for this program, enter 'Not Applicable'.

CWI offers at least one PLA opportunity for most of our courses. While this degree is not meant to center PLA, students would have the opportunity to earn PLA credit for any of the required courses except BUSA 490. PLAs are determined in a variety of ways, but most use a challenge exam. Because CWI offers CTE courses, we are well-poised to give PLA credit where it is due for a wider range of courses than a traditional BA in Business.

5. Affordability Opportunities

Describe any program-specific steps taken to maximize affordability, such as: textbook options (e.g., Open Educational Resources), online delivery methods, reduced fees, compressed course scheduling, etc. This question applies to certificates, undergraduate, graduate programs alike.

The following measures underscore CWI's dedication to providing a cost-effective pathway to higher education, addressing both the immediate financial concerns of its students and the broader economic imperative to cultivate a skilled workforce in Idaho. These efforts will meet the evolving needs of our community and the challenges of the contemporary job market.

The College of Western Idaho (CWI) has employed a multifaceted approach to maximize the affordability of its BAS degree program, ensuring it remains within reach for students from all economic backgrounds. CWI's strategic initiatives include the adoption of Open Educational Resources (OER), significantly reducing or eliminating the cost of textbooks. This commitment to OER is bolstered by a partnership with McGraw-Hill, offering a comprehensive textbook bundle for a nominal fee of $300, substantially less than the cost of traditional college textbooks.

CWI's bachelor's degree program's intent is, in part, to provide local employers the opportunity to promote from within. CWI's bachelor's degree is being designed to appeal to CTE graduates and provide them with a pathway designed for their individual needs for less than $20,000

CWI's BAS degree program will capitalize on the efficiency of online delivery methods and compressed 8-week rotations, allowing students to accelerate their education while managing work and personal responsibilities. This scheduling flexibility is particularly beneficial to non-traditional students, such as working adults and parents, who constitute a significant portion of the student body and our target market.
In terms of tuition, CWI has set rates that are highly competitive:

The in-district Idaho resident tuition rate is $139 per credit hour, or $8,340 for 60 credit hours
Out-of-district residents are charged $189 per credit hour, totaling $11,340 for 60 credit hours
And, non-resident and international students are $306 per credit hour, or $18,360 for 60 credit hours

Enrollments and Graduates

6. **Existing similar programs at Idaho Public Institutions.** Using the chart below, provide enrollments and numbers of graduates for similar existing programs at your institution and other Idaho public institutions for the past four years.

Instit	Program Name	Fall Headcount Enrollment in Program				Number of Graduates From Program (Summer, Fall, Spring)			
		FY18-19	FY19-20	FY20-21	FY21-22	FY18-19	FY19-20	FY20-21	FY21-22
BSU	BAS*	88	61	43	38	24	19	26	18
	BAS Online	118	146	156	124	18	28	32	43
	Cyber Operations BAS-Online	N/A	N/A	N/A	31	N/A	N/A	N/A	N/A
BSU	BBA Business Administration	2295	2808	3081	3707	159	217	251	219
ISU	BS General Business	513	457	408	405	97	85	76	55
LCSC	BA/BS Business Administration	416	336	244	240	76	40	44	51
U of I	BBA Business Administration	202	166	136	150	69	65	61	71

*Several concentrations are available, but enrollments and graduates aren't tracked separately

7. **Justification for Duplication** (if applicable). If the proposed program is similar to another program offered by an Idaho public higher education institution, provide a rationale as to why any resulting duplication is a net benefit to the state and its citizens. Describe why it is not feasible for existing programs at other institutions to fulfill the need for the proposed program.

Policy III.Z.2.b.iv – 3) Non-Competitiveness: *CWI's proposed BAS degree provides a net benefit to the state and its citizens by creating a workforce that is more skilled and ready to meet the specific needs of Idaho's economy. The program's unique structure, affordability, and alignment with the state's projected career field opportunities make it a necessary addition to Idaho's higher education offerings, rather than an unnecessary duplication.*

Policy III.Z.2.b.iv – 4) Collaboration: *The Bachelor of Applied Science (BAS) in Business Administration at CWI is not a duplication of existing programs within Idaho's higher education landscape; rather, it fills a unique niche. This program integrates Career and Technical Education (CTE) courses directly into its curriculum, providing a pathway that is distinct from traditional Bachelor of Science (BS) degrees. This integration is pivotal, as it addresses the specific needs of a segment of the student population that is underserved by conventional four-year degree programs without significant additional cost to the student.*

The BAS degree program acknowledges and values prior learning by allowing students to apply Prior

Learning Assessment (PLA) credits towards essential courses. This not only fosters accelerated progression through the degree program but also honors the practical experience and previous educational achievements of our students. It is especially beneficial for those who have already obtained an Associate of Arts (AA) or Associate of Science (AS), an Associate of Applied Science (AAS) degree or have significant workforce experience.

The focus on practical and technical education is central to the BAS program, preparing students for immediate career readiness and advancement within the workforce—objectives that may not be the primary focus of existing programs at Idaho's premier institutions. This hands-on approach is geared towards enhancing the advancement opportunities within current employment of graduates in a manner that traditional academic programs might not emphasize.

Ivy Love, a senior policy analyst at New America, said that while it may be easy to wonder if bachelor's programs offered by community colleges needlessly duplicate the offerings of colleges and universities, the answer is no. They are serving different students in different ways, she said. [source: From https://hechingerreport.org/from-associate-to-b-a-more-people-can-finish-a-four-year-degree-at-community-colleges/]

CWI's BAS program is specifically designed to meet the needs of non-traditional students, including working adults seeking to upgrade their skills and credentials without the significant time and financial investment that traditional four-year degrees often require.

8. **Projections for proposed program:** Using the chart below, provide projected enrollments and number of graduates for the proposed program:

Proposed Program: Projected Enrollments and Graduates First Five Years											
Program Name: Business Administration BAS											
Projected Fall Term Headcount Enrollment in Program						**Projected Annual Number of Graduates From Program**					
FY25 (first year)	FY26	FY27	FY28	FY29		FY25 (first year)	FY26	FY27	FY28	FY29	
25	75	125	150	150		0	0	25	75	75	

9. **Describe the methodology for determining enrollment and graduation projections.** Refer to information provided in Question #2 "Need for the Program" above. What is the capacity for the program? Describe your recruitment efforts? How did you determine the projected numbers above?

These are the minimum numbers we need to launch the program for it to become self-supporting in 2 years' time. There is increasing demand for workers with business acumen in the Treasure Valley. We will advertise our cohort model primarily toward adult learners with an AA/AS/AAS in hand, rather than toward high school seniors. This demographic is in the workforce already and is seeking upward mobility within their organizations. Students with an AAS degree may begin with CWI by taking general education courses to reach the 36 required, thus adding time to completion. We have estimated attrition rates into the graduate counts.

10. **Minimum Enrollments and Graduates.**
    a. What are the minimums that the program will need to meet in order to be continued, and what is the logical basis for those minimums?

Minimum of 25 students per cohort. We will start with a 3-year time frame and then re-evaluate it through program review.

    b. If those minimums are not met, what is the sunset clause by which the program will be considered for discontinuance?

We will give the program 3 years to achieve enrollments; this aligns with our program review schedule.

11. **Assurance of Quality.** Describe how the institution will ensure the quality of the program. Describe the institutional process of program review. Where appropriate, describe applicable specialized accreditation and explain why you do or do not plan to seek accreditation.

The College of Western Idaho (CWI) is unwavering in its dedication to maintaining the highest quality in its educational programs, including the proposed BAS degree. Our assurance of quality is multifaceted and systematic, encompassing regular program assessments, program prioritization, ACBSP accreditation pursuits, and student support enhancements.

CWI's institutional process for ensuring program quality begins with annual program assessments to monitor and evaluate the efficacy and currency of our curriculum. These annual reviews are complemented by more thorough program reviews every three years, providing opportunities for deeper analysis and adjustments as needed to keep the program aligned with industry standards and educational best practices.

In addition to these regular reviews, CWI undertakes a program prioritization process every four years. This process is essential for the strategic allocation of resources, ensuring that programs of high value and relevance receive appropriate support to continue their success and responsiveness to student and regional needs.

Specialized accreditation is a cornerstone of our quality assurance. Our AA in Business program currently holds accreditation from the Accreditation Council for Business Schools and Programs (ACBSP), and we are committed to pursuing the same esteemed accreditation for the BAS program. In accordance with ACBSP guidelines, we plan to seek accreditation after the program has been in operation for two years, underscoring our commitment to external validation of our program's quality.

CWI's commitment to quality is also evident in our focus on the student experience. By engaging an external agency to evaluate and improve the student journey from inquiry through matriculation, we have successfully created a high-touch, student-centric experience. This experience is further supported by our revised student-facing infrastructure and the provision of dedicated faculty, advisors, and student coaches for the BAS program, ensuring personalized guidance and support for each student's unique educational path.

Our systematic approach to program quality and continuous improvement is demonstrated by our graduation rate (within 150% of time) is 27% and increasing; the national average for community colleges is 31.4%. [source: USED IPEDS data]. This indicates not only the effectiveness of our current measures but also our commitment to further enhancing student success.

CWI's multifaceted strategy for quality assurance reflects a deep institutional commitment to excellence, accountability, and student success, establishing a strong foundation for the proposed BAS degree program.

12. **In accordance with Board Policy III.G., an external peer review is required for any new doctoral program.** Attach the peer review report as **Appendix A**.

13. **Teacher Education/Certification Programs** All Educator Preparation programs that lead to certification require review and recommendation from the Professional Standards Commission (PSC) and approval from the State Board of Education.

Will this program lead to certification?

Yes_____ No__x___

If yes, on what date was the Program Approval for Certification Request submitted to the Professional Standards Commission?

14. **Three-Year Plan: If this is a new proposed program, is it on your institution's approved 3-year plan?**

Yes x No _____

If yes, proceed to question 15. If no:

a. **Which of the following statements address the reason for adding this program outside of the regular three-year planning process.**

Indicate (X) by each applicable statement:

	Program is important for meeting your institution's regional or statewide program responsibilities.
	The program is in response to a specific industry need or workforce opportunity.
	The program is reliant on external funding (grants, donations) with a deadline for acceptance of funding.
	There is a contractual obligation or partnership opportunity related to this program.
	The program is in response to accreditation requirements or recommendations.
	The program is in response to recent changes to teacher certification/endorsement requirements.

b. **Provide an explanation for all statements you selected.**

Educational Offerings: Curriculum, Intended Learning Outcomes, and Assessment Plan

15. **Curriculum. Provide descriptive information of the educational offering.**

a. **Summary of requirements.** Provide a summary of program requirements using the following table.

REQUIRED: Completion of an AA, AS, or AAS	60
Credit hours in required courses offered by the department (s) offering the program.	48
Credit hours in required courses offered by other departments:	12
Credit hours in institutional general education curriculum	0-21, depending on how many GE credits the student earned as part of an associate degree
Credit hours in free electives	0
Total credit hours required for degree program:	120

b. Curriculum. Provide the curriculum for the program, including credits to completion, courses by title and assigned academic credit granted.

COURSE ID	NAME	CREDITS
BUSA 101	Introduction to Business	3
BUSA 120	Business Software Applications	3
BUSA 201	Business Communications	3
BUSA 207	Introduction to Business Analytics	3
BUSA 255	Leadership Development	3
BUSA 356	Advanced International Business	3
BUSA 365	Advanced Business Law	3
MRKT 125	Introduction to Marketing	3
MRKT 245	Business Simulation and Analysis	3
MRKT 357	Foundations of Management Theory	3
ECON 201	Principles of Macroeconomics	3
ACCT 201	Introduction to Financial Accounting	3
BUSA 325	Business Ethics	3
BUSA 335	Organizational Leadership	3
MRKT 340	Consumer Behavior	3
BUSA 345	Information Systems Management	3
BUSA 425	Project Management	3
BUSA 355	Human Resource Management	3
BUSA 435	Business Policy and Practice	3
BUSA 490	Strategic Seminar	3
TOTAL		60

c. Additional requirements. Describe additional requirements such as comprehensive examination, senior thesis or other capstone experience, practicum, or internship, some of which may carry credit hours included in the list above.

Students in this program must have already earned an associate degree (AA, AS, or AAS) and will have at least 60 credits from their associate degree applied towards the BAS.

16. Learning Outcomes: Expected Student Learning Outcomes and Connection to Curriculum.

a. Intended Learning Outcomes. List the Intended Learning Outcomes for the proposed program, using learner-centered statements that indicate what students will know, understand, and be able to do, and value or appreciate as a result of completing the program.

1. *Demonstrate foundational knowledge in accounting, economics, finance, and marketing.*
2. *Differentiate appropriate ethical courses of action in business practice.*
3. *Demonstrate professional written and oral communication skills for a variety of audiences and via a variety of channels (physical or virtual presence, digital and traditional media).*
4. *Apply principles of leadership and human resource management to a variety of business settings.*
5. *Apply strategies for effective collaboration with diverse individuals and teams in a variety of business situations.*
6. *Integrate personal values with ethical, legal, and socially responsible business practices to solve contemporary real-world problems across a variety of business settings.*

17. Assessment plans.

a. Assessment Process. Describe the assessment plan for student learning outcomes that will be used to evaluate student achievement and how the results will be used to improve the program.

CWI has an annual program assessment report, wherein programs examine student work centered upon 1-2 program outcomes, analyze the data, and make improvements. The BAS degree will engage in yearly assessment and will conduct a full program review in year 3. Additionally, CWI has instituted a high-level program prioritization analysis for all CWI programs in year 4 of our assessment cycle. The BAS degree will therefore a) undergo annual assessment review; b) perform a full program review in its 3rd year of existence; and c) undergo a prioritization analysis in its fourth year. Please contact CWI for information on our assessment process.

As mentioned above, as a component of the ACBSP accreditation process, once the program has been operational for two years and the application for ACBSP accreditation has been submitted, an ACBSP mentor will be appointed. Following this, a comprehensive self-study of the BAS program will be undertaken. This study will concentrate on areas such as Program Leadership, Strategic Planning, Measurement, Analysis, and Knowledge Management, as well as Faculty and Staff, and Process Management. The already robust assessment procedures at CWI will contribute data to the self-study, ensuring that the BAS program's outcomes are achieved and that the faculty and staff are upholding the highest standards for all stakeholders involved.

Resources Required for Implementation – fiscal impact and budget.

Organizational arrangements required within the institution to accommodate the change include administrative, staff, and faculty hires, facilities, student services, library; etc.

18. Physical Facilities and Equipment: Describe the provision for physical facilities and equipment.

a. Existing resources. Describe equipment, space, laboratory instruments, computer(s), or other physical equipment presently available to support the successful implementation of the program.

Policy III.Z.2.b.iv – 5) Resources: *Will use existing classroom space; no additional resources are necessary.*

b. **Impact of new program**. What will be the impact on existing programs of increased use of physical resources by the proposed program? How will the increased use be accommodated?

Policy III.Z.2.b.iv – 5) Resources: *Students will be enrolled in existing courses to begin the program, allowing us time to plan classroom usage appropriately for the 300-400 level courses to come. Courses will be available online as well as in-person.*
All students begin by taking courses as outlined in the degree map; if they complete courses in their AA/AS, they will begin with the 100/200 level courses they have not completed. We are currently developing all new courses, and revising existing courses, into 8-week formats online in order to provide flexibility, using an external consultant to ensure rigor and consistency across all courses. 300-400 level courses will be ready for launch by Spring 2025.

c. **Needed resources.** List equipment, space, laboratory instruments, etc., that must be obtained to support the proposed program. Enter the costs of those physical resources into the budget sheet.

None

19. Library and Information Resources: Describe adequacy and availability of library and information resources.

a. **Existing resources and impact of new program**. Evaluate library resources, including personnel and space. Are they adequate for the operation of the present program? Will there be an impact on existing programs of increased library usage caused by the proposed program? For off-campus programs, clearly indicate how the library resources are to be provided.

Policy III.Z.2.b.iv – 5) Resources: *We will need to expand our library's human resource and organizational leadership book selection, as well as upgrade our database to provide student access to journals, magazines, and newspapers for upper-level research in Business topics; we will also need to expand our tutoring services to provide sufficient support.*

Item	Description	One-time	Annual Ongoing
Library General Collection	These funds would support purchasing and licensing of books, ebooks, videos, etc. to support upper-level student research. This estimate is based on a review of core collection lists for academic libraries supporting bachelor's level programs in Business.	$30,000	$5,000
Library Database Upgrade	We will need a more substantial database to provide student access to journals, magazines, and newspapers for upper-level research in Business topics.	$0	$15,000
Tutoring and Writing Center Staffing	We will need to hire and train new tutors for this program. This funding will support one PT tutor and one PT writing consultant at 19.5 hrs/wk.	$0	$31,636

b. **Needed resources**. What new library resources will be required to ensure successful implementation of the program? Enter the costs of those library resources into the budget sheet.

As stated above, we will need to expand our book and journal offerings, upgrade our library database, and expand our tutoring services. This is noted on the budget.

20. Faculty/Personnel resources

a. **Needed resources.** Give an overview of the personnel resources that will be needed to implement the program. How many additional sections of existing courses will be needed? Referring to the list of new courses to be created, what instructional capacity will be needed to offer the necessary number of sections?

Policy III.Z.2.b.iv – 5) Resources: *We will hire 1 new full-time faculty in the area of human resources and/or organizational leadership; we will also add sections to existing 100-200 level courses. We are creating eight new courses to expand to 300-400 level courses. Courses are being developed by existing faculty in partnership with the Center for Teaching and Learning. We will hire 6 adjunct faculty as well.*
The BAS adds 8 new courses to the workload of the Business Department. A typical faculty teaching load is 5 courses per semester. Hiring an additional faculty member thus adds 10 new course availabilities to our schedule; the BAS chair will have a ½ time load of 5 courses per year. Given that the 8 new courses will be spread over 18 months, and we are planning to hire 6 new adjuncts, each of whom may teach 2 courses per semester, we have plenty of capacity to add this program, including adding additional sections of 100-200 level courses as needed.

b. **Existing resources**. Describe the existing instructional, support, and administrative resources that can be brought to bear to support the successful implementation of the program.

Policy III.Z.2.b.iv – 5) Resources: *CWI has a robust learning management system that will allow all modalities of teaching. Classrooms are available on multiple campuses throughout the college's area of operation.*

c. **Impact on existing programs**. What will be the impact on existing programs of increased use of existing personnel resources by the proposed program? How will quality and productivity of existing programs be maintained?

Policy III.Z.2.b.iv – 5) Resources: *This program builds on our already-successful business degrees and certificates. The hiring of additional faculty will reduce any burdens created.*

d. **Needed resources.** List the new personnel that must be hired to support the proposed program. Enter the costs of those personnel resources into the budget sheet.

Policy III.Z.2.b.iv – 5) Resources: *1-2 new faculty in business administration, human resources, and/or organizational leadership; a program director; 6 adjunct faculty; and a dedicated advisor.*

21. Revenue Sources

a) **Reallocation of funds:** If funding is to come from the reallocation of existing state appropriated funds, please indicate the sources of the reallocation. What impact will the reallocation of funds in support of the program have on other programs?

CWI's Board of Trustees and president support this degree development and are providing discretionary funds to initiate the launch. This will not affect other programs. CWI is using its own funding to launch this program. CWI has put together a five-year ROI plan to demonstrate enrollments, attrition, revenue and expenses for the roll-out of the program.

b) **New appropriation**. If an above Maintenance of Current Operations (MCO) appropriation is required to fund the program, indicate when the institution plans to include the program in the legislative budget request. *N/A*

c) **Non-ongoing sources**:
   i. If the funding is to come from one-time sources such as a donation, indicate the sources of other funding. What are the institution's plans for sustaining the program when that funding ends? *N/A*

   ii. Describe the federal grant, other grant(s), special fee arrangements, or contract(s) that will be valid to fund the program. What does the institution propose to do with the program upon termination of those funds? *N/A*

d) **Student Fees**:
   i. If the proposed program is intended to levy any institutional local fees, explain how doing so meets the requirements of Board Policy V.R., 3.b. *N/A*

   ii. Provide estimated cost to students and total revenue for self-support programs and for professional fees and other fees anticipated to be requested under Board Policy V.R., if applicable.

$139 per credit hour (in-district Idaho resident tuition) x 60 credit hours = $8340
$189 per credit hour (out of district Idaho resident tuition) x 60 credit hours=$11340
$306 per credit hour (non-resident/international tuition) x 60 credit hours=$18360
See budget for more detailed account of relationship between tuition and program costs.

22. Using the excel **budget template** provided by the Office of the State Board of Education, provide the following information:

- Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first **four** fiscal years of the program.
- Include reallocation of existing personnel and resources and anticipated or requested new resources.
- Second- and third-year estimates should be in constant dollars.
- The amounts should reconcile subsequent pages where budget explanations are provided.
- If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).
- Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

See attached.

Program Resource Requirements.

- Indicate all resources needed including the planned FTE enrollment, projected revenues, and estimated expenditures for the first **four** fiscal years of
- Include reallocation of existing personnel and resources and anticipated or requested new resources.
- Second and third year estimates should be in constant dollars.
- Amounts should reconcile subsequent pages where budget explanations are provided.
- If the program is contract related, explain the fiscal sources and the year-to-year commitment from the contracting agency(ies) or party(ies).
- Provide an explanation of the fiscal impact of any proposed discontinuance to include impacts to faculty (i.e., salary savings, re-assignments).

I. PLANNED STUDENT ENROLLMENT

	FY 25		FY 26		FY 27		FY 28	
	FTE	Headcount	FTE	Headcount	FTE	Headcount	FTE	Headcount
A. New enrollments	50	50	25	25	75	75	75	75
B. Shifting enrollments	0	0	50	50	50	50	75	75
Total Enrollment	50	50	75	75	125	125	150	150

II. REVENUE

	FY 25		FY 26		FY 27		FY 28	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
1. New Appropriated Funding Request	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
2. Institution Funds	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
3. Federal	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
4. New Tuition Revenues from Increased Enrollments	$166,800	$0.00	$433,350.00	$0.00	$593,250.00	$0.00	$695,250.00	$0.00
5. Student Fees	$5,500.00	$0.00	$8,250.00	$0.00	$13,750.00	$0.00	$16,500.00	$0.00
6. Other (i.e., Gifts)	$0.00	$500,000.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Revenue	$172,300	$500,000	$441,600	$0	$607,000	$0	$711,750	$0

Ongoing is defined as ongoing operating budget for the program which will become part of the base.

One-time is defined as one-time funding in a fiscal year and not part of the base.

III. EXPENDITURES

	FY 25		FY 26		FY 27		FY 28	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
A. Personnel Costs								
1. FTE	3.0	0.00	3.5	0.00	4.5	0.00	5.5	0.00
2. Faculty	$58,000.00	$0.00	$59,740.00	$0.00	$123,064.00	$0.00	$190,134.00	$0.00
3. Adjunct Faculty	1713	$0.00	40581	$0.00	54520	$0.00	48668	$0.00
4. Graduate/Undergrad Assistants	0	$0.00	24180	$0.00	24905	$0.00	25653	$0.00
5. Research Personnel	0	$0.00	0	$0.00	0	$0.00	0	$0.00
6. Directors/Administrators	75000	$0.00	77250	$0.00	79568	$0.00	81955	$0.00
7. Administrative Support Personnel	50000	$0.00	51500	$0.00	53045	$0.00	54636	$0.00
8. Fringe	37852	$0.00	42481	$0.00	57576	$0.00	71686	$0.00
9. Other: benefits	43350	$0.00	53025	$0.00	71325	$0.00	91025	$0.00
Total Personnel and Costs	$265,915	$0	$348,757	$0	$464,003	$0	$563,757	$0

	FY 25		FY 26		FY 27		FY 28	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
B. Operating Expenditures								
1. Travel	$0.00	$3,000.00	$0.00	$3,000.00	$0.00	$3,000.00	$0.00	$3,000.00
2. Professional Services	$0.00	$0.00	$0.00	$0.00	$0.00	$16,000.00	$0.00	$0.00
3. Other Services: Marketing	$40,000.00	$500,000.00	$10,000.00	$0.00	$10,000.00	$0.00	$10,000.00	$0.00
4. Communications	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
5. Materials and Supplies	$500.00	$0.00	$500.00	$0.00	$1,000.00	$0.00	$1,500.00	$0.00
6. Rentals	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
7. Materials & Goods for Manufacture & Resale	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
8. Miscellaneous	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Operating Expenditures	$40,500	$503,000	$10,500	$3,000	$11,000	$19,000	$11,500	$3,000

	FY 25		FY 26		FY 27		FY 28	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
C. Capital Outlay								
1. Library Resources	$5,000.00	$30,000.00	5150	$0.00	$5,305.00	$0.00	$5,464.00	$0.00
2. Equipment	$15,000.00	$0.00	$15,450.00	$0.00	$15,914.00	$0.00	$16,391.00	$0.00
Total Capital Outlay	$20,000	$30,000	$20,600	$0	$21,219	$0	$21,855	$0

	FY 25		FY 26		FY 27		FY 28	
	On-going	One-time	On-going	One-time	On-going	One-time	On-going	One-time
D. Capital Facilities Construction or Major Renovation	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
E. Other Costs								
Utilites	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Maintenance & Repairs	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00		$0.00
Other	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00	$0.00
Total Other Costs	$0	$0	$0	$0	$0	$0	$0	$0
TOTAL EXPENDITURES:	$326,415	$533,000	$379,857	$3,000	$496,222	$19,000	$597,112	$3,000
Net Income (Deficit)	-$154,115	-$33,000	$61,743	-$3,000	$110,778	-$19,000	$114,638	-$3,000

Budget Notes (specify row and add explanation where needed; e.g., "I.A.,B. FTE is calculated using…"):

III.A.8	fringe only
III.A.9	benefits only
II.C.2	laptops for advisor and new faculty member
II.B.3	Marketing and Marketing materials/supplies

COLLEGE OF WESTERN IDAHO

RESOLUTION NO. 2023-1
Board of Trustees

RESOLUTION RE: BACHELOR OF APPLIED SCIENCE DEGREES

A RESOLUTION OF THE BOARD OF TRUSTEES OF THE COLLEGE OF WESTERN IDAHO DECLARING ITS OFFICIAL INTENT TO DIRECT THE PRESIDENT TO PURSUE APPROVAL OF BACHELOR OF APPLIED SCIENCE DEGREES.

WHEREAS, the College of Western Idaho (CWI) Board of Trustees are locally elected representatives of the over 750,000 residents and taxpayers of Ada and Canyon County, Idaho; and

WHEREAS, the CWI Board of Trustees is responsible to, among other things, establish, review and revise the vision and mission of the College; to consider and approve curricular offerings; and to monitor College effectiveness; and

WHEREAS, the mission for CWI's is empowering students to succeed by providing affordable and accessible education to advance the local and global workforce; and

WHEREAS, the vision for CWI is to be a best-in-class community college that provides quality, affordable, and accessible education by delivering innovative and cost-effective programming that empowers students, leads to economic and social mobility, and meets evolving community needs; and

WHEREAS, we know that any investment that lowers the cost of college for students is an investment in the future economic vitality of the state of Idaho, and

WHEREAS, Idaho data shows that less than 30% of residents over the age of 25 hold a bachelor's degree, that our current going-to-college rate is 42%, and that our current median household income is less than $64,000; and

WHEREAS, we believe that low-cost degree options will create new opportunities for current career-technical graduates (including over 9,000 from CWI), adult learners who need more flexible options, and people who are choosing not to go to college at all due to cost, and

WHEREAS, Lightcast Job Posting analytics found over 18,000 business-related jobs requiring a bachelor's degree posted within a 100-mile radius of CWI last year; and

WHEREAS, the Treasure Valley especially stands to benefit from this offering since 80% of CWI students are from Ada and Canyon County (98% are from Idaho) and are likely to stay here upon graduation; and

WHEREAS, affordable access to baccalaureate degrees is a means of closing racial, ethnic and economic gaps in our community, and

WHEREAS, 23 other states already look to community colleges to offer baccalaureate degrees across a variety of disciplines, one-third of which offer 20 or more and Washington and Florida each offering 100-plus, and

WHEREAS, 21 community colleges in the neighboring states of Utah, Washington, Oregon, Colorado, Wyoming and Nevada specifically offer a business-related BAS degree, and

WHEREAS, the College of Western Idaho has developed a solid plan to offer a financially sustainable, quality, low-cost, flexible Bachelor of Applied Science degree for less than $20,000; and

WHEREAS, CWI has qualified, Masters and Doctoral-trained faculty in place, per accreditation standards, to deliver the program.

NOW, THEREFORE, BE IT RESOLVED by the Board of Trustees of the College of Western Idaho, that we fully support and endorse the offering of Bachelor of Applied Science degrees in areas that meet workforce needs at the College of Western Idaho.

Be it further resolved that we specifically support, endorse and direct the president to pursue approval of a Bachelor of Applied Science degree in Business Administration to be offered in Fall 2024.

PASSED AND APPROVED BY THE BOARD OF TRUSTEES OF THE COLLEGE OF WESTERN IDAHO THIS 9th day of November, 2023.

COLLEGE OF WESTERN IDAHO

By: _____
Chair, Board of Trustees

ATTEST:

_____
Secretary, Board of Trustees

November 21, 2023

We, the undersigned, support the expansion of affordable and accessible education in the Treasure Valley. Specifically, we support the College of Western Idaho (CWI) offering a Bachelor of Applied Science (BAS) degree in Business Administration.

Idaho is experiencing a shortage of skilled workers that can undermine our economic vitality. Increased numbers of baccalaureate-educated workers are needed to fill essential jobs that power the Treasure Valley and beyond.

Additionally, any investment that lowers the cost of college for students is an investment in the future economic vitality of the state of Idaho. Low-cost degree pathways can increase educational attainment and offer upward mobility for adult learners who need more flexible options, high school graduates who are choosing not to go to college at all due to cost as well as current career-technical graduates looking to further their career options.

The time has come to expand affordable bachelor's degree options in Idaho through our publicly funded community colleges. Let's think forward and equip our citizens so that the economic engine in the Treasure Valley and across the state of Idaho can grow and thrive into the future.

Jamie Scott, President JA & Kathryn Albertson Family Foundation	Tommy Ahlquist, Chief Executive Officer Ball Ventures Ahlquist
Wayne L. Hammon, Chief Executive Officer Idaho Associated General Contractors	Cortney Liddiard, Chief Executive Officer Ball Ventures, LLC
Ivan Castillo, Chief Executive Officer Odyssey Homes	Andrew Scoggin, Chief Executive Officer Scoggin Capital Investment
Melissa Schultz, Quality & PDI Manager Heartland Recreational Vehicles	George Iliff, Partner Colliers
Adam J. L. Minic, Chief Executive Officer SEO Idaho, Thrive Web Designs, HostCozy	Mike Pena, Partner, Brokerage Services Colliers
Alison Patt, President and CEO Thomas Cuisine	Peter Oliver, Partner, Investment Brokerage TOK Commercial
Mick Wiskerchen, Founder, Operating Partner Scale Navigators	Laurel Sayer, President & CEO Perpetua Resources
Ryan Martin, Managing Partner Laska Company	Gregory Braun, CPA & Principal Ripley Doorn & Company, P.L.L.C.
Bill Ilett, President TransCorp, Inc.	Dr. Bert Glandon, President Emeritus College of Western Idaho
Brandon Romero, President & CEO Advanced Heating & Cooling Partner, Kelso Industries President, Grazak Mechanical	Scott Madison, Executive Vice President Intermountain Gas Company
Torry McAlvain, Jr., President McAlvain Companies, Inc.	Joe Forney, President & CEO Cold Chain, LLC
Derek Ellis, Chief Executive Officer Vessel Scale	Enrique Rivera, Board President Idaho Hispanic Foundation
Tony Magnuson, Vice President RM Mechanical, Inc	

November 17th, 2023

Nampa Chamber of Commerce
101 11th Ave. S.
Nampa, Idaho 83651

Letter of Support for College of Western Idaho,

The Nampa Chamber of Commerce supports all higher education institutions exploring the expansion of affordable and accessible education in the Treasure Valley. We support the College of Western Idaho offering a Bachelor of Applied Science degree to better meet growing workforce demands.

Idaho is experiencing a shortage of skilled workers that can undermine our economic vitality. Increased numbers of baccalaureate-educated workers are needed to fill essential jobs that power the Treasure Valley and beyond.

Additionally, any investment that lowers the cost of college for students is an investment in the future economic vitality of the state of Idaho. Low-cost degree pathways can increase educational attainment and offer upward mobility for adult learners who need more flexible options, high school graduates who are choosing not to go to college at all due to cost as well as current career-technical graduates looking to further their career options.

The time has come to expand affordable bachelor's degree options in Idaho through our publicly funded community colleges. Let us think forward and equip our citizens so that the economic engine in the Treasure Valley and across the state of Idaho can grow and thrive into the future.

Respectfully,

Mitch Minnette

Mitch Minnette
President/CEO
Nampa Chamber of Commerce
Phone: 208.249.4268
Email: mitch@nampa.com

Boise State University
Comments on CWI's BAS in Business Administration proposal

Executive Summary

The recent proposal by the College of Western Idaho (CWI) to offer a Bachelor of Applied Science in Business Administration (BAS) does not align with the Idaho State Board of Education's fundamental principles to "...[coordinate] educational programs in a manner that enhances access to quality programs, while concurrently increasing efficiency, avoiding unnecessary duplication and maximizing the cost-effective use of educational resources through coordination between institutions" (SBOE Governing Policies and Procedures, Policy III.Z, p. 1).

CWI's proposed BAS is duplicative of high-quality business programs in the region and the state that operate efficiently and have sufficient capacity to handle enrollments beyond the CWI five-year projections. Specifically, the College of Business and Economics (COBE) at Boise State University, accredited by the highest quality, international business accreditation body - Association to Advance Collegiate Schools of Business (AACSB), is in very close proximity and has offered Bachelor of Business Administration (BBA) degrees, including a BBA in Business Administration and several specialized disciplines such as Marketing, Human Resource Management, Entrepreneurship, Business Economics, Supply Chain Management, etc. for over 50 years creating an excellent return on investment for the state and Idaho students. The proposed BAS program overlaps heavily in curriculum content with the Boise State BBA in Business Administration program. In addition, Boise State offers a BBA in Management, which is an online degree completion program, composed of 60 credits of coursework; courses are offered in 7-week sessions, with multiple entry points offering flexibility to adult/non-traditional or returning students.

Furthermore, Boise State offers an online (and in-person / hybrid) Bachelors of Applied Science (BAS) degree program that affords great flexibility to students with CTE credits. Students in the BAS program may select among several options including the Plus Business Certificate or Minor, Certificate in Business Creation, Certificate in Leadership and Human Relations, Certificate in Project Management, Certificate in Communication Management, Certificate in Conflict Management, and Certificate in Innovation and Design. The BAS program has also added Intermediate Technical Certificate (ITC) and Advanced Technical Certificate (ATC) to the list of technical credentials that qualify students for program admission. This addition ensures we have at least one path to a bachelor's degree for nearly every student who completes a substantial technical credential at a regionally accredited institution--something our Idaho community college partners have been requesting for years. Thus, Boise State is offering a wide variety of flexible degrees in business or with business focus and that the assertion that "CWI is poised to reach a market that is underserved by four-year institutions…" is inaccurate, unsupported and frankly outright misleading.

COBE ensures excellent accessibility with comprehensive academic and career advising tailored to business students along with a wide range of classes both on campus and online. These services and flexibility are especially vital for non-traditional, minority, or first-generation students. As a result of these additional investments which COBE has made for all students, 88% of all COBE graduates who began with fewer than 13 transfer credits graduate in 4.9 years or less. Improving time to graduation benefits non-traditional and traditional students by minimizing time and financial investments.

We believe that continuing the articulation partnership between Idaho universities and CWI will provide the best return for students. Idaho universities offer a greater variety of upper division program options, including majors, minors, and certificates. Boise State's College of Business and Economics offers nationally recognized and ranked academic programs and specialized advising in business. Four-year programs in business across Idaho and within the same region, offer programs with an established reputation, greater variability in program offerings, and more services to support all students. The business programs at Boise State, Idaho State, and the University of Idaho are all accredited by the highest quality, international business accreditation body - Association to Advance Collegiate Schools of Business (AACSB). It is unlikely that CWI would ever be able to award a business degree associated with AACSB accreditation. To make the most of state-funded resources and ensure the best return on investment for students, community colleges and universities should build on the strong collaborations between institutions that results in continued efficiency, avoids duplication, and maximizes the cost-effective use of educational resources.

Other Important Considerations

Time to Degree and Degree Completion

Two critical important and related factors to consider with regard to four-year degrees at community colleges are 1) time to degree completion and 2) graduation rates. The graduation rate (within 100% of time) for the first-time, full-time degree-seeking students in CWI is 14% according to the 2022 Factbook, published by the Idaho State Board of Education. This dismal graduation rate is the lowest among all Idaho public community colleges and substantially lower than within 100% of time graduation rates of 4-year institutions in Idaho.

The data in the 2022 Factbook indicates that students attending community colleges (in particular CWI) are generally less likely to complete their 2-year programs or to complete in a timely fashion. Simply offering a 4-year degree program BAS in Business Administration will not move the needle on graduation rates; it will require a substantial amount of work and investment, similar to what was required at 4-year institutions. Indeed, to exceed or even maintain the current 2-year graduation rate of 14, CWI (and other community colleges) would likely have to create a university-style infrastructure, which would necessitate a dramatic duplication in the same metro area. Such infrastructure requires specialized academic and career advising, along with other wrap-around services such as internships, access to

networking with industry and alumni etc., to help students finish their 4-year degree program and succeed post-graduation.

Students who extend their time to graduation will have less time to reap the benefits of a college degree, while continuing to pay expenses. This would actually reduce ROI, not increase it. Moreover, on an extended timeline, they are more likely to hit the maximum lifetime Federal Pell Grant access, which cannot exceed 12 terms or 6 academic years. Losing access to this important grant, which has proven critical in students' access to higher education, risks reducing our statewide success rate.

Systemness

Community colleges' offering four-year degrees weakens the *systemness* of public higher education in Idaho. Indeed, it could hurt effective and efficient postsecondary education in Idaho, cannibalizing limited resources available to postsecondary education and duplicating degree offerings in the same region. The collaboration requirement in Policy III.Z states that "Alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions. High-demand programs **must be offered** through inter-institutional collaboration as described in this policy."

Rather than shifting their focus to a four-year degree, the State would benefit most from additional focus on the transfer experience from community college to four-year universities. One of the arguments for having baccalaureate degrees at community colleges is eliminating the need and hurdle to transfer, however, co-admit and co-enrollment options can help eliminate this hurdle and help students transition into four-year institutions. In Idaho, we made substantial progress on collaborating with our co-admit and co-enrollment agreement, signed by all eight institutions as well as our extensive collaborative financial aid agreement. We recognize that much can still be done in collaboration on this front. Admitting and enrolling students in community colleges and universities at the same time, for example, can help with the hurdle of transferring.

We want to be unequivocal in stating that we firmly believe that our community colleges are vital partners and provide incredible mission-driven value for students and the state through the delivery of associate degrees. The criticism above should not be interpreted as a lack of respect for CWI and their role in higher education in the state of Idaho. On the contrary, it could be argued that CWI is Boise State's most important higher education partner in the state of Idaho. Our partnership with them, as we work together to improve transfer to our universities and to increase the achievement of associates degree completion through "transfer back," is critical. We seek all opportunities to partner with community colleges that benefit students. A good example of such a partnership and systemness is the 80/40 transfer pathway from CWI and CSI into two of Boise State's more flexible degree programs: Bachelor of Applied Science (BAS), and BA in Interdisciplinary Professional Studies (IPS). In this pathway, students can take up to 80 credits in CWI (or at another Idaho community college) and complete their degree program at Boise State after taking 40 upper division credits.

The IPS program is also now offering transfer students the opportunity to transfer up to 12 career and technical education (CTE) credits as general education electives so they can directly integrate their career education opportunities with their Boise State experience.

Both of the improvements above offer transfer students:
• Over $4,000 in tuition cost savings
• Reduced time to graduation
• New opportunities to transfer low-credit, career-focused credentials

And they have further strengthened our partnerships with Idaho community colleges.

Return on Investment

Return on Investment (ROI) analysis for four-year degrees should reflect workforce demand for the degree, quality of education—including access to academic and career advising services throughout their education, access to quality internships, access to alumni network etc. Resources, especially at the upper-division level, which are critical in helping students to complete their degrees, are not present at our community colleges because this is not their mission.

For the individual student and the state to obtain the ROI from college degrees, students must complete. As mentioned, the within 100% of time (i.e. 2-year graduation rate for associate degrees) is only 14% at CWI, particularly low among community college graduation rates. The value of college education is fully realized upon degree completion (and after successfully being employed in a desired position), an important question for community college leaders who wish to offer bachelor's degrees is "what makes community college leaders believe students who have difficulty persisting through a two-year program suddenly will persist through a four-year program?" Drozdowski, 2022. Community college students are more likely to be part-time students taking fewer courses in a semester than four-year university students (hence extending the time to degree completion) and stop-out more frequently, will ***need even more support services*** to complete their degree programs. This will require additional resources and increased competition for limited resources, and increased duplication and increased costs.

Internal Costs

Upper-division courses are far costlier to deliver, which few people outside the world of higher education understand. The courses require greater expertise and appropriate credentialing, and there is generally a small fraction of the students in an upper-division class compared to a lower division class in the same field (e.g. BUS 101 seats 230 students at Boise State, whereas BUS 450 seats only 40). Offering upper division courses will also be costlier for community colleges. Extrapolating the cost of a generic 4-year degree solely based on the published tuition rates for the two-year degrees does not capture the actual expenses.

Community colleges would likely need to develop additional funding mechanisms to subsidize upper division courses, and this again implies a duplication of resources at the upper-division level such as specialized academic and career advising, along with other wrap-around services where, in the case of community colleges, economies of scale will likely not be met.

Thus, a BAS in Business Administration degree program in CWI will ***not be necessarily less costly*** *to students or taxpayers*. In addition to the cost of education, its quality, value and ROI of the degree earned are critical for students and for the taxpayers.

Quality and Accreditation
Business colleges go through rigorous specialized accreditation processes that allow them to receive Association to Advance Collegiate Schools of Business (AACSB) Accreditation, which confer prestige, guarantees quality, and requires special labor. Most schools require dedicated leadership for this work. This BAS in Business Administration will not have this gold standard accreditation, which Boise State, University of Idaho and Idaho State all have. At community colleges, there will be a lack of access to alumni network pre and post-graduation and hands-on experience provided by internships.

Experience in Other States
Although there are several states (24 states) that allow community colleges to offer 4-year degrees, many of these come with several qualifications and restrictions, including:

- These bachelor's degree programs must be career-oriented and address a regional need.
- Another common restriction prevents community colleges from instituting baccalaureate programs that replicate what already exists at a state's four-year schools.
- Legislation typically requires community colleges to justify the need for a degree by demonstrating no overlap with four-year institutions.
- Finally, even though community colleges typically have lower tuition than four-year schools, some states take the extra measure of limiting how much community colleges can charge for their bachelor's programs.

Thus, it will be important to define under what conditions and criteria it will be effective for community colleges to offer baccalaureate degrees. SBOE Policy III.Z specifies five criteria that “when a university proposes to offer an associate degree or a community college proposes to offer a baccalaureate degree”, under which to evaluate the proposed degree. We discuss CWI’s justification of the proposed BAS in Business Administration under those five criteria next.

Discussion of CWI's Answers to "Additional Questions" in SBOE Policy III.Z

When a university proposes to offer an associate degree or a community college proposes to offer a baccalaureate degree, the Board Policy III.Z provides additional criteria to evaluate the proposed degree. CWI's justification under these additional criteria are **not sufficient** to justify the approval of this program. Below we provide a discussion of the responses by CWI to these additional questions/criteria.

Additional Criteria from Policy III.Z:
*1) **Demand**: Proposed offerings must be to meet an urgent, local need based on where students who complete the offering will be employed rather than on where the students reside. The demand for the proposed offering needs to be clear, urgent, and compelling, as evidenced through data and industry input. Commitments of practical support (e.g. funding, internships, etc.) from industry stakeholders constitutes evidence of demand.*

CWI's answer:
Employment in areas of management is projected to grow 19% over the next decade in the state of Idaho. While employees can be promoted into management positions, their salaries rarely increase unless they also acquire a bachelor's degree in business administration; salary increases an average of $40k with a bachelor's degree. Idaho sales manager positions pose a low risk of automation and are projected to grow by 28% in the next decade. Likewise, account manager positions are projected to grow 9% over the next decade.

Boise State's response:
This paragraph is copied and pasted from CWI's response to the second question in the main proposal (question 2.a: workforce and economic need), and, thus, does not constitute "additional justification." Moreover, this response does not make the case that proposed offering will meet an "urgent and local" need nor provides evidence through data and industry input for a clear, urgent and compelling need as required under the demand criteria. Most importantly, as evidenced in the enrollment and graduate numbers data provided in the proposal, Boise State has capacity for this growth within the immediate metro area (Region III). Similarly, the other 4-year universities in other regions of the state also have capacity for growth.

2) ***Specialization***: *The proposed offering must be based on the unique capability at the institution, founded on specialized instructional expertise and any infrastructure necessary for program delivery.*

CWI's answer:
CWI already has a robust set of offerings, at both the academic transfer and CTE levels, in business, bookkeeping and accounting, administrative specialization, and economics. We have recently developed an AAS in Management, allowing non-traditional students to get PLA and/or military transfer credit via a CTE degree that focuses on specialized training in management and administration. Expanding that program into a BAS in Business Administration allows non-traditional students a smooth path to a bachelor's degree to complement their on-the-job

experience.

Boise State's Response:
This specialization (Business Administration) exists and the Boise State College of Business and Economics already has mature articulation agreements with CWI for their students to transfer directly into our Bachelor of Business Administration degrees. In addition, Boise State offers a BBA in Management, which is an online degree completion program, composed of 60 credits of coursework; courses are offered in 7-week sessions, with multiple entry points offering flexibility to adult/non-traditional or returning students.

Boise State offers an online (and in-person / hybrid) Bachelors of Applied Science (BAS) degree program that affords great flexibility to students with CTE credits. Students in the BAS program may select among several options including the Plus Business Certificate or Minor, Certificate in Business Creation, Certificate in Leadership and Human Relations, Certificate in Project Management, Certificate in Communication Management, Certificate in Conflict Management, and Certificate in Innovation and Design. The BAS program has also added Intermediate Technical Certificate (ITC) and Advanced Technical Certificate (ATC) to the list of technical credentials that qualify students for program admission. This addition ensures we have at least one path to a bachelor's degree for nearly every student who completes a substantial technical credential at a regionally accredited institution--something our Idaho community college partners have been requesting for years. Many of our 4-year institutions are also offering a variety of Bachelor of Applied Science (BAS) degrees to meet the needs of Idaho students.

Frankly, there is no case for a specialized expertise within CWI for the delivery of this degree.

3) ***Non-Competitiveness***: *The proposed offering must be non-competitive with other institutions' offerings within the identified service area (whether regional or statewide) and supported by other institutions within the service area. The Executive Director or designee may request written commitments from the presidents of other institutions within the service area expressing conceptual and, if necessary, practical support for the proposed program.*

CWI's Answer:
There is currently no BAS in Business Administration programs in the state of Idaho. A BAS degree streamlines education for those who wish to advance their careers. While multiple schools offer traditional BS in Business Administration degrees, they are primarily academic programs requiring an extensive general education curriculum. By offering a BAS path for non-traditional students, CWI positions itself to fill an opportunity gap for the workforce.

Boise State's Response:
This is a distinction without a difference. As described above in detail, in the same metro area of the Treasure Valley, Boise State offers an in-person Bachelor of Business Administration and an online degree completion Bachelor of Business Administration in Management. The latter online program serves non-traditional cost-conscious students, while many of Boise State's in-

person BBA offerings are also available online making those options available for non-traditional students as well.

To maximize transfer student flexibility, Boise State offers a Bachelors of Applied Science (BAS) and BA in Interdisciplinary Professional Studies (IPS) degrees. Students in the BAS degree program may select among several options including the Plus Business Certificate or Minor, Certificate in Business Creation, Applied Leadership, Certificate in Leadership and Human Relations, Certificate in Project Management, Certificate in Communication Management, Certificate in Conflict Management, and Certificate in Innovation and Design.

This is clearly a duplication of a degree offering within the state and by definition is competitive with the 4-year institutions in the state.

4) ***Collaboration***: *Alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions. High-demand programs must be offered through inter-institutional collaboration as described in this policy.*

CWI's Answer:
Intra-CWI collaboration is expected to continue between the business department and the School of Industry and Trades, as those who acquire technical trade skills also wish to advance into management in their areas of expertise. CWI welcomes collaboration with our sister schools in the region.

Boise State's Response:
CWI's answer is not a response to the question or requirement under this criterion. It clearly states that "high-demand programs **must** be offered through *inter-institutional* collaboration as described in this policy," however, CWI has not reached out to Boise State to collaborate on a BAS in Business Administration degree program.

As described above, Boise State University's College of Business and Economics has collaborated closely with CWI's Business program to develop credit articulations and transfer equivalencies that facilitate student transfers into Boise State bachelor degree programs to minimize duplication or any extra coursework required of CWI transfer students. In proposing to offer a BAS, aside from one in-person request from an administrator to identify "win-win" opportunities a few weeks prior to their submission to the State Board, CWI has chosen not to collaborate with their closest neighbor. At Boise State, we welcome collaborative opportunities for non-competitive, complimentary programming. Perhaps better and more effective utilization of the co-admit and co-enrollment options can help eliminate this hurdle and help students transition into four-year institutions. In Idaho, we made substantial progress on collaborating with our co-admit and co-enrollment agreement, signed by all eight institutions as well as our extensive collaborative financial aid agreement. We recognize that much can still be done in collaboration on this front. Admitting and enrolling students in community colleges and universities at the same time, for example, can help with the hurdle of transferring.

5) ***Resources***: *The institution must have sufficient resources to develop and deliver the proposed offering.*

CWI's Answer:
CWI's Business department is well-staffed and well-equipped to expand into a BAS degree.

Boise State's Response:
This claim is unsubstantiated. A more thorough explanation concerning how community college faculty, part-time faculty, and full-time faculty, as well as their qualifications, will be managed would be necessary to evaluate this effectively. Looking at the budget provided shows that total expenditures of the proposed program will reach more than $700,000 by FY28 and the program does not appear to ever reach a positive cash flow.

Errors Found in the Proposal
The proposal on page 5 has an error: Boise State University's degree offerings in the College of Business and Economics are primarily Bachelors of Business Administration (BBA) degrees, not Bachelor of Science (BS).

Lewis-Clark State College
Responses

CEI: BAS Operations Management **(oppose)** creates duplication, lack of system-ness, unnecessary competition. LC State, ISU, and BSU already offer BAS options that have direct pathways. In our opinion, CEI should work with ISU to ensure a solid pathway for students who seek such a degree. The 4 year business programs have significantly higher costs with accreditation fees and standards which impacts 4 year institutions competitiveness, strictly on price point. A student may get confused between the difference (BS vs BAS) assuming they are the same, of which they are not.

CEI: BAS Digital Forensics and Analytics **(we support this regional specific necessary degree)**

CWI: BAS Business Administration **(oppose)** creates duplication, lack of system-ness, unnecessary competition. LC State, ISU, and BSU already offer BAS options that have direct pathways. In our opinion, CWI should work with BSU to ensure a solid pathway for students who seek such a degree. The 4 year business programs have significantly higher costs with accreditation fees and standards which impacts 4 year institutions competitiveness, strictly on price point. A student may get confused between the difference (BS vs BAS) assuming they are the same, of which they are not.

Response to Proposed Bachelor of Applied Science in Business Administration

Proposed by the College of Western Idaho. Response Submitted by the University of Idaho. Revised November 3, 2023.

In response to the College of Western Idaho's (CWI's) proposed Bachelor of Applied Science in Business Administration (BAS BA), the University of Idaho (U of I) is submitting the comments in this document. As explained below, CWI's proposal does not meet Policy III.Z's criteria for community colleges to offer baccalaureate degrees.

Criterion	CWI Response	U of I Concern
Demand	CWI'S proposal cites the following points to demonstrate demand: • Management positions are expected to increase 19% over the next decade (pg. 3). • Sales manager positions are expected to grow 28% in the same period and are unlikely to be replaced by automation (pg. 3). • Account manager positions' projected growth in the same period is 9% (pg. 3). • Bachelor's in business programs nationally have maintained stable conferral growth rates (-5% to +5%) over the last five years (pg. 3).	The proposal does not show the type of demand required by the criterion: • While we agree that growth is projected in related occupations, the figures listed do not demonstrate what Policy III.Z requires, namely, "demand [that is] . . . clear, urgent, and compelling as evidenced through data and industry input" (III.Z.2.b.iv.2). The figures do not show such need largely because Boise State University's Bachelor of Business Administration (BBA) produces graduates who can fill the demand. Per Boise State's student outcomes page, its BBA graduated 243 students in 2022-23, up from 212 in the preceding year and 193 the year before that. • Similarly, while we agree that business programs nationally are achieving stable growth, the figures noted appear to be for bachelor's degrees – not bachelor of applied science degrees. Though we do not have access to CWI's data source (Collegis Education), of the Bureau of Labor Statistics' (BLS') top 10 occupations in business, six typically require a bachelor's degree at the entry level. Five of these six have demand projected to grow from 1% to 16%, 2022-32. It is not clear that a bachelor of applied science degree is in demand or will meet employers' needs. Thus, while demand for the BBA is strong and likely to continue, CWI's proposal does not show that this demand is not already met by Boise State's BBA, that it will

		be met by the proposed BAS Business Administration, or that the degree will adequately prepare students to meet Idaho employers' needs.
Specialization	In its explanation of how the proposed BAS BA meets Policy III.Z's criteria for a community college to offer a baccalaureate degree, CWI offers two points: • It "already has a robust set of offerings . . . in business, bookkeeping and accounting, administrative specialization, and economics" (pg. 1). • Its proposed degree will provide "non-traditional students a smooth path to a bachelor's degree to complement their on-the-job experience" (pg. 1).	CWI's argument for specialization does not fulfill the definition of this criterion in Policy III.Z, which requires that the proposed degree "be based on the unique capability at the institution, founded on specialized instructional expertise and any infrastructure necessary for program delivery" (III.Z.2.b.iv.2). This lack of alignment between the proposal and the definition arises from three factors: • Although CWI may have relevant expertise, such expertise is in no way unique to it. As noted above, Boise State offers a BBA that graduated nearly 250 students last year. • In addition, U of I also has the relevant expertise and has launched an online BBA designed to serve the group CWI's proposal designates as its target population. • In claiming that the proposed BAS will offer a pathway for non-traditional students, CWI implies that it has unique capability to do so. However, U of I's online BBA is explicitly designed as a series of modular certificates that enable learners working full-time to develop skills they can apply immediately, e.g., in technical program management, sales, and other aspects of business administration. Further, this fully online BBA offers flexibility to accommodate students' work, family, and other commitments, while enabling students to earn only the certificate(s) of interest or to stack certificates to earn the full BBA degree. Students who earn the degree will also earn a certificate in four of the following areas: 1.) Applied Finance, 2.) Business Leadership, 3.) Enterprise System Integration, 4.) Sales Management, 5.) Technical Program Management, or 6.) Innovating Education. • Further, CWI's proposed cohort model may not provide the flexibility that adult learners need.
Non-Competitiveness	In explaining how the proposed BAS BA fulfills III.Z's criteria, CWI distinguishes the BAS from a BBA and states, "by offering a BAS path for non-traditional students, CWI positions itself to fill an opportunity gap for the workforce" (pg. 1).	CWI's explanation does not meet III.Z's criterion of non-competitiveness, which states that, "the proposed offering must be non-competitive with other institutions' offerings within the identified service area (whether regional or statewide)" (III.Z.2.b.iv.3). This lack of alignment between the proposal and the policy arises for three reasons: • As noted above, the proposed BAS BA competes with Boise State's BBA and U of I's online BBA.

		• Again, as noted above, U of I's online BBA targets the same population specified as the planned market for CWI's proposed BAS BA. • However, the proposed BAS BA does not offer the scope and depth of preparation provided by U of I's BBA, which equips students with specializations in four of the six domains represented by the certificates listed above, as well as greater depth in key areas, such as finance and accounting. For example, employers are likely to expect more accounting courses than the proposed BAS BA includes, covering fundamentals like the Generally Accepted Accounting Principles (GAAP). Including more accounting courses in the degree program would prepare graduates to pursue positions that require expertise beyond the bookkeeping skills provided by the AA degree. • Further, the return on the State of Idaho's investments in both Boise State's and U of I's BBA programs may be decreased. Each BBA program already has all necessary resources. Growing either or both programs will increase ROI on the state's investments in these programs. Conversely, if CWI's proposed BAS BA is approved, added resources will be needed, as noted below. Any state investment that results in shifting enrollments from Boise State and/or U of I to CWI will decrease the state's ROI without increasing post-secondary achievement levels. Arguably, improving such achievement levels might be more effectively achieved by establishing 2+2 programs, as discussed below.
Collaboration	In its explanation of how the proposed degree program meets Policy III.Z criteria, CWI states that it, "welcomes collaboration with our sister schools in the region" (pg. 1).	In its criteria for community colleges seeking to offer baccalaureate degrees, Policy III.Z states, "alternative approaches to meeting the identified demand addressed by the proposed offering should be fully considered, including potential collaboration with other institutions" (III.Z.2.b.iv.4). CWI's statement does not fulfill the policy's requirement for two reasons: • It is not clear that CWI has sought collaboration with Boise State. Expressing openness to collaboration does not constitute fully considering such collaboration. • U of I colleagues have requested a meeting with CWI's provost to explore the possibility of developing a 2+2 program that would serve place-based Treasure Valley CWI graduates of AA/AS/AAS programs by offering them a smooth transfer pathway into U of I's online BBA. We respectfully request that the State Board strongly encourage CWI to pursue this collaboration rather than the proposed BAS.

Resources	CWI's explanation of how its proposed BAS BA meets III.Z's criteria states that its Business Department "is well-staffed and well-equipped to expand into a BAS degree." However, CWI's proposal lists several resource needs to implement the degree program: • Library materials on human resources and organizational leadership. • Library databases providing students access to journals, magazines, and newspapers that address topics covered in upper-division business courses. • Expanded tutoring services. • Hiring one new full-time faculty member in human resources and/or organizational leadership. • Hiring six additional adjunct faculty.	CWI's proposal poses three related concerns regarding resources: • Policy III.Z's criterion for resources states, "the institution must have sufficient resources to develop and deliver the proposed offering" (III.Z.2.b.iv.5). While CWI explained during the November 2nd, 2023, Council on Academic Affairs and Programs (CAAP) meeting that it will use existing resources to launch the proposed degree program, doing so will still duplicate academic program offerings available at Boise State and other four-year institutions, as explained above. • For example, Boise State, in CWI's region, and U of I, across Idaho via our online BBA, already offer the corresponding bachelor's degree. We believe the U of I BBA is better structured to prepare students to succeed in business. • We respectfully submit that investing in a growth area not already served by the four-year institutions would provide greater return on investment (ROI) on the tax and tuition revenues being used, both for post-secondary students and for the state.

SUBJECT

Engineering and Computer Science Initiative Next Steps

REFERENCE

October 2023	The Western Interstate Commission for Higher Education (WICHE) needs assessment was presented to the State Board of Education.

APPLICABLE STATUTES, RULE OR POLICY

House Bill 809, Section 4 (2022)

BACKGROUND/DISCUSSION

In 2022, Governor Little's budget recommendation for the Office of the State Board of Education included one-time funding to develop a statewide needs assessment for engineering and computer science education in Idaho. The legislature appropriated funding, and the Office of the State Board of Education engaged WICHE to complete the engineering and computer science needs assessment.

Industry, education, and government leaders in Idaho have known for some time that the state has a dire need and an undeniable opportunity to grow the number of engineering and computer science graduates in support of economic growth and global competitiveness. Findings from the needs assessment and gap analysis were presented to the Board at the October 2023 Board meeting and confirmed the existing and projected gap in graduates.

At the recommendation of the Board, staff collaborated with the Idaho National Laboratory's Workforce & Economic Development Programs Manager to explore emerging recommendations from industry on this topic, already in proposal stage, from the Idaho Advanced Energy Consortium's Workforce & Education Subcommittee. This collaboration resulted in a clear scope and list of priorities for a proposed Engineering & Computer Science Higher Education Steering Committee. The formation of this proposed steering committee could be through an executive order of the Governor.

Specifically, this group envisions an industry-led Engineering & Computer Science Higher Education Steering Committee organized to address three of the most pressing challenges in the state's current ability to produce engineering and computer science graduates. While this committee would be industry-led, a member of the Board would have a seat on the committee and Board staff would provide technical support in the form of subject matter expertise as needed. The lifespan of this steering committee is intended to be relatively short-term at three years.

The Committee's priorities would be to:

1. Facilitate convenings and work sessions between institutions to pinpoint breakdowns in matriculation pathways, specifically from community colleges to four-year institutions
2. Map pathways from each community college and four-year institution across all engineering and computer science degree programs
3. Design a pilot pathway for recipients of associate of applied science degrees or intermediate technical certificate programming to progress into bachelor of applied science, bachelor of arts, and/or bachelor of science degree programs.

IMPACT

The direct impact of this decision is the potential for deliberate and meaningful collaboration by our industry and education leaders toward solving these long-standing challenges to engineering and computer science graduate production.

The indirect impacts are the potential increase in engineering and computer science graduates in Idaho that go on to fulfill or need for these professionals in the Idaho workforce.

ATTACHMENTS

WICHE Needs Assessment

STAFF COMMENTS AND RECOMMENDATIONS

Staff recommends approval.

BOARD ACTION

I move to support the recommendation of the Idaho Advanced Energy Consortium's Workforce & Education Subcommittee for the establishment of an Engineering & Computer Science Higher Education Steering Committee.

Moved by_____ Seconded by_____ Carried Yes _____ No

IF YOU BUILD IT, WILL THEY COME?

Exploring the Possibility of an Idaho Engineering and Computer Science Growth Initiative

WICHE
Western Interstate Commission for Higher Education

Authors
Peace Bransberger, Patrick Lane and Christina Sedney

Contact
csedney@wiche.edu

Disclaimer
The research presented here includes
information derived from
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the Idaho State Department of Education (SDE).
Any errors are attributable to WICHE.

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IF YOU BUILD IT, WILL THEY COME?

Exploring the Possibility of an Idaho Engineering and Computer Science Growth Initiative

WICHE
Western Interstate Commission for Higher Education

EXECUTIVE SUMMARY

Introduction

In 2022, industry leaders voiced concerns to policymakers that Idaho was not producing enough engineering and computer science graduates from its public institutions to meet the needs of Idaho's economy. These leaders expressed interest in launching an engineering and computer science growth initiative similar to a long-time effort in Utah to address these gaps. In response, the Idaho State Board of Education commissioned an analysis from the Western Interstate Commission for Higher Education (WICHE) to explore the issue. Guided by an industry advisory group, the project team reviewed existing research, analyzed publicly available data as well as data from the state's longitudinal data system, modeled the projected supply of graduates, and conducted a range of employer engagement activities to answer two key questions:

1. Is the supply of engineering and computer science graduates from Idaho's public institutions adequate to meet current and projected industry demand?
2. If not, how can the state strategically address the gap between supply and demand?

This analysis was not intended to provide a complete and detailed strategic plan, but rather to assist industry with articulating the gap between supply and demand to the greatest extent possible and identifying high-level, evidence-based approaches to increase credential production. Importantly, these potential approaches are tailored to fit Idaho's context and trends in population growth, demographics, and student flow.

Key Findings

Our analysis concludes the following, based on the best available evidence:

1. **Current Undersupply**: The supply of graduates in engineering and computing disciplines (broadly defined) from the states' public institutions does not appear sufficient to meet existing industry needs.
2. **Future Supply Constraints**: Growing the number of students prepared to enter and succeed in these majors is not as simple as increasing postsecondary capacity. Demographic and educational trends point to at best modest growth in the potential pool of students, meaning any effort to increase graduates in these fields must focus on expanding the educational pipeline of students from K–12 to postsecondary education who are interested in and equipped to succeed in these fields.

A coordinated, industry-led approach to developing a shared vision and action plan to address these nuanced, multifaceted challenges will be an important next step. It is important to recognize that because of the challenges in future demographics and the state's trends in education outcomes, this work will likely be more challenging than Utah's initiative.

Approach

No data source exactly quantifies the hiring demand for recent graduates in Idaho's labor market, nor the available supply of graduates planning to work in Idaho. This report relies instead on a combination of qualitative work, data analysis, and review of existing research to identify proxy metrics for supply and demand where possible and includes discussion of the strengths and limitations of this approach, potential gaps in information, and further questions. WICHE conducted a survey of key employers and industry leaders to gather their perspectives and additional data that is highly relevant to this report. WICHE also received invaluable guidance, counsel, and feedback from a core team of industry advisors drawn from across the state.

Understanding Supply

institutions are used as a proxy metric for the "supply" of new workers available to the state's businesses. The term "computer science" as used in the Utah initiative refers to a wide range of computer-related degrees, thus the term computer science has been adjusted to computer and information science in this report to more accurately reflect the range of degree types discussed. Similarly, both engineering and engineering technology programs were considered at the suggestion of Idaho's industry leaders that advised WICHE on this analysis. For some analyses, the limited number of individuals who enroll in and graduate with degrees in engineering technology make it impractical to present detailed data. Finally, the contributions of the state's private institutions are reflected where appropriate to provide a more complete picture of available supply.

A model of student flow through the education pipeline was used to examine how improvements on certain metrics, such as high school graduation rates, college go-on rates, or progression through postsecondary education would impact the number of graduates produced in the three fields of interest. The results and takeaways from this model are described briefly below and in greater detail in the full report.

Of course, postsecondary graduates are not the only source of supply in the labor market. Employers need to hire across a range of experience levels, some Idaho businesses hire from regional, national, or international candidate pools, and net migration also affects labor supply. However, qualitative research demonstrates robust employer demand for entry-level hires in the fields of interest — typically bachelor's graduates — as well as a strong employer preference for hiring Idaho graduates.[1] Therefore, degree production in engineering and computer and information science fields presents a useful, though imperfect, way to think about workforce supply.

Estimating Demand

The Bureau of Labor Statistics (BLS) offers historical estimates of employment by occupation at the national and the state level, allowing for cross-state comparisons. BLS also produces projections of employment by occupation, but only at the national level. The Idaho Department of Labor (ID DoL) produces state-level projections of employment by occupation, which provide the best available state-level projections of hiring demand by occupation despite certain limitations. For example, the 2020–2030 ID DoL projections do not yet reflect the projected impacts of significant federal policy changes such as the CHIPS and Science Act (CHIPS Act) and the Infrastructure Investment and Jobs Act (IIJA). The

project team supplemented the existing ID DoL projections with results from a 2023 employer survey on hiring demand in fields of interest and in-depth interviews with a subset of industry representatives.

Engineering & Engineering Technologies

Degree production and projected job demand in related fields are not a one-to-one match, but comparing the approximate magnitude of the difference between the two does provide some sense of the "gap" that exists between supply and demand. Meanwhile, examining projections based on current trends offers a way to understand whether identified gaps are likely to grow or to shrink if present trends continue.

Engineering and Engineering Technologies Supply

Historical trends in Idaho's engineering bachelor's degree production — the typical entry-level credential of most engineering professions[2] — show growth between 2010 and 2020, primarily driven by substantial growth between 2010 and 2015. Supply modeling shows that if contributing trends persist, Idaho can expect only minimal increases in the number of engineering and engineering technology graduates produced annually by its public institutions. A projected levelling off of the overall number of high school graduates in the state and a negatively trending college go-on rate of Idaho high school graduates are among the primary contributors to this low growth projection.[3]

Meanwhile, existing research shows that just over 60% of engineering bachelor's degree recipients who were Idaho residents at the state's public institutions work in Idaho after graduation, and under 40% of out-of-state students do (including international students, who are over-represented in engineering programs). In engineering technology, 74% of in-state associate degree holders stay in the state and 35% of out-of-state students remain in the state to work.[4] As a result, the number of graduates produced by the state's public institutions may under-represent the available workforce supply.

Importantly, data analysis also revealed that women are significantly less likely to select engineering majors even when controlling for factors like scores on math standardized tests. However, women that do so are more likely to complete their degrees. Strong performance on high school math standardized exams is also positively associated with choosing engineering as a major and completing a degree in the field. As is discussed later, developing and implementing strategies to welcome women into these fields may be productive as the gender disparities hold true even when controlling for math performance, meaning women with strong math results are still much less likely to enter into engineering as a major.

Engineering and Engineering Technologies Demand

Trends in Idaho's engineering job growth show increases over the past decade, at similar rates as surrounding states. Looking forward, there are moderate increases of about 5% nationally between 2021 and 2031 projected for engineering as an occupational field with even more robust growth projected in Idaho — more than 17% between 2020 and 2030. Growth in Idaho's engineering technology occupations is also expected to outpace the national number, growing by more than 13% in the state between 2020 and 2030 compared to 1.4% nationally between 2021 and 2031. According to the ID DoL, engineering can expect to see 984 job openings per year due to turnover and growth between now and 2030, while engineering technology is projected to see 227 annual openings.[5]

However, more recent developments suggest that this may be an underestimate. One engineering industry group estimates that projects funded by the IIJA alone will increase the need for engineers nationally by 82,000 and notes that these increases will affect every state.[6]

> ***"If we were able to fill all our positions, we'd be able to get more revenue in and more clients and we'd then have demand for more engineers… we've been stifled by an inability to find people to do the work, we have more work than we have people to do."***
>
> – Idaho Engineering Employer

The employer survey conducted for this project provides further evidence that the 2020–2030 projections may underestimate demand. Respondents estimated that they are trying to hire nearly 2,000 employees with degrees in engineering and engineering technology within the next 12 months alone, almost double the DoL projected average annual openings. Further, 77% of respondents noted that they are currently struggling to fill jobs that require degrees in engineering and engineering technology fields. While the employer survey sample was not representative of Idaho as a state, the table below illustrates respondents' self-reported number of Idaho-based engineering and computer-related employees compared to state estimates of total employment within these occupations to provide some sense of the coverage offered by the survey.

Employer Survey Respondent Engineering Employees in Idaho Compared to Overall Number of State Engineering Employees.

	STATE TOTAL 2020	STATE TOTAL 2023 (Estimated)	SURVEYED COMPANIES (Estimated)*
Engineering Occupations (17–2000)	10,321	10,892	6,478

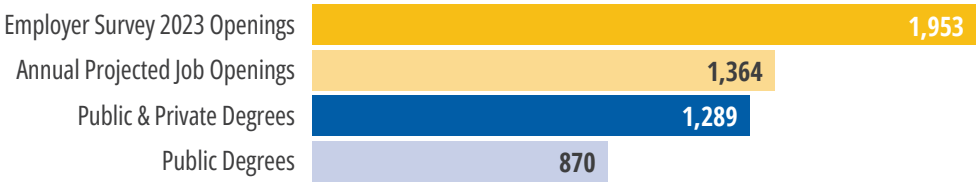
**Survey response options were presented as ranges and these totals assume a midpoint value of the selected range.*

Another key factor to consider is that workforce shortages in the short term may suppress future workforce demand. For example, according to Idaho employers interviewed, the undersupply of engineering candidates is already curtailing business growth opportunities or leading them to develop that business elsewhere. Existing undersupply has already dampened hiring demand, whereas increases in engineer supply could potentially enable business growth and expand hiring demand.

Engineering and Engineering Technologies Gap Analysis

The available quantifications of supply and demand indicate a gap between the number of engineering and engineering technology graduates of all degree types from Idaho public institutions (as depicted by the blue bars in the figure below) and the needs of Idaho's employers (as depicted by the yellow bars in the figure below). While the magnitude of the gap differs depending on the exact specifications used (whether graduates from private institutions are included, if migration is accounted for, etc.) the gap appears significant — particularly considering the likely undercount represented by the demand numbers — and likely to continue over time if present trends continue.

Idaho Institution Annual Engineering & Engineering Technology Degrees Produced (Average of 2018–2020), ID DoL Projected Annual Engineering & Engineering Technologist Job Openings (2020–2030) & WICHE Employer Survey Hiring Demand Estimates (2023)



Sources: Integrated Postsecondary Education Data System, Idaho Department of Labor Occupation Projections (2020–2030), WICHE Employer Survey

Computer & Information Science

Degree production and projected job demand in related fields are not a one-to-one match, but comparing the approximate magnitude of the difference between the two does provide some sense of the "gap" that exists between supply and demand. Meanwhile, examining projections based on current trends offers a way to understand whether identified gaps are likely to grow or to shrink if present trends continue.

Computer and Information Science Supply

The National Center for Education Statistics designates computer and information science degrees as Classification of Instructional Programs (CIP) 11: "Computer and Information Science and Support Services: Instructional programs that focus on the computer and information sciences and prepare individuals for various occupations in information technology and computer operations fields."[7] Similar to engineering, historical trends in computer and information science degree production at the bachelor's level in Idaho — also the typical entry-level credential for many in-demand computer-related professions[8] — show growth between 2010 and 2020, primarily driven by substantial increase between 2010 and 2015. Supply modeling shows that if contributing trends persist, Idaho can expect only minimal increases in the number of computer and information science graduates produced annually by its public institutions.

Research shows that a relatively high percentage of computer and information science public institution graduates stay in Idaho, with over 70% of in-state bachelor's graduates employed in the state after graduation and over 50% of out-of-state graduates.

Additionally, WICHE's pipeline analysis using student-level data finds stark gender gaps in the likelihood of declaring Computer and Information Sciences as a major, as well as completing degrees in this field, even when controlling for math scores and other characteristics. This analysis also showed the importance of K–12 math preparation, with results of standardized high school math tests being strongly associated with entrance into and success in this field in college. This last finding should not be surprising as it is supported by substantial other research as well as the perspectives of industry leaders.

Computer and Information Science Demand

The range of computer occupations continues to evolve, with the current BLS definitions including occupations ranging from computer scientists to web developers to network administrators. Trends in computer-related job growth show a fairly dramatic increase between 2010 and 2021 as computer and information technology related roles became ubiquitous across industries. Idaho's occupational growth

trends in a similar way to its neighboring states, though it has continued to lag slightly behind them over the past decade (Washington has long dominated in the overall amount of employment in computer occupations, though Utah's growth trajectory has been the steepest over this period).[9]

> ***"We've not necessarily tried to materially increase our hiring in the state of Idaho… we just found that it was too challenging to find enough candidates locally. So, we diversified our locations in order to fulfill that [need]."***
>
> *– Tech Sector Employer*

In terms of projections, computing occupational fields are projected to increase 14.6% nationally between 2021–31 and 12.2% between 2020–30 in Idaho. The ID DoL estimates that there will be 1,387 annual job openings in the field in Idaho between now and 2030.[10]

Because the projection methodology does not project shifts in industry mix, it may underestimate possible demand. That is, certain industries contract in response to things like macro-economic trends and changing technologies while others expand. While these shifts are difficult to predict, experts from the Idaho Department of Labor reported in a February 23, 2023 interview that there has historically been an increase in computer-related jobs as a range of industries expand their automated components.

As with engineering, the employer survey offers additional evidence that the existing projections for Idaho may underestimate demand. Industry respondents estimated they would like to hire nearly 1,600 employees with computer or information science degrees within the next 12 months, potentially 15% more than already projected. Further, 76% of respondents are currently struggling to fill jobs that require a computer or information science degree. Notably, survey respondents comprised a much smaller segment of the state's overall computing employee population than on the engineering side. Consequently, the computing estimates almost certainly significantly undercount statewide demand.

Employer Survey Respondent Computing Employees in Idaho Compared to Overall Number of State Computing Employees.

	STATE TOTAL 2020	STATE TOTAL 2023 (Estimated)	SURVEYED COMPANIES (Estimated)*
Computer Occupations (15–2000)	15,821	19,588	3,856

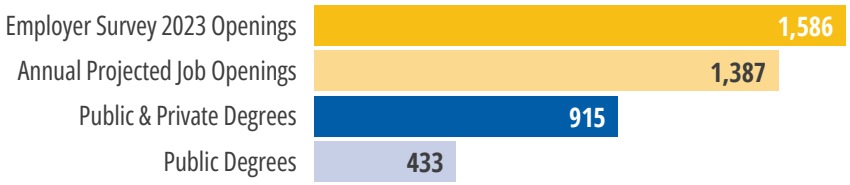
**Survey response options were presented as ranges and these totals assume a midpoint value of the selected range.*

Employer interviews also revealed how workforce shortages can have a downward impact on hiring demand. For example, in past years Idaho establishments have shifted or expanded their businesses outside the state after being unable to fill positions locally. In fact, some technology employers shared that the recent shift to remote work may enable Idaho-based companies to hire out of state to counterbalance local undersupply. Nonetheless, the strong demand for these occupations nationally also means that computer and information science graduates could remain in Idaho and work for employers located virtually anywhere while contributing to Idaho's tax base, reinforcing the benefits of steady graduate production. These types of decisions have the potential to drive demand up or down depending upon the local availability of talent.

Computer and Information Science Gap Analysis

The available quantifications of supply (represented in the blue bars below) and demand (represented by the yellow bars) indicate a gap between the number of computer and information science graduates from Idaho public institutions and the needs of Idaho's employers. Given the strong growth trends in this field, the identified gap appears robust across a range of specifications and appears likely to continue over time if present trends continue.

Idaho Institution Annual Computer and Information Science Degrees (Average of 2018–2020), ID DoL Projected Annual Computing Job Openings (2020–2030) & WICHE Employer Survey Hiring Demand Estimates (2023)



Sources: Integrated Postsecondary Education Data System, Idaho Department of Labor Occupation Projections (2020–2030), WICHE Employer Survey

Student Flow Model

The flow model described above is an important tool to help understand the challenge facing Idaho policymakers, industry leaders, and others committed to this work. The broad takeaway from adjustments to the flow model is that even with substantial improvements in postsecondary completion, few additional degrees would be produced. Improvements to college participation rates, which are obviously a broader state concern, have the potential to drive more students into these fields of interest. A key concern, though, is trying to ensure that those additional students are well-prepared to enter and succeed in the fields of interest.

The results of the flow model are stark. Even with substantial improvements in underlying metrics, like high school graduation rates and postsecondary progression, the state would produce relatively few additional degrees. This effort must be comprehensive and reach new populations of students who have not previously been interested in these fields. Additionally, the data point to the need for engaging students outside of the traditional high school-to-college pipeline.

Next Steps

As noted above, WICHE's does not aim with this report to create a detailed strategic plan for an engineering and computer and information science degree growth initiative. Instead, our intent is to provide a strong, evidence-based framework for potential next steps that is tailored to Idaho's context. The strong, overarching conclusion based on our analysis of the available data is that immediately moving to increase postsecondary capacity in these fields will not greatly increase production. It is important to recognize as a starting point that outcomes of initiatives like the one in Utah are useful guides, but have taken place in a different demographic reality than the one currently faced by Idaho.

The ultimate solution for Idaho will be to develop an Idaho-centered approach. The steps proposed below could form the framework for detailed strategic planning in the future.

Creating a Shared Vision & Coordinated Plan

Generating additional graduates in high-demand fields such as engineering and computer science is a complex, long-term endeavor. The downward demographic trends driving the overall number of high school graduates Idaho is expected to produce paired with the state's declining college-going rates mean the state is facing significant headwinds as they seek to increase supply. While Utah's initiative took place in a growth context (both demographically and economically), Idaho will face a more challenging environment for a similar effort (although the state's economic outlook is very positive). Moreover, addressing the multifaceted challenges of demographic and large-scale educational trends such as the college go-on rate will require the development of equally multifaceted responses.

To drive this effort, the state could facilitate an industry-led partnership between key stakeholders in policy and education to guide the development and ongoing refinement of a shared vision for increasing the number of engineering and computer-related graduates and a set of short- and long-term strategies to achieve this vision. This approach should also situate the effort in Idaho's broader economic context, considering the overall realities of the state's labor market and pressing shortages in other STEM fields such as healthcare.

With substantial attention already focused on college go-on rates, an engineering and computer science growth initiative should complement those efforts with a focus on supporting improvements in K–12 preparation for these fields, as well as driving interest among students.

Additionally, a potential initiative can also work to create and expand other potential student pipelines through enhanced upskilling of current employees, identification and recruitment of individuals who completed substantial credits in these fields but left postsecondary education without a degree, and other strategies focused on adult students.

Identifying Clear Roles & Responsibilities

As partners in this work, industry, policymakers, universities, community colleges, and the K–12 sector should identify how they will individually and collaboratively contribute to achieving the shared vision through the identified short- and long-term strategies. For example, higher education institutions might commit to increasing the number of female students enrolling in and completing engineering and computer and information science programs, partnering with K–12 to improve the math preparedness of high school graduates, and collaborating across the two- and four-year sectors to improve transfer pathways. Alternatively, industry partners might commit to employee upskilling initiatives, provide equipment and internship or project opportunities that meaningfully address challenges identified by educational partners, and provide timely and actionable feedback to educational partners. Given the demographic trends of Idaho's youth population, an important area of focus for all partners should be identifying how to identify, attract, and support non-traditional-aged students through to degree completion.

If there is going to be a sustained initiative, WICHE strongly believes that there will need to be a statewide entity that bears responsibility for coordinating that work. Given the interest of employers and their effectiveness in driving change, it seems appropriate that some type of industry-led body should serve in that role. It is important to note that this recommendation does not imply that such a body would have authority over the other entities noted above, but would collaborate and coordinate within appropriate roles and responsibilities of the different agencies and organizations committed to addressing these issues.

Investing for Impact

In order to make the most of any investment, the partners must identify and prioritize the greatest barriers and most effective solutions to workforce supply. Engineering and computer-related fields encompass a broad range of credentials and specialties that lead to a variety of occupations. The state may consider if a broad or a targeted approach will be most effective for meeting their goals with available funds. As part of this analysis, they should also focus on leveraging Idaho's unique assets in both industry and education for maximum value. Finally, it will be critical to balance immediate employer needs with sustainable growth plans that have the flexibility to account for changing dynamics such as recessions and shifts in automation.

Hopefully, readers of this report will agree with the conclusion that immediately investing in postsecondary capacity improvements should not be the first priority. Obviously, continuing to invest in these programs to make sure that they are turning out high-quality graduates is essential, but it does not appear that postsecondary capacity is the current limiting factor on degree production. Investment must instead first focus on growing the pipeline of students who are prepared to enter and succeed in these fields. Capacity issues can be addressed as those trends begin to change.

Data, Metrics, and Research

While it is standard fare for a report on postsecondary supply and employment demand to feature a recommendation related to data and metrics, that does not make it any less important. As part of the framework, WICHE recommends that industry leaders and other key agencies and organizations coalesce around meaningful metrics for understanding how the initiative that is envisioned is impacting outcomes. It would be easy to focus solely on the number of graduates that are produced annually in each field, and we agree that is an important metric. However, if, for example, the number of students enrolled in public postsecondary institutions in the state declines substantially, but the number of graduates in these fields holds steady, that would be a sign of some success. This report contains numerous different data points and ways of considering supply and demand issues. Certainly not all of the data points will resonate, but they could represent a starting point for consideration. As an initiative unfolds, it is highly doubtful that every approach and policy change will bear fruit, but with a successful monitoring and evaluation approach, it will be possible to continuously refine efforts to improve outcomes.

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INTRODUCTION

With a high-skill, high-tech workforce emerging as a hallmark of a flourishing economy, a steady supply of well-trained graduates in engineering, computer science, and related disciplines will play a critical role in Idaho's future. From building and maintaining the infrastructure needed for the state's fast-growing population, to providing the talent demanded by key industries, engineers, engineering technologists, and computer and information science professionals are a foundational pillar of the state's growth.

These high-paying occupations offer Idahoans family-sustaining wages and contribute to the state's tax base and overall economic vitality. Engineering, engineering technology, and computing occupations all pay well above the average annual salary in the state, with engineering technologists earning 24% more than the average occupation, engineers earning 78% more, and computing occupations a whopping 112% more than the average according to the most recent available data.[11] Moreover, many of these occupations are in high-growth fields, with environmental, industrial, civil, mechanical, electrical, computer hardware, and nuclear engineers, electrical and electronic technicians, and software developers, computer and information systems managers, computer systems analysts, and network and computer system administrators all present on the Idaho "Top Jobs" list.[12] Yet the impact of these occupations on the state goes far beyond these direct contributions.

Average Annual Wages in Idaho Occupations

All Occupations
$60,580

Engineering Occupations
$108,133

Computing Occupations
$128,391

Engineering Technologist Occupations
$74,821

Source: WICHE analysis of Idaho DoL data.

Idaho's key industries as identified by the state's Department of Commerce all rely on these professions, in particular advanced manufacturing, aerospace, food production, shared services, and energy.[13] Idaho companies of all sizes — from large employers like Micron Technology and Idaho National Laboratory (INL) to local small businesses — rely on the high-tech workforce to maintain their operations and to spur growth and innovation. According to interviews WICHE conducted with multiple employers between January and April 2023, many of the state's fastest growing companies have been founded, launched, and staffed by graduates of the state's engineering and computer science programs, bringing new industries and opportunities to the state. Therefore, a healthy pipeline of engineering and computer and information science graduates seems to play a pivotal role in the continued growth of Idaho's economy.

Yet in recent years, industry leaders have begun to express concerns that they cannot find enough talent in these critical fields, impacting their companies' growth and innovation. These leaders expressed interest in launching an engineering and computer science growth initiative similar to a long-time effort in Utah to address these gaps. A recent analysis of Utah's initiative found that the number of engineering and computer science graduates from Utah public institutions more than doubled between 2000 and 2020, as did engineering and computer science employment over the same period. The report's authors also found that in 2020, Utah's engineering and computer science workforce sustained and supported 238,419 jobs, $19.1 billion in earnings, and $25.2 billion in gross domestic product for the state.[14]

In response to these industry concerns, the Idaho State Board of Education commissioned an analysis from the Western Interstate Commission for Higher Education (WICHE) to explore the issue. Guided by an industry advisory group, the project team reviewed existing research, analyzed publicly available data, modeled the projected supply of graduates using Idaho data, and conducted a range of employer engagement activities to answer two key questions:

1. Is the supply of engineering and computer science graduates from Idaho's public institutions adequate to meet current and projected industry demand?.
2. If not, how can the state strategically address the gap between supply and demand?.

This analysis was not intended to provide a complete and detailed strategic plan, but rather to assist industry with articulating the gap between supply and demand to the greatest extent possible and identifying high-level, evidence-based approaches to increase credential production.

METHODOLOGY

Understanding Supply

Graduates in engineering, engineering technology, and computer-related fields from Idaho postsecondary institutions are used as a proxy metric for the "supply" of new workers available to the state's businesses. To analyze this population WICHE used publicly available data from the Integrated Postsecondary Educational Data System (IPEDS) as well as data from the Idaho State Board of Education (more detail on the State Board of Education data can be found in the Appendix).

After consultation with the Industry Advisory Team and a literature review, WICHE opted to include three codes from the Classifications of Instructional Programs (CIP) — developed by the National Center for Educational Statistics to offer a standardized way to categorize postsecondary academic programs by field — in the analysis.

- **CIP 11 – COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES** Instructional programs that focus on the computer and information sciences and prepare individuals for various occupations in information technology and computer operations fields.[15]
- **CIP 14 – ENGINEERING** Instructional programs that prepare individuals to apply mathematical and scientific principles to the solution of practical problems.[16]
- **CIP 15 – ENGINEERING TECHNOLOGIES/TECHNICIANS** Instructional programs that prepare individuals to apply basic engineering principles and technical skills in support of engineering and related projects or to prepare for engineering-related fields.[17]

A note on terminology, the term "computer science" as used in the Utah initiative refers to the full range included in CIP 11 (a wide range of computer-related degrees) thus the term computer science has been replaced with computer and information science to more accurately reflect the degree types discussed. In addition, while this report focuses on graduates of public institutions, the contributions of the state's private institutions are reflected where appropriate to provide additional information on available supply.

The analysis primarily focuses on the credential type most typical for entry-level employment in its related field, however, additional information on postsecondary degree types critical to industry such as masters and doctoral degrees are included as well. After receiving substantial feedback from employers on the topic of non-degree credentials such as certificates, it became clear that there is not consensus among Idaho employers on any type of certificate that was critical for employment in these fields, thus, they are not a primary focus of this analysis.

Of course, recent postsecondary graduates are not the only source of supply in the labor market. Employers need to hire across a range of experience levels and some Idaho businesses hire from regional, national, or international candidate pools and net-migration also affects labor supply. However, qualitative research demonstrates robust employer demand for entry-level hires in the fields of interest — typically bachelor's graduates — as well as a strong employer preference for hiring Idaho graduates.[18] Therefore, degree production in engineering and computer-related fields presents a useful, though imperfect, way to think about workforce supply.

To better understand the pipeline supplying graduates of these two fields, WICHE employed a range of quantitative and qualitative approaches. This work includes a complex student flow model developed by the National Center for Higher Education Management Systems (NCHEMS) that examines how the number of graduates in these fields may change in the future based on current trends and state demographics.

This model is based on numerous different data points from the education pipeline with a focus on the three fields of interest: engineering, engineering technologies, and computer science and information services.

At a high level, the model shows what happens to degree production when you adjust any one of a number of "levers" related to the education pipeline. This is not designed to be a tool for making perfect projections about future degree production, but more of a tool to show how changes in important metrics are likely to impact overall outcomes.

The model will help policymakers, industry leaders, and others to see where it might be possible to get the best "bang for the buck" in terms of investment.

The model is built by analyzing a combination of publicly available data from the U.S. Department of Education's Integrated Postsecondary Data System (IPEDS), U.S. Census Data, state high school graduation rates, and student-level data provided by the Idaho State Board of Education. Each of these data sources is used to build up a model of the education pipeline.

Within the model, we are able to then adjust key metrics, including

- High-school graduation rates
- College go-on rates
- Number of out-of-state students attending college in Idaho
- Overall participation rate of Idaho residents in postsecondary education (which helps account for adult students)
- Progression rates within particular degree programs

With each adjustment, the model then calculates the change in degrees produced, with a focus on the three fields of interest. As an example, Idaho institutions annually produced 737 engineering degrees on average from 2019–21. Based solely on shifts in the population and assuming the status quo in all metrics, by the 2029–30 school year, the state would produce a total of 37 additional bachelor's degrees in Engineering (this is not an increase of 37 per year, but 37 total over the time frame). As will be discussed in greater detail below, this would not fill the expected gaps, and changes in some metrics would be expected to produce greater gains than others.

One metric that the model does not adjust for is the percentage of students who elect to go into the fields of interest. As will be discussed below, this is likely an important piece to consider as well. Separate data analyses below examine the percentage of students ever choosing a field of interest, but it is difficult to say if these numbers are good, bad, or indifferent without appropriate comparisons and additional research.

It is important to emphasize again that the model is not intended to be an exact projection model, but to help guide thinking and approaches to addressing the issues raised by industry and key state employers. It is an essential tool for situating the issue within Idaho's population and demographic context.

Estimating Demand

There is no one perfect data source that cleanly lays out the precise number of new engineers and computer science graduates that Idaho will need in the future. Instead, WICHE has examined a range of measures, trends, and projections, and paired that with first-hand information from Idaho employers who are looking to hire these graduates.

Historical employment trends

The Bureau of Labor Statistics (BLS) offers historical estimates of employment by occupation at the national and the state level, allowing for cross-state comparisons. BLS also produces projections of employment by occupation, but only at the national level.

Occupational projections

The Idaho Department of Labor (ID DoL) produces state-level projections of employment by occupation, which provide the best available state-level projections of hiring demand by occupation despite certain limitations. For example, the 2020–2030 ID DoL projections do not yet reflect the projected impacts of significant federal policy changes such as the CHIPS and Science Act (CHIPS Act) and the Infrastructure Investment and Jobs Ac (IIJA).

Employer survey & interviews

The project team supplemented the existing ID DoL projections with results from a 2023 employer survey on hiring demand in fields of interest and in-depth interviews with a subset of key industry representatives.

Gap Analysis

Degree production and projected job demand in related fields are not a one-to-one match, but comparing the approximate magnitude of the difference between the two does provide some sense of the "gap" that exists between supply and demand. Meanwhile, examining projections based on current trends offers a way to understand whether identified gaps are likely to grow or to shrink if present trends continue. In the sections that follow WICHE has attempted to combine the available evidence to assess the gap in degree production but recognizing that many different factors may affect that gap for all three fields of interest.

SUPPLY OVERVIEW

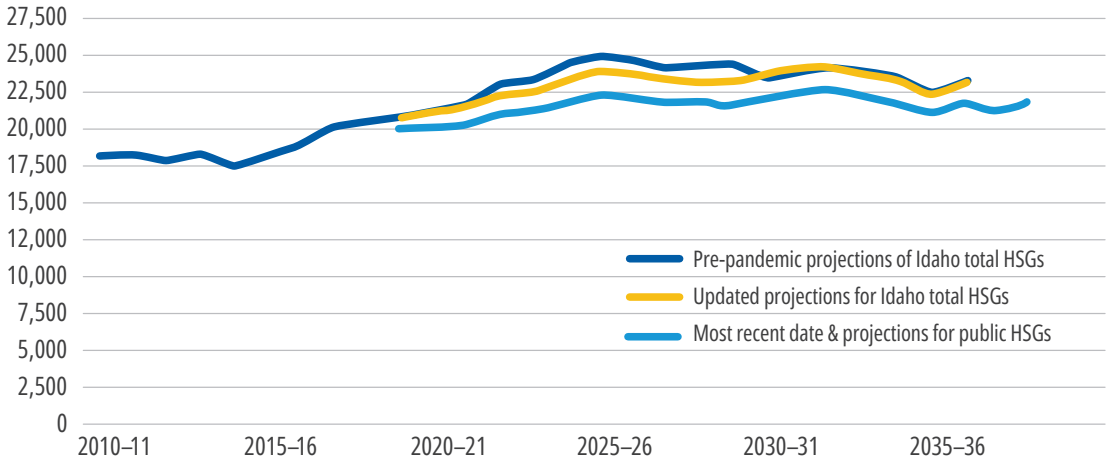
General Student Trends

Nationally, the number of students enrolled in postsecondary education is projected to grow by nine percent by 2031.[19] That growth would be welcome across the country as the last decade has seen steady declines in the number of students enrolled. Idaho has seen substantial drops in its college-going rate in recent years. The percentage of high school graduates enrolling in a postsecondary institution within three years of graduation has declined five percentage points, from 63% to 58% from the graduating class of 2015 to the class of 2019 (the most recent year for which data are available).[20] This mirrors national trends, which have also shown a declining number of high school graduates enrolling in postsecondary institutions.[21]

While these metrics relate to rates, the raw number of potential future graduates is also a key concern when considering approaches to increasing the number of future graduates in particular fields of study. A useful starting point for this piece of the puzzle is projections about the size of Idaho's future high school graduating classes.

The state's future high school graduating classes are expected to grow through the middle of the decade, followed by a period of modest decline, ending in 2037 at roughly the same number of high school graduates as the state produces today. This is shown in Figure 1.

Figure 1. Projected Idaho high school graduates



Source: WICHE, Knocking at the College Door

These trends help set the context for Idaho's intended effort to grow the number of graduates in the three fields of interest. The solid dark line represents projections made by WICHE in 2020 using data that predates the COVID-19 pandemic. The dotted lines represent updated projections with more recent state data. While the new information indicates a slightly lower peak in the total number of graduates in the middle of the decade (represented by the dark dots), the longer-term numbers are relatively consistent with previous projections. Idaho is still expected to see a relatively flat number of high school graduates through the remainder of the projected period.

While Utah is often cited as the model for an initiative such as this, it is absolutely essential to recognize that Utah's effort started in a vastly different context than what Idaho faces today. As Utah launched its work, the state was in a period of growing high school graduating classes, increasing postsecondary enrollment, and a booming state economy.[22]

While Idaho's economic growth continues to be strong, the trends in the other two areas are quite different from those Utah faced. As can be seen in Figure 1 above, Idaho is expected to soon reach a peak in the number of high school graduates it produces, followed by years of relatively constant production. Coupled with the state's college go-on trends, this necessitates different thinking and different policy approaches. While in Utah, the effort benefited from natural growth in potential student populations, meaning that the major interventions could focus on increasing postsecondary capacity, in Idaho, as the data will show, interventions likely will have to focus on growing the pipeline of potential students as a precursor to increasing postsecondary capacity to handle influxes of students in these majors.

Essentially, this initiative must develop a laser focus on being more efficient with a smaller number of students. As the analysis on the following pages hopefully makes clear, Idaho's pathway to an increased number of graduates in Engineering, Engineering Technology, and Computer and Information Science requires a concerted effort across the pipeline, from interesting more K–12 students in these fields at younger ages, to improving math preparation in K–12, to increasing the percentage of students who are likely to succeed that select one of these fields, to supporting them after they declare a major all the way through to graduation. Simply put, based on the data and analysis that follow, if the state invests resources in increasing postsecondary capacity in these fields without prior efforts to grow the pipeline of incoming students, it is unlikely that the number of graduates would meaningfully increase.

To get to that conclusion, we walk through analysis of the current pipeline, and blend that with the underlying trends described at the outset of this section.

Cohort Analysis Background

To shed further light on issues of supply, WICHE has analyzed student-level data provided by the Idaho State Board of Education and the State Department of Education to identify factors that are associated with students choosing to major in one of these fields and succeeding once they do so. This analysis also examines how many students with these characteristics of success are opting for and succeeding in different educational pathways. The aim is that this analysis can help sharpen the focus of policy and financial interventions to boost the number of graduates working in Idaho.

For this work, WICHE has examined two discrete cohorts of students — those entering public postsecondary institutions in the state for the first time in the 2013–14 school year and those doing so for the first time in the 2018–19 school year. Descriptive data for the two cohorts are useful for comparing differences over time and across majors of interest — in this case computer and information science, engineering, and engineering technologies. WICHE selected these cohorts intentionally, with the earlier cohort being chosen to provide enough time for program completion and the more recent cohort selected to provide more current information while still allowing some time to observe progress through the postsecondary system.

The data WICHE received from the Idaho State Board of Education runs through the 2021–22 school year.

Cohort Demographic information

In the following sections, descriptive demographic data are presented for the two cohorts. [23] As can be seen in Table 1, both cohorts feature more females than males, consistent with other demographic data reported by the Idaho State Board of Education.

The data show a decreasing overall cohort size of first-time enrollees in postsecondary education from the 2013–14 to 2018–19 cohorts. Additionally, both cohorts show a slightly larger population of females than males.

Similar to Idaho's overall population, the race/ethnicity of the cohorts is predominantly white, as can be seen in Table 2.

Table 1. Gender distribution of cohorts

	2013–14	2018–19
Females	53.0%	54.6%
Males	44.8%	45.1%
Unknown/Unreported	2.2%	< 1%
Total Students	**21,894**	**18,883**

Table 2. Race/ethnicity of cohorts

	2013–14	2018–19
Black/African American	1.8%	1.9%
Asian	1.6%	2.4%
NHOPI	< 1%	< 1%
AI/AN	1.1%	< 1%
White	79.8%	79.4%
Multiracial	1.6%	2.0%
Hispanic	11.4%	11.5%
Unknown/Unreported	2.5%	1.6%
Total Students*	**18,881**	**17,926**

**Note: The number of students reported in this table differ across variables due to missing data for some students.*

Standardized Exam Math Results

WICHE also received information on student results on standardized tests. Two exams were considered —— the Idaho Standards Achievement Test (ISAT) and the SAT (the meaning for the acronym of this national exam was dropped years ago but originally stood for "Scholastic Aptitude Test"). Distribution of the results is described in Tables 3 and 4 (page 26). Our focus is on students' math results and the relationship between those and student outcomes in computer and information science and engineering (which is discussed in greater detail in later sections). These results are only presented for the 2018–19 cohort and not available for all students. While multiple measures of ISAT math performance are available, WICHE focuses on the math composite results. The results include disaggregation by gender, because, as will be seen throughout this report, there is a substantial gender gap in the number of students that go into the fields of interest.

Table 3. ISAT results distribution, 2018–19 cohort

LEVEL	% OF ALL STUDENTS	% OF MALES	% OF FEMALES
1 – Does not meet standards	25.6%	26.1%	25.3%
2 – Nearly meets standards	30.0%	28.7%	30.9%
3 – Meets standards	27.2%	26.2%	27.9%
4 – Exceeds standards	17.2%	18.9%	15.9%

Students take the ISAT for math in grade 10. The four levels are described by the State Department of Education as follows: level 4 shows that the student exceeds grade level achievement standards; level 3 represents meeting grade level achievement standards; level 2 indicates that the student has nearly met the grade level achievement standards; and level 1 suggests that the student has not met those standards.[24]

Distribution on the math portion of the SAT is somewhat similar, with the majority of students grouped into the middle bands.

Table 4. SAT scores, 2018–19 cohort

LEVEL	% OF ALL STUDENTS	% OF OF MALES	% OF OF FEMALES
< 301	< 1%	< 1%	< 1%
301–400	9.0%	8.2%	9.6%
401–500	29.3%	26.6%	31.4%
501–600	41.5%	41.5)	42.0%
601–700	15.4%	18.1%	13.3%
701–800	4.4%	5.9%	3.1%

ISAT results were available for about 37% of students and SAT results were available for about 34% of the 2018–19 cohort with substantial overlap meaning most students who took any exam took both. With only about a third of students having math scores, caution is warranted before drawing firm conclusions about math results in the subsequent sections. There are statistically significant differences between the populations of students who do have results and those that don't, but the results, as will be shown later, are important and suggestive in helping to guide potential policy decisions. This is an important vein of analysis with substantial research showing strong connections between math preparation and student success in fields like engineering and computer science, although this relationship can also be tied to students' perceptions of their own self-efficacy in math.[25]

The gender differences in distribution on both tests are relatively consistent and statistically significant. More males tend to score in the highest bands, but, as will be discussed in greater detail below, this modest difference does not come close to explaining the substantial gender gap in the students who choose these three fields of interest.

Geographic

WICHE is also able to examine geographic information for a subset of students in each cohort. Using generally accepted definitions, the distribution of students in the two cohorts varies in their location, as can be seen in Table 5.

Table 5. Geographic distribution of cohorts

LOCALE	2013–14	2018–19
City	26.0%	26.4%
Suburb	29.7%	26.7%
Town	22.7%	24.3%
Rural	21.6%	22.7%
Total Students	**8,503**	**9,737**

As can be seen in the Table 5, in both cohorts, the majority of students live in cities and suburbs, with over 55% of postsecondary students coming from schools in those locales in the 2013–14 cohort and over 53% doing so in the 2018–19 cohort. With concerns about inequalities across regions of the state in math preparation, this distribution will be examined in greater detail below for considering impacts to the supply pipeline for future engineering and computer and information science graduates.

Degree Completion Results

In the two cohorts analyzed, a large number of students completed postsecondary credentials. The information in Table 6 shows the distribution of completions in all fields as well as the percentage of students who were still enrolled and the number who no longer appear in the dataset. This suggests that they may have stopped out, although this should not be taken as a detailed analysis of overall completion rates due to various data considerations.

Table 6. Degree distribution by cohort

DEGREE LEVEL	2013–14	2018–19
Associates	6.2%	5.4%
Bachelor's	22.9%	17.7%
Master's	6.4%	6.1%
Doctorate	< 1%	< 1%
Still Enrolled	< 1%	8.4%
No Longer Enrolled	63.6%	62.3%
Total Students	**21,894**	**18,883**

As would be expected, the data for 2013–14 show more credential completions and fewer students still enrolled. Of those who completed degrees or are still enrolled, more than 80% of degree completers in the 2013–14 cohort earned bachelor's or higher degrees, while just under 17% of degree completers earned associates degrees. For the 2018–19 cohort, the numbers are closer to 60% completing bachelor's or higher, with a quarter of that population still enrolled and about 14% earning associates degrees. A large percentage of both cohorts is no longer enrolled.

ENGINEERING

Engineering Supply

Historical trends in Idaho's engineering bachelor's degree production — the typical entry-level credential of most engineering professions[26] — show growth between 2010 and 2020, primarily driven by substantial growth between 2010 and 2015.

Supply modeling shows that if contributing trends persist, Idaho can expect only minimal increases in the number of engineering graduates produced annually by its public institutions. A projected levelling off of the overall number of high school graduates in the state and a negatively trending college go-on rate of Idaho high school graduates are among the primary contributors to this low growth projection.[27]

Meanwhile, existing research shows that just over 60% of engineering bachelor's degree recipients who were Idaho residents at the state's public institutions are found in the state's unemployment insurance data after graduation, suggesting that a large portion of graduates from Idaho institutions may be leaving the state.[28] Under 40% of out-of-state students are found in working in jobs covered by the state's unemployment insurance data (including international students, who are over-represented in engineering programs).[29] As a result, the total number of graduates produced by the state's public institutions may overstate the available workforce supply due to outmigration, though there are not available data for the in-migration of graduates in these fields from other states.

Importantly, data analysis for the project also revealed that women are significantly less likely to select engineering majors, although those who do so are more likely to complete their degrees.

Engineering Technology

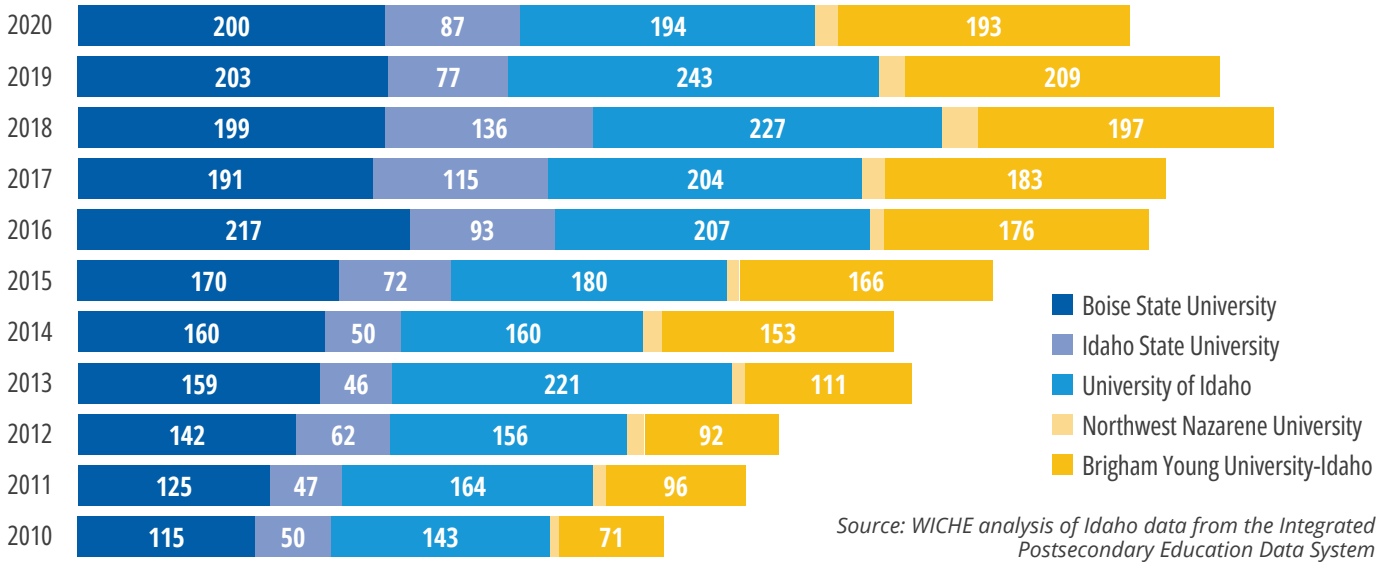
Engineering technology programs have historically been offered at the sub-baccalaureate level, including associate degree and certificate options. Between 2018 and 2020, Idaho produced 166 associate degrees in engineering technology per year; in 2020, the highest percentage came from Idaho State University (40%) followed by the College of Western Idaho (22%), the College of Southern Idaho (17%), North Idaho College (6%), and Lewis-Clark State College (4%). The remaining 10% of the annual associate degrees were from Brigham Young University-Idaho (BYU-Idaho). Currently the state's public institutions only produce a handful of graduates in bachelor's degree programs in engineering technology — 15 per year statewide between 2018 and 2020.

While BYU-Idaho does graduate a significant number of students in CIP 15, they are largely in subcategories of the designation that may more naturally fit into descriptive categories outside of engineering. For example, their main bachelor's degree offering in Engineering Technology is in CIP 15.1202 — Computer/Computer Systems Technology/Technician (from which they produced an average of 123 bachelor's degrees per year between 2018 and 2020).

Trends in Degree Production

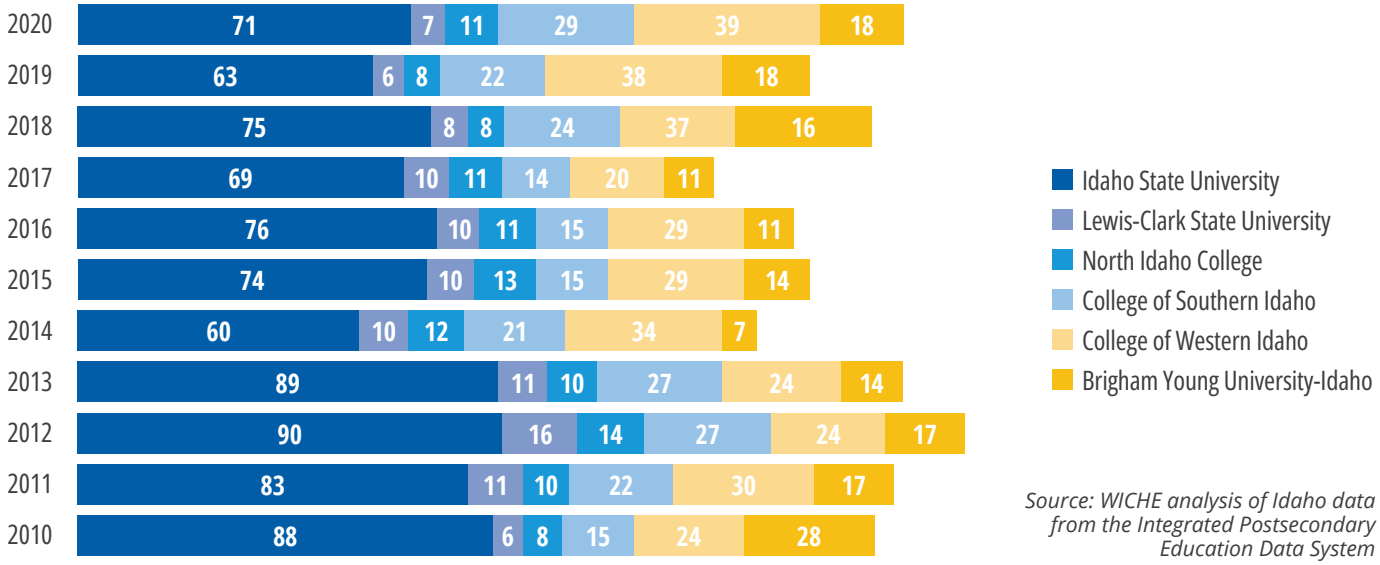
We begin the supply analysis with summary data on completions from all Idaho institutions. As can be seen in Figure 2, according to federally collected data, Idaho's institutions grew the number of Engineering graduates the latter part of the 2010s, but that growth has tapered off, which would be consistent with the observed decline in the number of students declaring one of these fields as their major. Figure 3 shows completions of associates degrees in engineering technology have been more volatile and in 2020 (the most recent available year of data), eclipsed 2010 numbers.

Figure 2. Annual bachelor's degree completions in engineering from Idaho institutions



Source: WICHE analysis of Idaho data from the Integrated Postsecondary Education Data System

Figure 3. Annual associate degree completions in engineering technology from Idaho institutions



Source: WICHE analysis of Idaho data from the Integrated Postsecondary Education Data System

The growth over time for bachelor's degrees in engineering is particularly noteworthy, but further and continuing analysis is warranted to determine how much all institutions (including BYU-Idaho) contribute graduates to the workforce and whether graduates are employed in the state. As noted earlier, previous research by the Idaho State Board of Education shows that engineering graduates in particular tend to have a lower-than-average rate of being found in state employment data.[30]

Cohort Analysis: Engineering and Engineering Technologies

Using the data from the two cohorts of students, WICHE analyzed pathways, progression, and successful student outcomes in the different majors of interest. This section presents those results, starting with descriptive data about the number and characteristics of students who opt into these majors, then similar data about those students who complete degrees in these fields.

This analysis builds toward a more complex model that estimates the association between different student characteristics, including performance on math standardized tests and student demographics, and pursuing and completing a degree in these fields. The model is not meant to provide causal conclusions, but to try to illustrate the types of students who are succeeding in these fields as a tool to assess the potential pathways for greatly expanding the number of graduates.

In this vein, this analysis is complementary to the model showing how improvements in different areas of the education pipeline are likely to impact the potential future number of graduates in different ways (please see the section below on the student flow model).

Descriptive Data – Engineering and Engineering Technologies Supply

As a first step in this analysis, Table 7 shows the percentage of students who declare a major within CIP code 14 or 15 at any point in the time frame covered by the data, as a percentage of all students that ever declared a major.

Among the 2013–14 student cohort, of all the students who declared a major, 7.5% were engineering majors at some point, which decreased to 6.0% for the 2018–19 cohort. For the engineering technologies major those numbers were 1.5% for the 2013–14 cohort and 1.3% for the 2018–19 cohort.

Table 7. Percentage of students declaring engineering and engineering technologies as a major

MAJORS	2013–14	2018–19
CIP 14 (Engineering)	7.5%	6.0%
CIP 15 (Engineering Technologies)	1.5%	1.3%
Total Students Declaring a Major	**18,929**	**16,839**

While it is not fully appropriate to draw trends from two points in time, the decline in the overall number of students declaring a major is supported by other data points and the drop in the percentage of students entering these fields is sobering. The decline in the percentage of students who ever declared engineering, when compounded with the declining overall numbers of students, represents a drop of 400 students between the 2013–14 cohort and the 2018–19 cohort. While not all of these enrollees may have graduated, it potentially illustrates the reasons for the end of the growth in degree production illustrated above.

Next, the analysis turns to examining some of the potential gaps between how likely different populations are to enter these fields. As a starting point, Tables 8 and 9 show the percentage of males and females that ever declare a major of engineering or engineering technology.

These data show what is well-known to faculty and leadership at institutions of higher education and consistent with volumes of research about gender disparities in engineering fields. This gender gap is persistent throughout the data points examined in this report and suggests that identifying ways to attract more females into the field may be an important approach. The results are statistically significant and substantively large. Discussion will return to questions around the gender gap in discussing the associations between performance on math standardized tests and success in these fields, but the gap remains persistent after taking other factors into account.

Disparities by race and ethnicity were also raised as a potential issue in discussions with employers as well as staff from postsecondary institutions. Here, the data are less clear, partly due to limited information on race and ethnicity for some individuals. The data in the table below shows the percentages of students ever declaring engineering as a major.

There are numerous interesting points from this examination. Overall, the data are clearly consistent with the decline in the number of students declaring engineering as a major. While there are statistically significant differences in the distribution across races, also of note are the sharp declines in the percentage of Asian and multiracial students who declared engineering as a major. Although the number of Asian students who declared any major grew by more than 130 students between the two cohorts, the number of those students who declared this major increased by only a single student.

Table 8. Percentage of students declaring engineering as a major by gender

MAJORS	2013–14	2018–19
Female	2.1%	2.0%
Male	13.9%	11.0%
Total Students Declaring Major	**18,929**	**16,839**

Table 9. Percentage of students declaring engineering technologies as a major by gender

MAJORS	2013–14	2018–19
Female	< 1%	< 1%
Male	2.7%	2.6%
Total Students Declaring Major	**18,929**	**16,839**

Table 10. Percentage of students ever declaring engineering as a major by race/ethnicity

RACE/ETHNICITY	2013–14	2018–19
Black/African American	4.5%	4.0%
Asian	16.1%	10.7%
NHOPI	***	***
AI/AN	4.4%	4.0%
White	6.3%	5.9%
Multiracial	9.9%	6.9%
Hispanic	4.8%	4.5%

****Redacted due to small cell sizes.*

Due to small numbers of graduates, a separate analysis of students declaring engineering technology as their major disaggregated by race/ethnicity is not included.

Research shows that students' math knowledge is highly predictive of selection of engineering (and ultimate success), with some caveats that this can be moderated by improvements in self-perception of math abilities and strong goals.[31] Table 11 shows the percentage of students scoring at each level of the ISAT who ever declared engineering as a major, while the subsequent table showing the same results by band of results on the math portion of the SAT.

As would be expected, for both exams there is a clear and consistent pattern of students with higher math scores being associated with a higher likelihood of ever declaring engineering as a major. Referring back to the previous data points on gender, it is also a worthwhile question to consider whether the gender gap in declaration of engineering as a major is partially explained by differences in performance on math exams by gender.

This data point shows that the gender gap persists even among students with equivalent math performance. It shows that of students from the 2018–19 cohort, only about seven percent of females with the highest math scores on the ISAT ever declared engineering as a major, while just under 26% of males with similar scores did. Looking at the spread for students who scored over 600 on the math portion of the SAT, just under eight percent of those females ever declared engineering as a major compared to almost 24% of males. For females, high math scores appear to have less of an association with declaration of engineering as a major.

The smaller number of students in engineering technologies precludes a detailed analysis of the relationship between math and major declaration, though the results do not suggest as strong of a relationship between performance on math standardized tests, nor are they statistically significant

Table 11. ISAT scores and declaration of engineering as a major

ISAT COMPOSITE LEVEL	% OF STUDENTS DECLARING ENGINEERING
1	1.3%
2	3.3%
3	6.1%
4	16.0%

Table 12. SAT scores and declaration of engineering as a major

SAT SCORE RANGE	% OF STUDENTS DECLARING ENGINEERING
< 301	0%
301–400	< 1%
401–500	1.9%
501–600	5.4%
601–700	12.9%
701–800	28.1%

Table 13. Percentage of students with high math scores declaring as engineers

EXAM	% OF MALES DECLARING ENGINEERING	% OF FEMALES DECLARING ENGINEERING
ISAT Level 4	25.7%	6.8%
SAT Math > 600	23.8%	7.7%

Throughout the course of the project, discussions with employers and others raised questions about the role of Idaho's geography in producing engineers. In particular, respondents wondered whether those from more rural areas may be less likely to enter into these fields. The data suggest there may be some truth to this, with statistically significant differences in the percentage of students from each location that ever declare engineering as their major. The numbers for both cohorts are presented in Table 14.

Table 14. Percentage of students from each locale ever declaring engineering as a major

COHORT YEAR	CITY	SUBURB	TOWN	RURAL
2013–14	9.2%	5.1%	5.6%	5.6%
2018–19	8.1%	6.3%	4.9%	5.8%

The location information comes from students' high school records, and does not cover the entire cohorts, but the results are suggestive of a modest difference with students from urban areas more likely than those from rural areas to declare engineering as a major. These results are statistically significant.

With smaller numbers of students opting into engineering technologies, the results differ. For the 2013–14 cohort, there are no statistically significant differences, but for the 2018–19 cohort, there are differences, with students from rural areas more likely to pursue that pathway. The results are shown in Table 15.

Table 15. Percentage of students from each locale ever declaring engineering technologies as a major

COHORT YEAR	CITY	SUBURB	TOWN	RURAL
2013–14	1.2%	0.9%	1.0%	0.8%
2018–19	.9%	.9%	1.7%	2.6%

Student Characteristics and Graduation

The data above shows how different student characteristics are associated with declaring one of the two broad engineering categories as a student major. This section focuses on the association between those same student characteristics and student success — defined as completing a degree — of those who ever declared one of these two fields as a major. Because the cell sizes shrink considerably when only using a subset of students (in this case, those that ever declared engineering or engineering technologies as a major), some of the analyses are not as fully disaggregated as above.

Table 16. Degree completion rates for students that ever declared engineering as a major

COHORT YEAR	GRADUATED	GRADUATED IN ENGINEERING
2013–14	45.6%	68.3%
2018–19	27.9%	75.9%

Table 17. Degree completion rates for students that ever declared engineering technologies as a major

COHORT YEAR	GRADUATED	GRADUATED IN ENG. TECH
2013–14	36.0%	68.8%
2018–19	19.2%	78.4%

Overall, approximately 29% of students who ever declare any major in the two cohorts ultimately end up completing a degree. The data in the tables below show that the success rate for those who ever declare engineering is higher, and about the same for engineering technologies. As one would expect, the percentage of those completing a degree in the 2018–19 cohort is lower, which is likely mainly due to there being fewer years for those students to complete their studies.

These tables show the percentage of students who declared the noted major who graduated. The third column shows the percentage of those graduates who completed their degree in the field of interest.

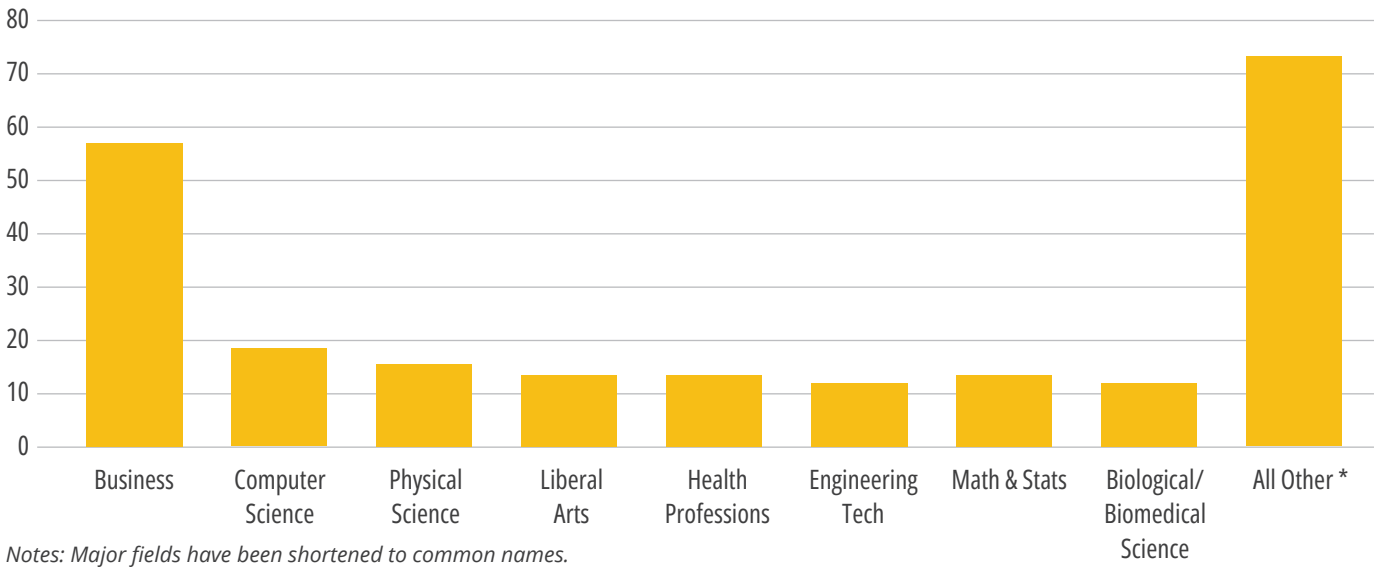
This shows that of those who graduated and at any point in their academic career declared engineering (CIP 14) as a major, in the 2013–14 cohort, about 68% graduated in engineering, while 76% of those same students from the 2018–19 cohort did so. Without broader analysis, it is difficult to determine whether this represents a material change between the cohorts or whether the shorter time horizon explains the difference. It could be that those who left the major will take longer to graduate, so over time, both the percentage of students from that cohort who graduate will increase and the number graduating in other fields will increase, driving down the percentage who graduate in engineering.

It is also difficult to know whether this number is good, bad, or indifferent without comparators from other years, and possibly other states and institutions. Even cross-state applicability and generalizability is questionable due to differing state contexts.

However, this type of pipeline metric would be essential to monitor and understand as this broader initiative continues to move forward. The interested parties should pay close attention to the pipeline and how it may change.

One key question from this analysis is what other fields these students are graduating in. Figures 4 and 5 show the most popular alternative majors for this population.

Figure 4. Majors of graduates who completed degrees in other fields after declaring as an engineering major, 2013–14 cohort



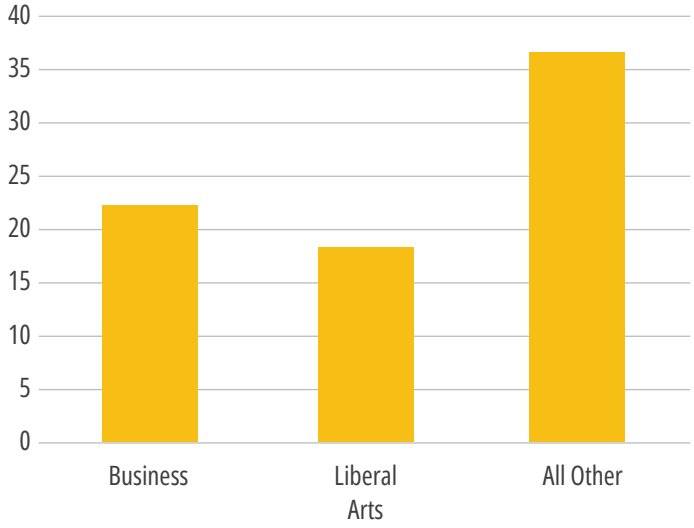
Notes: Major fields have been shortened to common names.

**The "all other" category includes numerous majors, but none with a graduate count above nine individuals.*

This shows that business was by far the most popular alternative major for those that ever declared engineering as a major. It also suggests that further analysis is warranted to help analyze why students are leaving the major and whether policy or practice decisions might lead to greater completions. Although business majors are important to the economy, converting graduates from that major to engineering may not cause as much concern as it would if most of the students who switched majors moved to education or nursing-related fields, given the state's workforce shortages in those areas.

Similar data for the 2018–19 cohort shows fewer majors, which is not surprising given that a smaller number of students from that cohort graduated in other fields. The most prevalent other fields were business and liberal arts.

Figure 5. Majors of graduates who completed degrees in other fields after declaring as an engineering major, 2018–19 cohort



Notes: Major fields have been shortened to common names.

The "all other" category includes numerous majors, but none with a graduate count above nine individuals.

Now we turn to examining whether different student characteristics are associated with differences in the rates at which students who ever declare engineering as a major graduate in engineering. Looking at differences by gender, there are very slight, but not statistically significant differences, with both females and males who ever declare engineering completing in engineering at relatively similar rates (although those women are more likely to graduate overall).

The smaller sample sizes for engineering technology do not support disaggregated analysis.

Math scores again are only available for a subset of the 2018–19 cohort, but are suggestive of a strong relationship. With small sample sizes, it is not possible to draw firm conclusions, but among those students who ever declared engineering as a major and ultimately graduated, those who, for example scored in the highest levels of the ISAT and SAT were more likely to graduate in engineering. Again, these results are only suggestive due to the limited coverage of math exam results, but are worth further consideration as this initiative continues.

Examining data by location again shows suggestive, but not statistically significant, differences with rural students who declare engineering as a major being just slightly less likely to graduate in engineering compared to peers from other locales.

Probability model

From here, we examine the student characteristics that are associated with completing a degree in engineering and engineering technology. Through a model that incorporates multiple characteristics, we are able to isolate, for example, the association between gender and completion while controlling for a student's high school location and math scores. It is important to note that this is not a causal analysis. The results discussed below do not prove that any particular student characteristic causes increased or decreased success rates but are suggestive of important relationships that should be considered as part of this initiative.

As would be expected based on the summary statistics provided above, as well as other pre-existing research, the factors associated with the biggest difference in the probability of graduating with an engineering degree are being male and scoring well on standardized tests. The model used, called a logistic regression, shows whether the likelihood of the outcome of interest — in this case, graduation with a degree in engineering — increases or decreases with a change in one variable while controlling for others.[32]

Females, even when controlling for race/ethnicity, location of high school, and math performance are about 22 times less likely to graduate with an engineering degree than males. This result is statistically significant, and, to say the least, substantively large. Again, it is worth emphasizing that this is when we also controlled for math results, so this strong relationship holds when math results are equivalent.

The math results also show strong statistical significance and pointed in the direction that would be expected. Students achieving a rating of three on the ISAT were about three times less likely to graduate in engineering than those who achieved the highest rating (again, the results were statistically significant). Students achieving a rating of two were about 10 times less likely to graduate (also statistically significant.)

The limited availability of data on math exam results greatly decreases the number of observations, making it difficult to assess in particular, the relationship between race/ethnicity and graduation in engineering while controlling for location and previous math performance.

The limited data available for math results shrank the number of observations which likely contributed to the lack of statistically significant results for location and race/ethnicity. We repeated the model without the math results, which is not ideal, because it is clearly an important factor. But the model can still show important areas for consideration.

In this second model, being female is again negatively associated with graduating in engineering. The results also show a statistically significant difference, with students who came from cities just about twice as likely to graduate in engineering as those from rural areas. Additionally, students with a multiracial background were about 2.3 times more likely than white students to graduate in engineering, while Hispanic students were about half as likely as white students to do so. All of these results were statistically significant.

In summary, these results confirm what is already suspected. It is clear that there is a strong negative association between being female and completing a degree in engineering, even when controlling for math performance. Additionally, it appears possible that there are important differences worth considering related to race/ethnicity. As Idaho's employers and higher education institutions begin considering how best to boost the number of engineers, addressing gender gaps appears to be a high priority.

Also, it is clear from these results, as well as the knowledge and expertise of institutional faculty and staff, that math skills are particularly important.

Student Flow Model

The final component of the supply analysis is a model that allows us to examine how many degrees the state is expected to produce in the coming years based on current and recent trends around college go-on rates, progression in postsecondary education, and other factors. This is particularly helpful for identifying where significant changes to the pipeline of students will have the greatest impact on the number of graduates over time. This model should not be viewed as a "crystal ball" that perfectly predicts what will happen in the future based on different inputs (like increased high school graduation rates). Instead, it should be viewed as a tool that gives industry experts, policymakers, and other interested parties a sense of which metrics and data points are particularly important if the state aims to substantially increase degree production in these fields.

Current Trends Continue

If current trends in high school graduation rates, college-going rates (both of directly out of high school for in-state and out-of-state students as well as first-time college participation of 20–44-year-olds), progression year-over-year in postsecondary, and credential completion continue through 2029–2030 the state can expect their degree production in fields of interest to hold nearly flat with an increase of less than one percent in both engineering and engineering technology.

Table 18. Current and projected additional undergraduate engineering awards by credential type

	CURRENT UNDERGRADUATE AWARDS (2019–21 PEDS AVG.)		PROJECTED ADDITIONAL AWARDS (2021–22 THROUGH 2029–2030)	
	ENGINEERING	ENGINEERING TECH	ENGINEERING	ENGINEERING TECH
Certificates	21	137	1	1
Associates	29	166	0	2
Bachelor's	737	202	37	2

The data allows for this projection to be broken down by institutional sector as well — with the "Public Research" category encompassing Boise State University, Idaho State University, and the University of Idaho.

Table 19. Current and projected additional undergraduate engineering awards by institutional sector

	CURRENT UNDERGRADUATE AWARDS BY PROGRAM (2019–21 PEDS AVG.)		PROJECTED ADDITIONAL AWARDS BY PROGRAM (2021–2022 THROUGH 2029–2030)	
	ENGINEERING	ENGINEERING TECH	ENGINEERING	ENGINEERING TECH
Public Research	543	115	36	1
Public Masters and Bachelors	4	11	0	2
Public Two-Year & Less Than Two-Year	25	175	0	2
Private	215	204	1	2

Increasing the High School Graduation Rate

Beginning with the model's first lever, high school graduation rates, we can explore the impact of an increase to the state's overall high school graduation rate on credential production in our fields of interest. If Idaho were to increase their overall high school graduation rate from its current 80% to just under 91% — an average of the highest state high school graduation rates in the country — the model projects modest degree gains over time at about seven additional bachelor's degrees in engineering per year and less than one additional associates degree per year in engineering technology. This is not surprising, given the relatively strong current high school graduation rate, there is simply limited room to grow.

Table 20. Projected additional undergraduate engineering awards with an increase in high school graduation rate

	PROJECTED ADDITIONAL AWARDS BY PROGRAM – CURRENT TRENDS (2021–22 THROUGH 2029–2030)		PROJECTED ADDITIONAL AWARDS BY PROGRAM – WITH HS GRAD RATE AT AVERAGE OF BEST-PERFORMING STATES (2021–22 THROUGH 2029–2030)	
	ENGINEERING	ENGINEERING TECH	ENGINEERING	ENGINEERING TECH
Certificates	1	1	2	2
Associate	0	2	0	2
Bachelor's	37	2	52	3

Increasing the College-going Rate

One of the most critical areas to examine is how changes to Idaho's college-going trends might impact future degree production. Between 2017 and 2020, the state saw a declining "go-on" rate, the percentage of graduating Idaho high school seniors who enroll directly in college the following fall, decreasing by over 10 percentage points during this period.[33] As the table below demonstrates, increasing college go-on rates for students directly out of high school has a more dramatic impact on degree production. If Idaho were to achieve a go-on rate of 47%, which is the national average as well as a rate the state exceeded as recently as 2018, the model suggests that could lead to 80 additional bachelor's degrees in engineering over the course of the projections. This would more than double the 37 additional bachelor's degrees expected with the current go-on rate. If the state were to approach a more aspirational goal — such as the nearly 58% seen in state's with the highest go-on rates — that number more than triples, with 118 additional degrees projected.

Table 21. Projected additional undergraduate Engineering awards due to increased go-on rates

	PROJECTED ADDITIONAL AWARDS BY PROGRAM – CURRENT TRENDS (2021–22 THROUGH 2029–2030)		PROJECTED ADDITIONAL AWARDS GO-ON RATES AT NATIONAL AVG. (2021–22 THROUGH 2029–2030)		PROJECTED ADDITIONAL AWARDS GO-ON RATES AT TOP-PERFORMING AVG. (2021–22 THROUGH 2029–2030)	
	ENG.	ENG. TECH	ENG.	ENG. TECH	ENG.	ENG. TECH
Certificates	1	1	3	3	4	5
Associate	0	2	1	4	1	6
Bachelor's	37	2	80	5	118	8

While different methods of calculating the go-on rate can offer different perspectives — for example using a three year after-high school timeframe to better capture students who take time off for a gap year or a Church mission — it is clear that increases in the go-on rate are an important piece of the puzzle.

Increasing Out-of-State Students

Findings from the State Board of Education have also revealed some substantial increases in out-of-state students opting to attend college in Idaho in recent years — including a 21% jump in enrollment at Idaho universities from fall 2019 to 2022.[34] While there is speculation this was driven by pandemic-related trends, if out-of-state enrollment continued to grow at a rapid pace, we can see this also leads to a small uptick in engineering degree production.

Table 22. Projected additional engineering undergraduate awards with increased out-of-state directly out of high school (DOHS) college-going numbers

	PROJECTED ADDITIONAL AWARDS CURRENT TRENDS (2021–22 THROUGH 2029–2030)		PROJECTED ADDITIONAL AWARDS – OUT OF STATE DOHS COLLEGE-GOING INCREASED 10% (2021–22 THROUGH 2029–2030)		PROJECTED ADDITIONAL AWARDS – OUT OF STATE DOHS COLLEGE-GOING INCREASED 20% (2021–22 THROUGH 2029–2030)	
	ENG.	ENG. TECH	ENG.	ENG. TECH	ENG.	ENG. TECH
Certificates	1	1	2	2	2	2
Associate	0	2	0	2	0	2
Bachelor's	37	2	44	4	51	6

Increasing College Participation of 20–44-year-olds

Another way to explore this question is to look at the first-time college participation rate of the state's 20–44-year-old population. Currently, Idaho's participation rate for this population is 1.55%, however, the national average is just over 2% and the best-performing states sit above 3%. Attracting more adult students into the educational pipeline leads to even larger projected increases in degree production — at the top end of the range leading to nearly 30 additional bachelor's degrees in engineering per year over the projections period, more than a six-fold increase over current trends.

Table 23. Projected additional undergraduate engineering awards with an increase in first-time (FT) college participation rates of 20–44 year-olds

	PROJECTED ADDITIONAL AWARDS – CURRENT TRENDS (2021–22 THROUGH 2029–2030)		PROJECTED ADDITIONAL AWARDS – FT PARTICIPATION RATE AT NATIONAL AVG. (2021–22 THROUGH 2029–2030)		PROJECTED ADDITIONAL AWARDS – FT PARTICIPATION RATE AT BEST-PERFORMING AVG. (2021–22 THROUGH 2029–2030)	
	ENG.	ENG. TECH	ENG.	ENG. TECH	ENG.	ENG. TECH
Certificates	1	1	4	4	9	9
Associate	0	2	1	4	1	9
Bachelor's	37	2	93	3	229	6

Improving Postsecondary Progression Rates

Another scenario the model can explore is what a change in progression rates from year-to-year in our fields of interest might look like. For example, a 10-percentage point increase in progression rates (first-to-second year, second-to-third year, and third-to-fourth year) in engineering programs would generate more than three times the number of degrees with no change (about 12 new bachelor's degrees in engineering per year between 2021 and 2029). A 10-percentage point increase in progression rates is a dramatic improvement — research shows one intensive program increased retention rates in STEM fields between nine to 15 percentage points — necessitating a significant investment from the institution and including robust student support services.[35] A 10-percentage point increase in engineering and engineering technology progression rates across all institutions and each year-to-year transition would be an aspirational goal.

Table 24. Projected additional engineering undergraduate awards with an increase in year-to-year progression rates

	PROJECTED ADDITIONAL AWARDS BY PROGRAM – CURRENT TRENDS (2021–22 THROUGH 2029–2030)		PROJECTED ADDITIONAL AWARDS BY PROGRAM – 10-PERCENTAGE-POINT INCREASE IN PROGRESSION RATES (2021–22 THROUGH 2029–2030)	
	ENGINEERING	ENGINEERING TECH	ENGINEERING	ENGINEERING TECH
Certificates	1	1	5	8
Associate	0	2	1	8
Bachelor's	37	2	128	2

Student Flow Model Conclusions

Of course, no model can perfectly capture all the needed inputs nor perfectly predict outcomes. Rather, their true value lies in exploring the patterns and trends that could emerge in different scenarios by making adjustments to the inputs based on estimates of possible — if aspirational — future directions drawn from existing data and research findings.

The model levers possible with the available data show us that impacting college participation will be a key factor in increasing degree production for engineering at the bachelor's level, while important questions such as breakdowns by gender and major choice remain unanswered.

Engineering Demand

Key Findings

Taken together, historical trends that show growth in engineering employment over the last decade, projections that predict continued occupational growth, and recent qualitative data that suggest hiring demand for engineers is already exceeding these growth projections demonstrate a robust labor market for graduates with degrees in engineering fields.

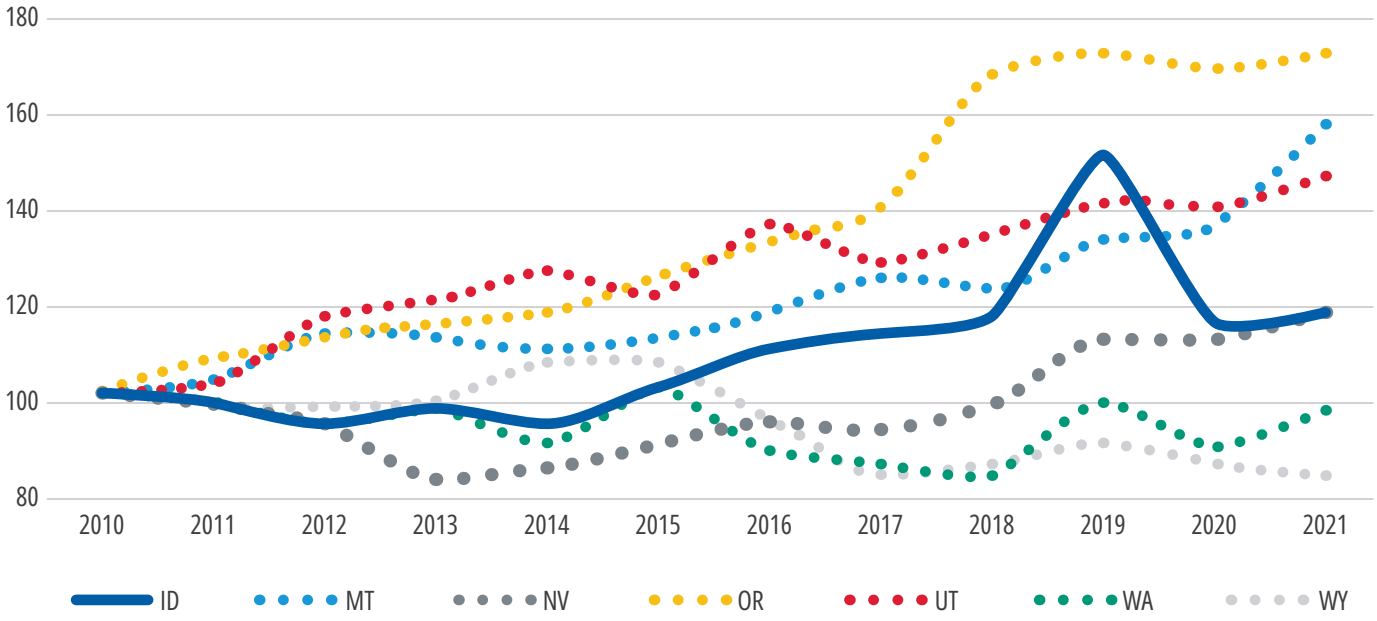
A key question for additional study will be the relationship between engineering and engineering technology fields in terms of employer demand and higher education degree production.

Historical Data

From 2010 to 2021, employment in engineering occupations in Idaho grew at a comparatively moderate pace, with BLS estimating 7,450 Idaho engineers in 2010 and that number rising to 8,710 by 2021. Among Idaho's surrounding states, Oregon saw the most dramatic growth in engineering employment during this time period, followed by Utah and Montana, while Nevada more closely matched Idaho's own growth trajectory.

However, there are some important differences in the overall number of engineers estimated to be working in each state. In the northwest, Washington employs significantly more engineers than any of Idaho's other neighbors, followed by Oregon and Utah.[36]

Figure 6. Engineering occupational employment growth overtime in Idaho and surrounding states

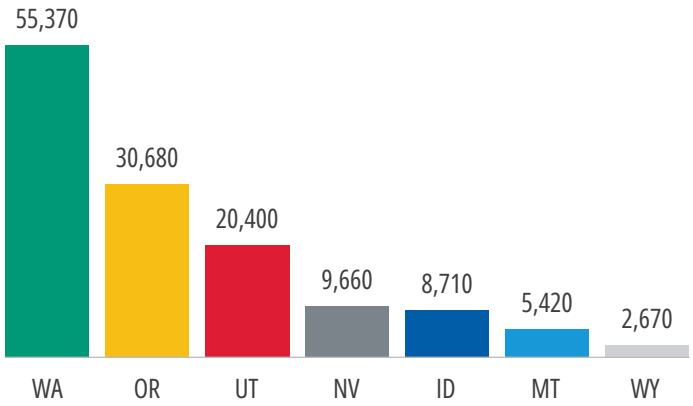


Note: *Data are indexed where 100 = Number of Jobs in 2010*

Source: Bureau of Labor Statistics, Occupational Employment Statistics (OES) Survey

The combination of ongoing regional growth and large engineering labor markets in neighboring states suggests that Idaho's engineering graduates likely have — and will continue to have — competing employment opportunities in surrounding states. This is further confirmed by a 2017 study on the inter-state movement of licensed professional engineers educated in Idaho, which showed that while a preponderance remain in the state, the most common alternative destination for engineering graduates was Washington.[37]

Figure 7. Engineering occupational employment in Idaho and surrounding states (2021)



Source: Bureau of Labor Statistics, Occupational Employment Statistics (OES) Survey

Projections

Looking forward, there is moderate growth projected for engineering as an occupational field nationally, with an increase of about 5% between 2021 and 2031. Meanwhile in Idaho, the state Department of Labor projects more dramatic growth, with the occupation growing 17% between 2020 and 2030. The Idaho Department of Labor projects that there will be 984 annual job openings in engineering due to turnover and growth each year between now and 2030.[38]

However, due to the timing of the state-level projections, the impacts of relevant policy developments such as the federal Infrastructure Investment and Jobs Act (IIJA) and CHIPS and Science Act are not yet reflected. One engineering industry group estimates that infrastructure projects funded by the IIJA alone will increase the need for engineers nationally by 82,000 and notes that these increases will affect every state given the distribution of funding.[39] Meanwhile, the CHIPS and Science Act has spurred growth in Idaho's semiconductor industry, most notably Micron's planned expansion, including the construction of a new manufacturing fab in Boise projected to create 2,000 jobs — including a subset in engineering technology fields.[40]

> ***"If we can't hire them here than we will grow in other areas. We will go where the graduates are. We have [multiple] other offices [across the country]."***
>
> – Idaho Engineering Employer

Therefore, it is likely that the 2020 projections underestimate the total number of new jobs in engineering that will be available in Idaho in the coming years.

Another crucial point is that the projected annual job openings only describe what employers are projected to need — they do not say anything about the availability of workforce to fill these openings.[41] Employer interviews revealed that workforce shortages in the short term have already contributed to suppressed workforce demand. One engineering firm described turning down projects and ultimately growth opportunities for their firm because of a lack of qualified engineers available to do the work. They also noted that this can then lead to overwork and burnout for existing employees — further exacerbating supply issues. Another Idaho employer, with offices across the country, shared that they would like to hire locally, but would hire outside the state if they couldn't find the candidates they needed.

While it is not possible to directly quantify these impacts, these comments suggest that an increase in the supply of engineers could potentially enable business growth and expand hiring demand beyond current projections, alternatively, a continued undersupply could have a dampening effect on demand.

> ***"If we were able to fill all our positions, we'd be able to get more revenue in and more clients and we'd then have demand for more engineers … we've been stifled by an inability to find people to do the work, we have more work than we have people to do."***
>
> – Idaho Engineering Employer

Engineering Technology

The linkage between engineering technology educational programs and occupations is not as direct as the link between many engineering degrees and occupations. For example, you'd likely hire someone with a bachelor's degree in civil engineering to fill a civil engineer role. However, our qualitative analysis suggested that employers in Idaho often approach technician roles with more flexibility, hiring from a variety of STEM-related degree fields and providing on-the-job training for needed skillsets. While the employer survey discussed below revealed robust demand for bachelor's degrees in engineering technology fields, as noted in the supply section, the state does not currently produce a large number of bachelor's in engineering technology fields.

Employer Survey

The employer survey conducted for this project provides further evidence that the 2020–2030 state projections may underestimate demand. While the employer survey sample was not representative of Idaho as a state, Table 25 illustrates respondents' self-reported number of Idaho-based engineering employees compared to state estimates of total employment within engineering occupations to provide some sense of the coverage offered by the survey.

Table 25. Employer survey respondent engineering employees in Idaho vs. total of state engineering employees

	STATE TOTAL 2020	STATE TOTAL 2023 (ESTIMATED)	SURVEYED COMPANIES (ESTIMATED)*
Engineering Occupations (17–2000)	10,321	10,892	6,478

**Survey response options were presented as ranges and these totals assume a midpoint value of the selected range.*

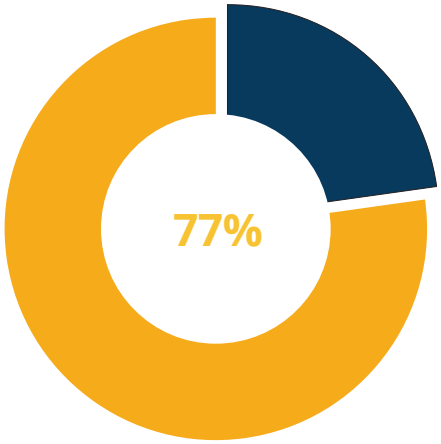
Among employers looking to hire workers in engineering roles, approximately two-thirds were looking for applicants with a bachelor's degree in an engineering or engineering technology field. However, it is important to note a subset of employers had a significant need for more advanced degree types, with nearly 20% of respondents looking for applicants with a masters' degree in engineering, and three percent seeking to hire candidates with doctoral degrees.

Respondents estimated that they are trying to hire nearly 2,000 employees with degrees in engineering and engineering technology fields within the next 12 months alone, almost double the DoL projected average annual openings. This number grows to 4,377 over the next five years, and up to 5,325 over the next 10 (even though some employers were not able to speculate beyond the five-year time horizon).

Nearly 80% of respondents indicated that they are struggling to fill jobs requiring engineering degrees.

Another key theme from the survey — as well as employer interviews — was the quality of Idaho graduates. The survey results demonstrated a strong employer preference for hiring from Idaho institutions, with 92% of responding companies agreeing that "'Hiring graduates from Idaho colleges and universities is important to us." and nearly 80% responding that Idaho universities are not producing enough graduates for their hiring needs.

Figure 8. Percent of survey respondents currently struggling to fill jobs that require a postsecondary engineering degree



Engineering Gap Analysis

The available quantifications of supply and demand indicate a gap between the number of engineering and engineering technology graduates from Idaho public institutions and the needs of Idaho's employers. The magnitude of the gap differs depending on the exact specifications used.

Considerations:

- **Type of Degree**: There is demand for a range of degree types — from associates to doctoral degrees — among Idaho's employers, although the majority of the demand appears to be at the bachelor's level. More detailed analyses exploring employers' demand for specific degree types could be a potential next step. Moreover, in engineering different specializations prepare graduates for different occupations with limited substitutability. The state may wish to focus on particular areas of importance to the state and its industries. For this initial analysis, all engineering degree types have been aggregated into a broad "engineering" category.
- **Institutional Sector**: The focus of this work is public institutions and their degree production, however, private institutions — in particular BYU-Idaho — also play a key role in producing graduates. Considering how to include the impact of private institutions (and what percentage of their graduates remain in Idaho) is another question for future study.

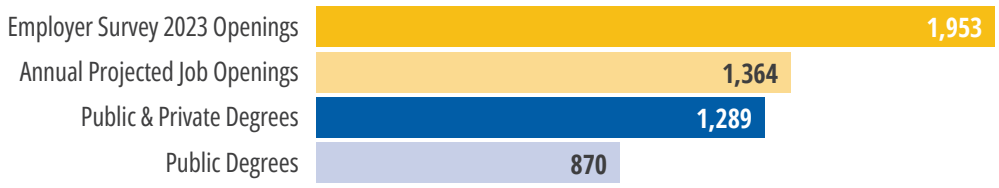
> ***"Idaho has had a fantastic record of producing graduates that can work shoulder to shoulder with engineering graduates from anywhere in the country — Purdue, Yale, Kansas State, Penn State, all the best engineering schools — we produce really, really good engineers which is unusual for a small, rural state"***
>
> – Idaho Engineering Employer

- **Migration**: Past research demonstrates that Idaho will lose some percentage of recent engineering graduates to jobs in other states. Therefore, not all of the graduate "supply" will end up in the state's labor market. Nonetheless, qualitative work did reveal that some engineers educated in Idaho opted to come back as mid-career professionals. Though these numbers cannot be quantified with available data sources, it is important to keep these in- and out-flows in mind when considering approaches to increasing supply. With previous research showing engineering graduates are among the most likely to leave the state, industry should focus on retaining a greater percentage of recent graduates in the state.
- **Time Horizon**: Projections by nature become less reliable the farther they stretch from baseline data. As a result, short-term projections have the greatest likelihood of accuracy. For this reason, numerical gaps are only presented for a 12-month period. The available data suggest that the gap between supply and demand will widen over time as Idaho (without intervention) produces only a very modest additional number of engineering graduates year- over-year and employer hiring demand rises to 4,377 job openings for candidates with a degree in engineering/engineering technology by 2028 (as indicated in the employer survey). Yet the demand-suppressing effects of workforce shortages that can lead employers to limit growth or relocate as described in interviews might ultimately drive down the overall amount of hiring demand. It's important to note that while the "gap" between supply and demand would lessen in this scenario, Idaho's economy would still be losing out on potential growth.

Summary

The available numbers (see the figure below) and the robust employer demand expressed in survey responses and interviews suggest that Idaho's labor market would benefit from a significant increase in the number of engineering and engineering technology graduates. However, supply modeling shows that the pipeline of students prepared to enter and succeed in Idaho's programs is not large enough to drive the increases Idaho employers are looking for. Taken together, these results suggest an investment in Idaho's student pipeline is needed.

Figure 9. Idaho degree production for engineering and engineering tech compared to projected job openings and employer survey job demand



Sources: Integrated Postsecondary Education Data System, Idaho Department of Labor Occupation Projections (2020–2030), WICHE Employer Survey

COMPUTER & INFORMATION SCIENCE

Computer & Information Science Supply

The National Center for Education Statistics (NCES) classifies computing degrees as "Computer and Information Science and Support Services: Instructional programs that focus on the computer and information sciences and prepare individuals for various occupations in information technology and computer operations fields."[42] Similar to engineering, historical trends in computer-related degree production at the bachelor's level in Idaho — also the typical entry-level credential for many in-demand computer-related professions[43] — show growth between 2010 and 2020. Supply modeling shows that if contributing trends persist, Idaho can expect only minimal increases in the number of computer-related graduates produced annually by its public institutions.

Research shows that a relatively high percentage of computer-related public institution graduates stay in Idaho, with over 70% of in-state bachelor's graduates employed in the state after graduation and over 50% of out-of-state graduates.[44] At the associates level, an impressive 78% of non-resident students end up in Idaho's workforce after graduation, a percentage point higher than the 77% of resident students who are found in the state's workforce.[45]

Cohort Analysis – Computer Science

This analysis follows a similar path as the previous one for engineering and engineering technologies. Using student-level data from the two cohorts (2013–14 and 2018–19 first-time postsecondary students) we present descriptive data about the number and characteristics of students who enter this major and go on to complete a degree in the field. For convenience, the full name of the field is shortened to "computer science" throughout this section.

We also conclude this section with a more advanced model that controls for student characteristics to examine relationships that may be useful in charting a path forward for this initiative.

Alternative Credentials & Skills-Based Hiring

Employers throughout the technology sector expressed a strong preference for skills over specific degree types. Many noted that they consider a candidate's portfolio of work ahead of their academic credentials.

While this might suggest employers are flocking to hire graduates of bootcamps or other short-term credential offerings, qualitative work suggested that this is not the case in Idaho.

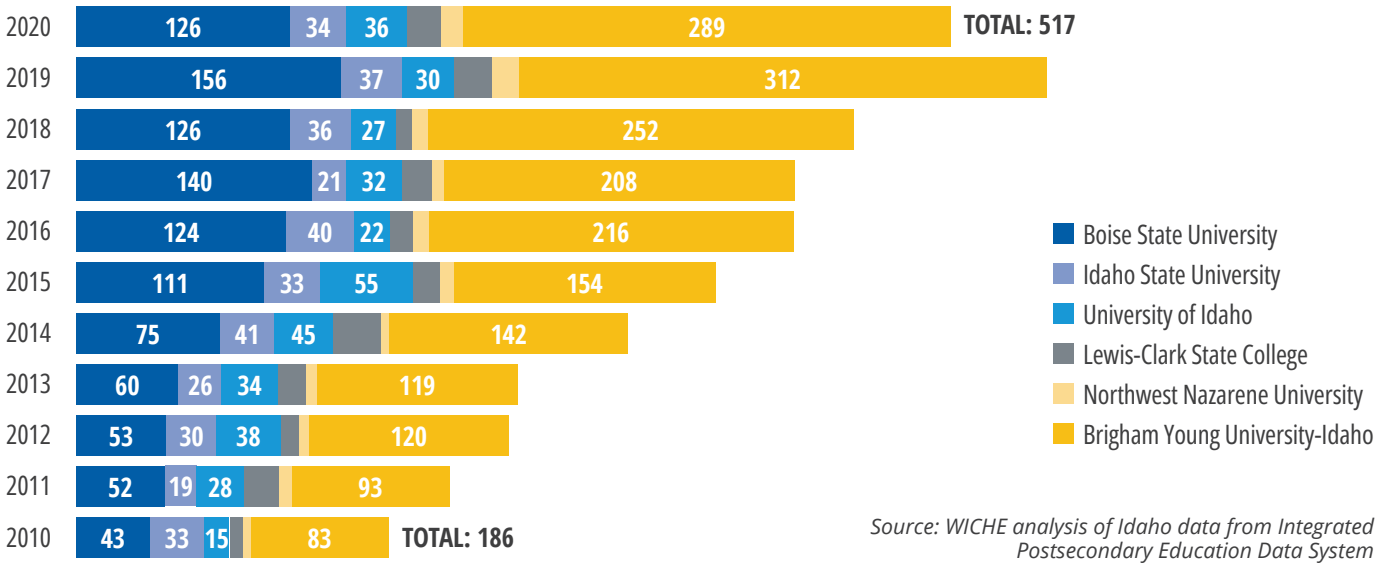
Overwhelmingly, survey respondents and interviewees in the tech sector noted that their most successful candidates came from either traditional academic pathways (such as a bachelor's degree in computer science) or from backgrounds with robust on the job training — such as cybersecurity experience gained in the military. Several employers shared that candidates from shorter-term training providers like bootcamps did not bring the desired skill level.

Therefore, despite the focus on skills-based hiring in the tech sector, degrees in computer and information science do seem to continue to offer a reasonable proxy of supply (so long as they continue to offer high-level skills training and relevant curricula).

Summary Statistics

As a first step in this analysis, we show the state trends in degree production for Computer Science. Similar to the analysis above, WICHE also examined the number of degrees produced over the past 10 years at Idaho institutions. Those results are presented in the below.

Figure 10. Annual degree completions in computer science



Source: WICHE analysis of Idaho data from Integrated Postsecondary Education Data System

At first glance, the numbers show impressive growth, nearly tripling from 2010 to 2019. However, much of that growth comes from private institutions (particularly BYU-Idaho). While that could be an important source of degree production, it is not clear what percentage of those graduates are located in Idaho and how many may be located in other states completing degrees via distance education.

There was substantial growth in the public sector from 2010 through 2015, but at that point, the growth for public institutions essentially levels off. While the private sector could be an important sector to consider, it is generally beyond the scope of this report.

Next, we begin to use the student-level data from Idaho public institutions to better understand the pipeline for computer science. The first step in this analysis shows the percentage of students who declare computer science as a major.

For the 2013–14 cohort, of all the students who ever reached the point of declaring a major, four percent declared Computer Science (CIP 11) at some point in their academic career. This grew to nearly five percent in the 2018–19 cohort, representing an increase of 40 total students (due in part to the shrinking overall size of the 2018–19 cohort compared to 2013–14.)

Table 26. Students declaring computer science as a major

COHORT	STUDENTS DECLARING ANY MAJOR	PERCENT EVER DECLARING COMPUTER SCIENCE
2013–14	18,929	4.0%
2018–19	16,839	4.8%

Next, the analysis examines the relationships between different student characteristics and declaring Computer Science as a major, with results reported in Table 27.

Table 27. Percentage of students declaring computer science as a major by gender

GENDER	2013–14	2018–19
Female	1.1%	1.6%
Male	7.4%	8.6%

Similar to Engineering, there is evidence of a large gender gap in the percentage of students who ever declare Computer Science as a major, perhaps pointing towards similar potential policy and practice interventions. These differences are statistically significant.

As noted earlier, there is a very modest, but statistically significant difference in performance on math standardized exams by gender. But similar to the analysis above, that difference is nowhere near large enough to account for the gender disparities in declaring for Computer Science. Table 28 shows the same data point — percentage of students declaring Computer Science as a major — limited to those students who achieved high levels on those exams.

Table 28. Percentage of high-scoring students declaring computer science as a major by gender

EXAM & SCORE	MALE STUDENTS DECLARING CIP 11	FEMALE STUDENTS DECLARING CIP 11
ISAT Composite Highest Level	15.4%	2.6%
SAT Math Above 600	15.2%	3.6%

This analysis shows a similar story as engineering, with students achieving high results on standardized math tests showing a greater likelihood of ever declaring Computer Science as a major. Females with high math scores still show a substantially lower likelihood of ever declaring this major compared to Males. These differences are statistically significant.

Turning to Race/Ethnicity, we examine the same information for the percentage of students of different backgrounds who ever declared Computer Science as a major.

Table 29. Percentage of students declaring computer science as a major by race/ethnicity

RACE/ETHNICITY	2013–14 COHORT % DECLARING CIP 11	2018–19 COHORT % DECLARING CIP 11
Black/African American	4.5%	3.6%
Asian	5.6%	10.7%
NHOPI	***	***
AI/AN	3.3%	6.7%
White	4.0%	4.6%
Multiracial	5.5%	4.2%
Hispanic	4.1%	4.0%
Unknown	5.2%	3.7%

****Redacted due to small cell sizes.*

The interesting points from this examination are the relatively homogenous distribution among the 2013–14 cohort, with substantial increases in the percentage of Asian and American Indian/ Alaska Native students declaring this major in 2018–19. The increases in students from these racial backgrounds accounts for the majority of the growth in total numbers between the two cohorts. The differences among groups in the 2013–14 cohort are not statistically significant, but that changes for the 2018–19 cohort.

Following the same approach as with engineering, we now examine any differences by a student's location while in high school to assess whether there are important differences to consider for Idaho's rural communities.

Table 30. Percentage of students declaring computer science as a major by high school location

COHORT	CITY	SUBURB	TOWN	RURAL
2013–14	4.5%	4.0%	3.6%	4.4%
2018–19	6.4%	5.3%	4.8%	5.3%

Again, there are noteworthy differences between the 2013–14 and 2018–19 cohorts. The distribution from the earlier cohort is not statistically significant, but it is for the latter group of students. The primary difference is the sharp increase in the percentage of students from high schools located in cities who declare this major.

With that as an overview of the relationships between students' characteristics and likelihood of declaring computer science as a major, we now turn to likelihood of completing a degree in the field. As noted earlier, overall about 29% of those students who declare any major end up completing a degree. Table 31 shows how many students who ever declared computer science as a major ended up graduating. Then of those graduates, it shows the percentage who graduated in computer science.

Although the total numbers differ, generally speaking it appears that those who at one point declare Computer Science as a major and graduate in something else tend towards Business and Liberal Arts degrees, similar to those majoring in engineering.

Table 31. Percentage of computer science majors that graduate and that do so in the field

COHORT	GRADUATED IN ANY MAJOR	GRADUATED IN COMPUTER SCIENCE
2013–14	33.4%	68.9%
2018–19	23.0%	67.3%

Turning to the question of whether different student characteristics are associated with persistence in computer science, for the 2013–14 cohort, there is a marginally statistically significant difference, with about 58% of females who ever declare it as a major completing in the field, compared to about 71% for males. For the 2018–19 cohort, there is no statistically significant difference, with about 63% of females who declare computer science as a major completing within the field, compared to 69% for males.

Looking at the relationship between math scores and persistence to completion within the major, there is not a strong relationship, mainly due to the small sample size. Similarly, the results for the relationship between location of a student's high school and persistence within the field is mixed and not statistically significant.

Probability Model

WICHE analyzed a probability model that looks at the association between graduating with a degree in computer science and various student characteristics, including gender, race/ethnicity, and location. We also, similar to the engineering analysis, use one model with math results and one without due to the limited data available. This approach allows us to control for these characteristics to try to isolate the important relationships with the hope of guiding policy and practice as Idaho considers a broader initiative.[46]

The results are similar to those for engineering. Being female, when controlling for location, race/ethnicity, and math scores, is associated with a ten-fold decrease in the likelihood of completing a computer science degree. Math results (ISAT composite achievement ranking) are less linear, but individuals scoring below a "four" associated with substantially lower odds of completing a degree in this field as well. Asian students are associated with substantially greater odds of completing a Computer Science degree (more than 10 times) than white students while controlling for the other factors. The relationships with other races/ethnicities is not statistically significant.

In the second model, when we drop the controls for math results (which again warrants substantial caution in interpreting the results), the statistically significant relationships do not change.

Student Flow Model

As in engineering, the final component of the supply analysis for computer and information science is projecting the number of degrees the state can expect to produce in the coming years.

Current Trends Continues

If current trends in high school graduation rates, college-going rates (both of directly out of high school for in-state and out-of-state students as well as first-time college participation of 20–44-year-olds), progression year-over-year in postsecondary, and credential completion continue through 2029–2030 the state can expect their degree production in the field of interest to hold nearly flat with an increase of less than 1% in computer and information science.

Table 32. Current and projected additional undergraduate computer & information science awards

	CURRENT UNDERGRADUATE AWARDS (2019–21 IPEDS AVG.)	PROJECTED ADDITIONAL AWARDS (2021–22 THROUGH 2029–2030)
	COMPUTER SCIENCE	COMPUTER SCIENCE
Certificates	146	4
Associates	234	7
Bachelor's	518	11

The data allows for this projection to be broken down by institutional sector as well — with the "Public Research" category encompassing Boise State University, Idaho State University, and the University of Idaho.

Table 33. Current and projected additional undergraduate computer & information science awards by institutional sector

	CURRENT UNDERGRADUATE AWARDS BY PROGRAM (2019–21 IPEDS AVG.)	PROJECTED ADDITIONAL AWARDS BY PROGRAM (2021–2022 THROUGH 2029–2030)
	COMPUTER & INFORMATION SCIENCE	COMPUTER & INFORMATION SCIENCE
Public Research	224	6
Public Masters and Bachelors	35	2
Public Two-Year & Less Than Two-Year	281	9
Private	360	5

Increasing the High School Graduation Rate

Beginning with the model's first lever, high school graduation rates, we can explore the impact of an increase to the state's overall high school graduation rate on credential production in computer and information science. If Idaho were to increase their overall high school graduation rate to that of an average of the highest state high school graduation rates in the country, the model projects only a handful of gains,. The model projects only 18 additional bachelor's degrees by 2029–2030 with an improved high school graduation rate, or said differently, less than one more degree per year than current trends produce.

Table 34. Projected additional undergraduate computer and information science awards with an increase in high school graduation rate

	PROJECTED ADDITIONAL AWARDS BY PROGRAM – CURRENT TRENDS (2021–22 THROUGH 2029–2030)	PROJECTED ADDITIONAL AWARDS BY PROGRAM – WITH HS GRAD RATE AT AVERAGE OF BEST-PERFORMING STATES (2021–22 THROUGH 2029–2030)
	COMPUTER & INFORMATION SCIENCE	COMPUTER & INFORMATION SCIENCE
Certificates	4	6
Associates	7	11
Bachelor's	11	18

Increasing the College-Going Rate

As with all of higher education in Idaho, college-going rates are projected to have an impact on computer and information science degree production. If Idaho were to achieve the national average go-on rate of 47% for in-state students directly out of high school, the model suggests that could lead to 29 additional bachelor's degrees in computer and information science over the course of the projections. If the state were to approach a more aspirational goal — such as the nearly 58% seen in state's with the highest go-on rates — that original number more than quadruples, with 45 additional degrees projected.

Table 35. Projected additional undergraduate computer and information science awards with increases in the college-going rate of direct out of high school (DHOS) students in Idaho

	PROJECTED ADDITIONAL AWARDS – CURRENT TRENDS (2021–22 THROUGH 2029–2030)	PROJECTED ADDITIONAL AWARDS – DOHS COLLEGE-GOING RATE AT NATL. AVG. (2021–22 THROUGH 2029–2030)	PROJECTED ADDITIONAL AWARDS – DOHS COLLEGE-GOING RATE AT BEST-PERFORMING AVG. (2021–22 THROUGH 2029–2030)
	COMPUTER & INFORMATION SCIENCE	COMPUTER & INFORMATION SCIENCE	COMPUTER & INFORMATION SCIENCE
Certificates	4	10	15
Associate	7	18	27
Bachelor's	11	29	45

Increasing Out-of-State Students

Looking at the impacts of increasing the number of out-of-state students enrolling directly out of high school, we can see that this is projected to double the number of additional bachelor's degrees, but has less of an impact on associates degrees and certificates (similar to the findings in engineering and engineering technology).

Table 36. Projected additional computer & information science undergraduate awards with increased out-of-state directly out of high school (DOHS) college-going numbers

	PROJECTED ADDITIONAL AWARDS – CURRENT TRENDS (2021–22 THROUGH 2029–2030)	PROJECTED ADDITIONAL AWARDS – OUT-OF-STATE DOHS COLLEGE-GOING INCREASED 10% (2021–22 THROUGH 2029–2030)	PROJECTED ADDITIONAL AWARDS – OUT-OF-STATE DOHS COLLEGE-GOING INCREASED 20% (2021–22 THROUGH 2029–2030)
	COMPUTER & INFORMATION SCIENCE	COMPUTER & INFORMATION SCIENCE	COMPUTER & INFORMATION SCIENCE
Certificates	4	4	4
Associate	7	8	9
Bachelor's	11	18	25

Increasing College Participation of 20–44-year-olds

Increasing the rate of first-time college participation of the state's 20–44-year-old population to national and high-performing state averages has a particularly strong impact on the projected production of computer and information science bachelor's degrees, which rise to 52 additional degrees produced over the projection period.

Table 37. Projected additional undergraduate computer & information science awards with an increase in first-time (FT) college participation rates of 20–44-year-olds.

	PROJECTED ADDITIONAL AWARDS – CURRENT TRENDS (2021–22 THROUGH 2029–2030)	PROJECTED ADDITIONAL AWARDS – FT PARTICIPATION RATE AT NATIONAL AVG. (2021–22 THROUGH 2029–2030)	PROJECTED ADDITIONAL AWARDS – FT PARTICIPATION RATE AT BEST-PERFORMING AVG. (2021–22 THROUGH 2029–2030)
	COMPUTER & INFORMATION SCIENCE	COMPUTER & INFORMATION SCIENCE	COMPUTER & INFORMATION SCIENCE
Certificates	4	9	20
Associate	7	15	34
Bachelor's	11	23	52

Improving Postsecondary Progression Rates

As with engineering, improving progression year-over-year in postsecondary does increase the number of additional degrees produced more significantly than increasing the high school graduation rate, but less so than increasing college participation.

Table 38. Projected additional undergraduate computer & information science awards with a 10% increase in retention rates

	PROJECTED ADDITIONAL AWARDS – CURRENT TRENDS (2021–22 THROUGH 2029–2030)	PROJECTED ADDITIONAL AWARDS – 10-PERCENTAGE-POINT INCREASE IN RETENTION RATES (2021–22 THROUGH 2029–2030)
	COMPUTER & INFORMATION SCIENCE	COMPUTER & INFORMATION SCIENCE
Certificates	4	21
Associates	7	32
Bachelor's	11	30

Student Flow Model Conclusions

Similar to engineering, the model levers possible with the available data show us that impacting college participation will be a key factor in increasing degree production at the bachelor's level in computer and information science, while important questions such as breakdowns by gender and major choice remain unanswered.

Computer & Information Science Demand

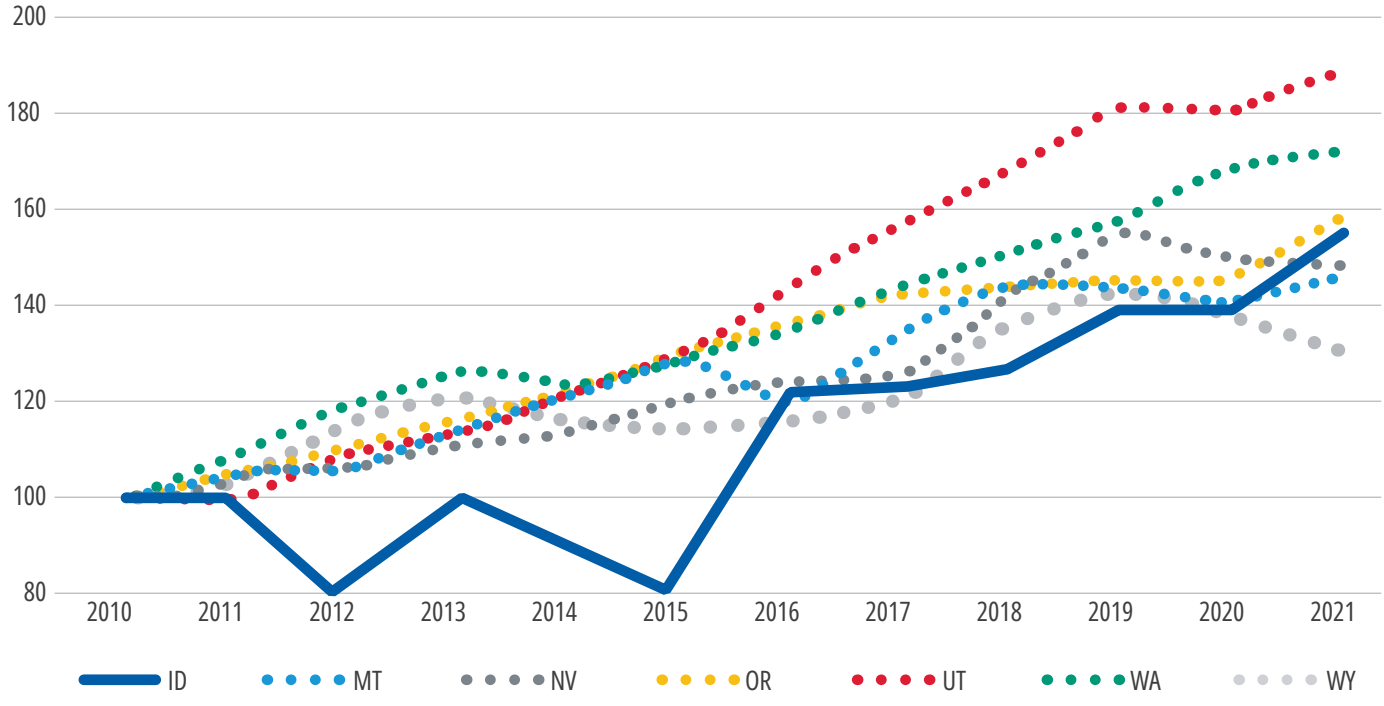
Key Findings

Historical trends that show growth in computing employment over the last decade, projections that predict continued occupational growth, and recent qualitative data that suggest hiring demand is already exceeding these growth projections demonstrate a robust labor market for graduates with degrees in computer-related fields.

Historical Data

From 2010 to 2021, employment in computing occupations in Idaho grew substantially, with BLS estimating 12,050 Idahoans were employed in computer occupations in 2010 and 18,750 by 2021. This growth trend was present across the Northwest, with Utah leading the way in terms of growth trajectory.

Figure 11. Computer Science employment growth in Idaho and surrounding states



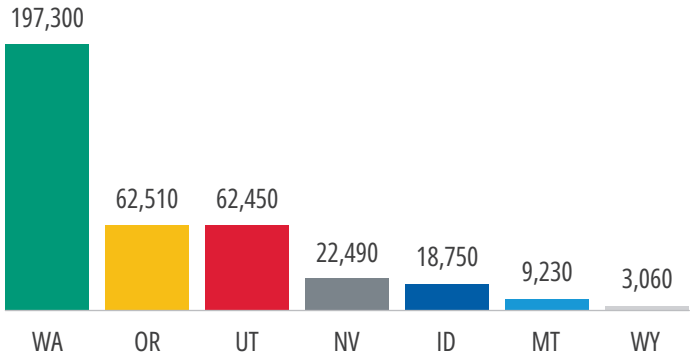
Note: *Data are indexed where 100 = Number of Jobs in 2010*

Source: Bureau of Labor Statistics, Occupational Employment Statistics (OES) Survey

As with engineering, the total number of employees in computing occupations varies widely in the region, with Washington employing the greatest number by a large margin. Overall, employment in computer occupations is substantially higher than in engineering occupations over the same time frame, with computer occupations employing roughly double the number of estimated workers in engineering.

The combination of ongoing regional growth and large labor markets in neighboring states suggests that Idaho's graduates in computer-related fields will likely have competing employment opportunities in surrounding states.

Figure 12. Computer occupational employment in Idaho and surrounding states (2021)



Source: Bureau of Labor Statistics, Occupational Employment Statistics (OES) Survey

Importantly, computer occupations are among the occupational types that have undergone some of the greatest changes over the past few decades. New job types have emerged that didn't exist a decade ago, while others have become obsolete. This is one argument for continuing to look at computer occupations in a broad sense, as a targeted focus on more detailed occupation types might end up being difficult to track over time as occupational classifications shift.

Nonetheless, the field does incorporate a variety of occupational types with quite a range in key attributes such as skillsets required, educational qualifications needed, and median salaries. There may be specific areas of focus for the state, such as software development or cybersecurity, as well as potentially emerging areas related to the development and use of technologies loosely known as artificial intelligence (AI), that warrant special attention.

Projections

Computer-related occupations are projected to grow considerably in both Idaho and across the United States in the coming years, increasing by more than 12% between 2020 and 2030 in Idaho and by nearly 15% between 2021 and 2031 nationally (this is compared to a 5% growth rate for all occupations). According to the ID DoL's 2020–2030 projections, the state can expect to see 1,387 annual openings due to turnover and growth in computer-related occupations each year till 2030.[47]

Remote Work

Another factor that increases the difficulty in accurately projecting the number of available jobs in coming years is the rise in remote work — which is especially common in computer-related occupations. As businesses have the option of hiring from anywhere, employer interviews revealed a few key points:

- Some Idaho-based technology companies will hire locally, if talent is available but they will hire remote workers if not.
- An increasingly remote tech workforce offers opportunities for Idaho's graduates to work for companies either within or outside of the state — while still contributing to the state's tax base.

It is also important to understand that shifts in industry mix are not reflected in the projections' methodology. For example, as advances in computing led to the automation of clerical work the number of clerical jobs declined, but the number of jobs in information technology grew — meaning that jobs shifted from one industry to another over time.[48] Future shifts towards automation could certainly

change the projected growth trajectory of computer occupations. Though past trends suggest that these shifts in industry mix might lead to more jobs in computer-related occupations, rapidly evolving technologies such as artificial intelligence add a layer of uncertainty.

The projections also do not reflect national trends in 2022 and early 2023 which have featured some large-scale layoffs at major technology companies. However, early evidence suggests that, in many cases, those laid off were able to find alternative employment within their occupational field. This highlights the distinction between occupations and industries. It is possible that industries — such as the tech sector — may expand and contract without a corresponding impact on occupations, as other industries like healthcare, retail, and finance continue to expand their hiring demand for computer-related occupations such as software engineers and developers.[49]

Employer interviews also suggested an extremely strong demand for mid-career computer science professionals — particularly among Idaho's burgeoning start-up sector. Some interviewees felt that the layoffs from large multi-national corporations might even offer opportunities to hire for traditionally difficult-to-fill roles. Further, multiple smaller, earlier stage tech startups noted that while they typically hire later career talent in their initial phases, they plan to hire more entry-level (just out of school) talent as they expand and have more capacity to train less experienced staff. Therefore, expanded availability of mid-career tech talent could possibly support growth and have a positive impact on future demand in certain scenarios.

Alternatively, rising interest rates which increase the cost of borrowing — a posited contributor to the tech sector layoffs — will likely also negatively impact the growth and hiring demand of Idaho's technology-focused businesses. For example, one technology company noted a recent hiring freeze.

Large-scale, macro-economic trends such as a cooling economy or possible recession would also negatively impact the demand for workers in this occupational field, and this possibility cannot be ignored. However, while not predictive, existing research on Utah's engineering and computer science growth initiative from 2000–2020 shows that the 2008 recession resulted in a short-term flattening of available jobs in the two fields, which then rebounded in subsequent years.[50]

Employer Survey

The employer survey was focused on employers in the engineering and technology sectors, meaning those for whom a large percentage of their workforce is made up of employees with credentials in engineering and computer and information science fields. However, as discussed in preceding sections of the report, computer occupations span a wide variety of industries with employers in all sectors increasingly needing talent with computer-related skills. It is likely the lower share (relative to engineering) of computing employees reached by the survey in comparison to state totals reflects the difficulty in reaching the many different types of employers who employ those in computer occupations. Nonetheless, the survey was able to capture valuable feedback from a robust number of employers with computer-related hiring demand.

Table 39. Survey respondent computer-related employees vs. overall number of Idaho computer-related employees

	STATE TOTAL 2020	STATE TOTAL 2023 (ESTIMATED)	SURVEYED COMPANIES (ESTIMATED)*
Computer Occupations (15–1200)	15,821	19,588	3,856

**Survey response options were presented as ranges and these totals assume a midpoint value of the selected range.*

Among employers looking to hire candidates with degrees in computer-related fields, nine percent were looking for associates degrees, 72% bachelor's degrees, nine percent for masters degrees, and seven percent for doctoral degrees. Similar to engineering, this suggests that a focus on bachelor's degrees would most align with employers' overall needs — though some companies do have specialized needs for candidates with advanced degrees as well as at the associates level.

Computer & Information Science Gap Analysis

The available quantifications of supply and demand indicate a gap between the number of computer-related graduates from Idaho public institutions and the needs of Idaho's employers. The magnitude of the gap differs depending on the exact specifications used and will remain sensitive to the evolving nature of the field.

Considerations

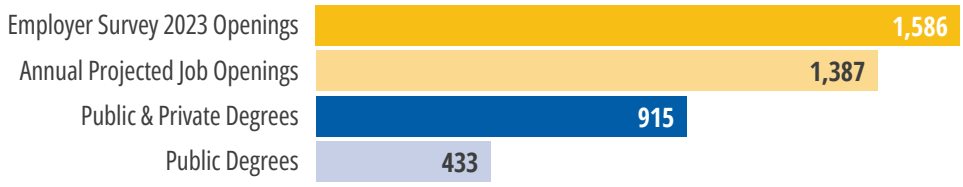
- **Relationship Between Degrees & Skills-based Hiring**: Because of employers' strong preference for demonstrable skills over specific degree types, a key factor in maintaining demand for Idaho's computer and information science graduates will be ensuring that programs offer strong preparation in foundational skills and industry-relevant curricula.
- **Institutional Sector**: The focus of this work is public institutions and their degree production, however, private institutions — in particular BYU-Idaho — also play a key role in producing graduates. Considering how to include the impact of private institutions is another question for future study.
- **Migration**: The evolving nature of remote work, especially given recent trends of large-scale layoffs from major technology companies, has an uncertain directional impact on Idaho's demand for tech workers. Yet Idaho's strong history of retaining both in- and out-of-state graduates of computer and information science programs in their workforce suggests increasing the local supply of tech talent could have advantages for both Idaho's employers and the state's tax base.

- **Time Horizon**: Projections by nature become less reliable the farther they stretch from baseline data. As a result, short-term projections have the greatest likelihood of accuracy. For this reason, numerical gaps are only presented for a 12-month period. The available data suggest that the gap between supply and demand will widen over time as Idaho (without intervention) produces only a very modest additional number of computer and information science graduates year-over-year and employer hiring demand rises to 2,216 job openings for candidates with degrees in computer and information science by 2028 (as indicated in the employer survey). Yet the demand-suppressing effects of workforce shortages that can lead employers to limit growth or relocate as described in interviews might ultimately drive down the overall amount of hiring demand. It's important to note that while the "gap" between supply and demand would lessen in this scenario, Idaho's economy would still be losing out on potential growth.

Summary

The available numbers (see Figure 13) and the robust employer demand expressed in survey responses and interviews suggest that Idaho's labor market would benefit from a significant increase in the number of computer and information science graduates. However, supply modeling shows that the pipeline of students prepared to enter and succeed in Idaho's programs is not large enough to drive the increases Idaho employers are looking for. Taken together, these results suggest an investment in Idaho's student pipeline is needed.

Figure 13. Idaho degree production for computer and information science compared to projected job openings and employer demand



Sources: Integrated Postsecondary Education Data System, Idaho Department of Labor Occupation Projections (2020–2030), WICHE Employer Survey

NEXT STEPS

Although this document is not intended to be a traditional strategic plan, it can be thought of as a framework for how the state might move forward on an initiative to increase production and retention of engineering, engineering technologies, and computer science. Although there is not a single clear data point or analysis that fully proves the state is facing shortfalls in these fields, WICHE's conclusion, based on a range of available evidence, is that there is a strong need to increase the number of skilled, educated, and trained workers in these fields. Failure to meet this demand may not show up as an immediate crisis, but instead would be evident in missed opportunities for economic growth and increases in the number of sustainable, well-paying jobs. :

The other central conclusion, hopefully made abundantly clear from the data analysis presented throughout this report, is that Idaho faces a completely different context and demographic situation compared to Utah in 2000. Capacity constraints in postsecondary education are not currently the limiting factor in the production of graduates in these fields. This is not to say that those programs may or may not need investment to stay current and ensure high-quality programs (a question that is beyond the scope of this report). Instead, the substantial focus of any initiative must be on changing the underlying factors of the pipeline first. As more students select into these fields, capacity may become a bigger issue, but currently, that is not as big a problem as declining college go-on rates and the relatively low number of students that are prepared to enter and succeed in these fields.

The rest of this section identifies potential next steps to develop a growth initiative that is driven by data and evidence and led by industry experts.

Creating a Shared Vision & Coordinated Plan

The available evidence is compelling that Idaho would benefit from a growing pipeline of well-trained engineers, engineering technicians, and computer and information science professionals. Idaho's public institutions have a strong record of producing successful graduates in these occupations, yet the overall number of graduates has not kept pace with industry demand in Idaho's growing economy.

Generating additional graduates in these high-demand fields is a complex, long-term endeavor. The downward demographic trends driving the overall number of high school graduates Idaho is expected to produce paired with the state's declining college go-on rates mean the state is facing significant headwinds as it seeks to increase supply. While Utah's successful growth initiative took place in a high-growth context (both demographically and economically), Idaho will face a more challenging environment for a similar effort. Moreover, addressing the multifaceted challenges of demographic and large-scale educational trends such as the college go-on rate will require the development of equally multifaceted responses.

Single sector or piecemeal efforts will be inadequate to address this challenge, so the state must develop a shared vision for growth in these fields, ensuring that all that relevant partners from industry, policy, and education are at the table. As the ultimate beneficiary and subject matter expert, industry is well-positioned to take the lead in guiding this work.

Three key questions to answer in establishing this vision will be:

- What entity will lead this effort?
- What is the overarching goal?
- What is the scope of the effort?
  - What fields will it encompass?
  - What degree and/or credential types will be included?
  - Will the focus be on public institutions or all institutions in the state?
  - How will it address issues outside of the education pipeline, such as retention of graduates in Idaho?

Once a shared vision for the state's engineering and computer and information science workforce pipeline is established, the focus must be on actionable steps to take the vision from theory to reality. ¬The initiative partners must identify the combination of short- and long-term strategies they will pursue as part of a coordinated plan to achieve their goal, and the metrics they will track along the way to determine successes and necessary course corrections.

Key questions to answer as a coordinated action plan is crafted will be:

- What long-term actions must be taken to achieve the vision?
- What short-term actions must be taken to achieve the vision?
- What metrics will need to be tracked to determine success? (more discussion presented below)
  - Do these data currently exist and if so, are they being collected?
- Who will be responsible for monitoring progress and making decisions along the way?

This approach should also situate the effort in Idaho's broader economic context, considering the overall realities of the state's labor market and pressing shortages in other STEM fields such as healthcare.

Identifying Clear Roles & Responsibilities

As partners in this work, industry, policymakers, universities, community colleges, and the K–12 sector should identify how they will individually and collaboratively contribute to achieving the shared vision through the identified short- and long-term strategies.

A critical element will be the statewide framing and approach. Each group of partners must come to the effort prepared to contribute to the development and execution of the statewide vision, exploring how they are best positioned to leverage their unique resources to contribute to the overall goal. Rather than individual plans and targets, each partner should have clear responsibilities mapped out that will collectively lead to the achievement of the statewide goal(s).

For example — given the results of the supply analysis — postsecondary institutions (both two- and four-year institutions) may wish to initially focus on building their pipeline of potential students. In many cases this may include building on and investing in ongoing efforts in these areas.

- Partnering with K–12 to improve the math preparedness of high school graduates and generating more interest in these fields.
- Collaborating across the two- and four-year sectors to improve transfer pathways, and
- Engaging non-traditional students such as those who have never attended postsecondary, those who attended and stopped out (especially with substantial credits in fields of interest), or those looking to shift careers or upskill within the field.

Another important element will be identifying the current and needed capacity of existing higher education programs in the fields of interest. Specifically, the state will want to review available data and collect needed data to identify the gaps between current capacity and the capacity needed to achieve the goal(s) set by the visioning process. A sample capacity assessment rubric is included in Table 40.

Table 40. Sample capacity assessment rubric

ELEMENT	CONSIDERATIONS	IDEAL CAPACITY	CURRENT CAPACITY	INVESTMENT
Faculty	• What type of faculty are needed? • What resources (labs, etc.) will they need to be successful? • Are there opportunities to share high-cost faculty positions across institutions?	• What are ideal student-faculty ratios for offering high-quality programs in the fields of interest? • How many faculty, by type, would be needed to offer the number of credit hours required by the target number of students?	• How many faculty are currently employed in the fields of interest and how many credit hours can they teach?	• What level of investment would be needed to go from current to ideal capacity? • Which investments would produce maximum impact in a constrained funding environment?
Students	• What types of additional student supports (ex. advising, tutoring, etc.) are needed to support successful entry into and progression through these programs? • What resources can be shared at the state level ?	• What evidence-based supports would a student in the fields of interest ideally have access to?	• How many of these support services are currently offered? • Where are there gaps in terms of availability and capacity of current services?	• What level of investment would be needed to go from current to ideal capacity? • Which investments would produce maximum impact in a constrained funding environment?
Space & Equipment	• What facilities (classroom space, labs, etc.) are needed to offer these programs at a high level of quality? • How can institutions work together to jointly leverage assets?	• What space and facilities would these programs have in an ideal scenario?	• What space and equipment resources does the institution currently have?	• What level of investment would be needed to go from current to ideal capacity? • Which investments would produce maximum impact in a constrained funding environment?

Meanwhile, industry partners might commit to employee upskilling initiatives, provide equipment and internship or project opportunities that meaningfully address challenges identified by educational partners, and provide timely and actionable feedback to educational partners.

Given the demographic trends of Idaho's youth population, an important area of focus for all partners should be identifying how to identify, attract, and support non-traditional-aged students through to degree completion. There are numerous potential audiences for this approach, including employees at existing firms that have interest in advancing their careers through additional education, students who have stopped out of these programs with a substantial number of credits, and other working Idaho residents who are in related fields. This outreach should be paired with effective policies and practices, including employee tuition assistance, strong prior learning assessment, and other approaches that serve adult students.

Investing for Impact

In order to make the most of any investment, the partners must identify and prioritize the greatest barriers and most effective solutions to increasing workforce supply. Engineering and computer-related fields encompass a broad range of credentials and specialties that lead to a variety of occupations. The collective effort may consider if a broad or a targeted approach will be most effective for meeting their goals with available funds. As part of this analysis, they should also focus on leveraging Idaho's unique assets in both industry and education for maximum value. Finally, it will be critical to balance immediate employer needs with sustainable growth plans that have the flexibility to account for changing dynamics such as recessions and shifts in automation.

While this report does not attempt to place a dollar figure on a level of state investment that is appropriate (due in part to the need to effectively set the stage for exactly how such an initiative will produce growth), it is likely that this will lead, if successful, to needs for additional state resources.

But it is also clear that such an initiative will require investment and contributions from industry. Contributing time and thought to leading such an initiative is only the first step. Additionally, it may require industry investment to aggressively support additional employee education and training opportunities and to help address the large percentage of engineering graduates that appear to be leaving the state.

It is important to recognize that this work will not take place in a vacuum, with substantial state-wide attention and effort focused on improving college go-on rates, addressing worker shortages in healthcare, education, and other fields, and major recent policy changes such as the new funding available for the Idaho Launch program. Ensuring that the vision and plan for this initiative functions within this broader context can help make investments of all parties more effective and efficient rather than redundant or duplicative.

Data, Metrics, and Research

Most reports that lay out how an initiative like this could be successful include a section on improving data and metrics and carrying out additional research. While this is a common approach, that does not make it any less important. A thorough and detailed data analysis shifted WICHE's initial expectations for charting out how this initiative might best proceed. Initially, our thought was that the Utah work seemed very effective and essentially following that model would serve Idaho well. As has been clearly laid out, though, the different state contexts suggest that Idaho must follow a different approach to reach the same goal.

As part of this framework, WICHE recommends that industry leaders and other key agencies and organizations coalesce around meaningful metrics for understanding how the initiative that is envisioned is impacting outcomes. Essentially, the initiative should develop a set of key metrics that it hopes to shift through policy and practice. These will likely include readily available administrative data, such as enrollments and completions in these programs, but also more complex analyses including retention in state of recent graduates, medium-term migration and employment patterns of recent graduates, student interest in these fields, and more. It would be easy to focus solely on the number of graduates in each field that are produced annually, and we agree that is an important metric. But if, for example, the number of students enrolled in public postsecondary institutions in the state declines substantially, but the number of graduates in these fields holds steady, that would be a sign of some success. This report contains numerous different data points and ways of considering supply and demand issues. Certainly not all of the data points will resonate, but they could represent a starting point for consideration. As an initiative unfolds, it is highly doubtful that every approach and policy change will bear fruit, but with a successful monitoring and evaluation approach, it will be possible to continuously refine efforts to improve outcomes.

Additionally, it is highly likely that the initiative will benefit from a strong research and evaluation plan. As new policies, programs, or approaches are tried, it is essential that some form of evaluation takes place to assess their effectiveness and potentially lead to improvement. It is also likely that the work would benefit from research on certain topics. As one example, better understanding the clear gender gaps is essential. It may be that as professions, engineering and computer science never end up with equal numbers of males and females, but the data clearly show that there are a large number of females who would likely succeed, but are choosing different paths.

Additionally, it should be clear from this report that qualitative data from surveys and interviews are essential to gaining a full perspective of not just what is happening, but why.

Ultimately, this will be a difficult and complex undertaking, but there is strong evidence that it is highly needed for Idaho. Effective use of data and research will help ensure success, efficient use of investment, and better overall outcomes for Idaho and its students.

The state is blessed with a strong data system and an insightful research team at the State Board of Education. Certainly, there are always competing priorities and limits on staff capacity, but the state has plenty of existing infrastructure to provide an effective data infrastructure to support this work.

ACKNOWLEDGEMENTS

Industry Advisory Team

This initiative was guided by a core advisory team of industry representatives. These leaders in Idaho's engineering and technology sectors generously dedicated their time and expertise to inform the project, offering extensive feedback on the scope and design and making critical connections with their colleagues across Idaho in support of employer engagement efforts. The team met six times between November 2022 and April 2023, in addition to providing feedback on survey design, interview and survey outreach, and the preliminary findings.

Industry Advisory Team Members

- Elli Brown, Director, State and Local Government Affairs, Idaho National Laboratory
- Tim Haener, Chairman and Corporate Risk Manager, J-U-B Engineers & Industry Advisory Board Member, University of Idaho College of Engineering
- Jim Gasaway, Industry Advisory Board Chair, Boise State University Department of Computer Science
- Jay Larsen, President, Idaho Technology Council
- Tom Loutzenheiser, Industry Advisor Board Chair, Boise State University College of Engineering
- Dee Mooney, Executive Director, Micron Foundation
- Alan Prouty, Vice President, Environmental & Regulatory Affairs, J.R. Simplot & Industry Advisory Board Chair, Idaho State University College of Science & Engineering
- Ryne Stoker, Chief Executive Officer, President, and Principal Engineer, GeoTek and Industry Advisory Board Chair, University of Idaho College of Engineering

Report Contributors

This report would not have been possible without vital contributions from a variety of individuals, including: the Idaho Office of the State Board of Education (OSBE) staff — in particular the leadership and coordination of Scott Greco and the partnership and data expertise of Cathleen McHugh and Andy Mehl; the data modeling of the National Center for Higher Education Management Systems led by Johnna Clark and Louisa Hunkerstorm; and the graphic design talent of Cathy Calder of Blonde Ambition Inc. and the editing support of Annie Sugar.

Additional insights from the Idaho Department of Labor — particularly Craig Shaul and Samuel Wolkenhauer — as well as from Hope Morrow, Idaho National Laboratory's Manager of Workforce and Economic Programs, were invaluable. Finally, the employer survey would not have been possible without the expertise of Hope Swann at the Idaho Technology Council. While all of these individuals were incredibly helpful and patient with their time and expertise, any errors, omissions, or misinterpretations are not their fault, but WICHE's.

Employers

Employers across Idaho made time in their busy schedules to offer their feedback on the issues raised in this report. We deeply appreciate the time they took to reflect on the importance of an engineering and computer and information science trained workforce to their companies' success. Their perspectives constitute a critical piece of this analysis and their ongoing engagement will be key to continued progress.

TECHNICAL APPENDIX

Student Data Analyzed

Public Education Pipeline Model

This the rationale and overall scope of the data WICHE requested for the analysis in the foregoing report. WICHE proposed to develop and provide a projection model for degree production in key majors for engineering and computer and information science by Idaho public postsecondary institutions. This work also shows key leakage points and identifies important metrics for future monitoring and evaluation of efforts to increase production.

This model can only estimate supply from public education sources. In its reporting, WICHE identifies to what extent Idaho K–12 and public postsecondary students contribute to overall degree production for engineering and computer and information science, and what other sources supplement this in Idaho. The parameters of the projections (i.e. the number of years into the future the model covers) were determined by the available data.

To produce this analysis, WICHE proposed using aggregated data to create a cohort-based flow model, and using individual-level data across cohorts of high school graduates and postsecondary enrollees and credential completers to build a model of the pipeline for producing graduates in engineering and computer science.

The research questions included:

1. Based on current and recent historical trends, how many credentials in engineering and computer science are Idaho's public institutions expected to produce?
2. At what point in their enrollment progression do students entering postsecondary enter into major programs of interest?
3. At what point(s) in enrollment progression, and to what extent/volume, do students transition out of engineering and computer science majors, or from other majors into these?
4. What factors are associated with postsecondary students entering into these majors?
5. What factors are associated with credential completion in these majors and programs? Of switching program or stopping out?
6. What factors are associated with student success for first time and transfer students?
7. What factors are associated with employment in Idaho?
8. At what rate do students who stop out return, and when they do, are they successful? (this was anticipated for the earlier cohort initially proposed, which was not included due to data limitations)

9. How has "leakage" changed over time? Key analysis points:
    1. What pct. Of high school graduates enter postsecondary within 3 Years?
    2. What pct. of CIP-entrants complete 25% of credits necessary for graduation within X years? 50%? 75%? 100%? (Compare 2013–14, and 2018–19 entering cohorts)
    3. What pct. of CIP graduates are employed in the universe of businesses covered by Idaho unemployment insurance within 1, 5, and 10 years?

Description of Students Covered

This appendix highlights some high-level information about the students included for the analysis in the report, for context, and is not an exhaustive data dictionary or the like. Important things to keep in mind about the resulting dataset(s) compiled from the data received from the Idaho OSBE:

- Results may be affected, although presumably marginally, by errors or anomalies in the data provided to WICHE. As well, these results may 'over-simplify' or mask some complexity and nuance that are inherent to postsecondary enrollment and completion student behavior and data patterns. Further research, planning and tracking should include deliberate data preparation and review, to account for and represent more myriad and nuanced patterns than were intended for this 'snapshot' of results.
- The results in this appendix generally summarize the highest observed postsecondary awards among the covered students, and do not specifically tabulate students who earned multiple of the same 'highest award' (e.g., two Bachelor's). Further research, planning and tracking should consider the incidence of multiple awards, including among computer and information science and engineering graduates. And the results in this appendix focus on the completion and degree outcomes of the students, and for the most part, not their enrollment patterns.

Cohort Flow Model Aggregated Data: Student Counts, FTE and Graduates, by Categories

This approach builds from WICHE's existing work on High School graduates and is based on aggregated student data, that has been compiled to the state-level by WICHE from publicly available sources supplemented by student-level data requested here. The model is based on enrollment and graduation data from K–12 in Idaho and enrollment and completion data from Idaho's public postsecondary institutions.

This results in a product similar to WICHE's Knocking at the College Door, projecting the number of graduates in CIP codes of interest.

Aggregated Data Request

WICHE requested public school K–12 enrollment counts (October census headcounts), by grade, and the number of high school graduates, for school years 2020–21 and 2021–22. Note: State-level counts were requested, at a minimum; the data and timeline did not support detailed analysis within state (e.g., by education region or school district), but this level of analysis might be relevant for further analysis, for identifying regional differences in potential school populations.

WICHE also requested counts of degree-seeking postsecondary students, by declared major (CIP), and enrollment and awards completed for Idaho public postsecondary institutions (Assoc, Bach, Masters, and PhD) by CIP Code for academic years 2016–17 through 2021–22 (fall 2022–23 data were not available for this report).

For postsecondary enrollment, WICHE also requested that four-year students be categorized into groupings representing <20%, 40%, 60%, 80%, and >100% of progress towards the number of credits necessary for degrees, for each academic year, by CIP (in categories of <33%, 66%, and >100% progress towards the number of credits necessary for two-year/Associate's degree students).

For graduate degrees/students, WICHE requested that students be grouped into numbers initially enrolled, at intermediate progression points evident in the data, and number who completed by award type and CIP. These data were requested for academic years 2016–17 through 2021–22. For all of the aggregated information, WICHE requested disaggregation by race/ethnicity, gender, and income flag (economic disadvantage status), but analysis by these categorizations was ultimately not part of the analysis due to data limitations and low cell counts.

Ultimately, only six categorizations were available in the data for the cohort flow model: academic year 2016–17 to 2021–22, at 2-year or 4-year institution, whether student was directly from high school or other enrollment status. Thus, details such as student sex, race/ethnicity or transfer status were not able to be modeled from the available data.

Note: *For brevity, not all details are presented in the tables below. Also provided were full-time equivalent and percent of progress towards credits required for degree.*

Head counts by Related Major and Years Enrolled, 2016–17 to 2021–22

a. Idaho Public Postsecondary Four-Year Institutions

MAJOR	ID PUBLIC HIGH SCHOOL GRADUATES ENROLLED IN YEAR AFTER GRADUATION ("IMMEDIATE COLLEGE-GOING")						OTHER					TOTAL	HIGH SCHOOL GRADUATES % TOTAL OF YEAR ONE STUDENTS
	ACADEMIC YEAR	ONE	TWO	THREE	FOUR	FOUR +	ONE	TWO	THREE	FOUR	FOUR +		
Computer and Information Sciences and Support Services	2016–17	229	158	121	101	170	239	201	180	144	363	1,906	49%
	2017–18	192	171	130	111	205	265	177	153	131	333	1,868	42%
	2018–19	225	137	142	119	227	237	206	143	107	321	1,864	49%
	2019–20	170	160	115	131	230	197	189	155	115	295	1,757	46%
	2020–21	202	131	134	102	266	217	165	140	124	276	1,757	48%
	2021–22	208	157	128	125	260	294	157	133	113	269	1,844	41%
Engineering	2016–17	354	271	252	194	280	529	551	581	403	936	4,351	40%
	2017–18	308	261	246	234	327	529	428	402	390	848	3,973	37%
	2018–19	316	209	222	212	377	426	410	348	280	802	3,602	43%
	2019–20	291	243	194	206	398	424	307	319	276	669	3,327	41%
	2020–21	287	209	191	181	399	374	333	243	275	597	3,089	43%
	2021–22	318	189	200	180	394	380	285	266	212	533	2,957	46%
Engineering/ Engineering-Related Technologies/ Technicians	2016–17	40	36	19	18	27	51	48	43	29	99	410	44%
	2017–18	51	37	33	11	34	42	52	33	28	85	406	55%
	2018–19	48	40	27	27	33	55	43	35	19	95	422	47%
	2019–20	67	28	27	14	52	62	37	26	26	84	423	52%
	2020–21	58	51	20	26	53	66	50	32	20	75	451	47%
	2021–22	35	41	31	16	48	63	53	34	19	68	408	36%

b. Idaho Public Postsecondary Two-Year Institutions

MAJOR	ID PUBLIC HIGH SCHOOL GRADUATES ENROLLED IN YEAR AFTER GRADUATION ("IMMEDIATE COLLEGE-GOING")					OTHER				TOTAL	HIGH SCHOOL GRADUATES % TOTAL OF YEAR ONE STUDENTS
	ACADEMIC YEAR	ONE	TWO	THREE	THREE +	ONE	TWO	THREE	THREE +		
Computer and Information Sciences and Support Services	2016–17	100	65	29	43	114	69	33	108	561	47%
	2017–18	95	74	55	72	121	79	37	109	642	44%
	2018–19	124	55	48	103	115	64	45	114	668	52%
	2019–20	144	106	52	162	106	74	50	116	810	58%
	2020–21	115	70	59	156	84	68	51	84	687	58%
	2021–22	137	90	70	201	102	60	45	86	791	57%
Engineering	2016–17	21	12	10	8	37	25	8	23	144	36%
	2017–18	19	12	5	15	30	18	9	25	133	39%
	2018–19	50	21	14	24	39	26	11	25	210	56%
	2019–20	73	34	16	55	72	31	16	37	334	50%
	2020–21	49	42	29	53	43	37	20	30	303	53%
	2021–22	62	31	32	47	46	29	25	34	306	57%
Engineering/ Engineering-Related Technologies/ Technicians	2016–17	34	30	10	22	54	25	21	52	248	39%
	2017–18	32	26	17	27	57	32	15	62	268	36%
	2018–19	26	20	17	34	44	32	22	59	254	37%
	2019–20	29	23	17	56	38	34	18	64	279	43%
	2020–21	17	16	20	33	25	24	18	35	188	40%
	2021–22	37	14	15	27	34	17	13	24	181	52%

Progression Model Individual Level Data: High School Graduate, Other First-Time College Students and Degree Completer Cohorts

This model complements the pipeline projections by identifying points in the Idaho public postsecondary credential pipeline (particularly for associates and bachelor degrees) where there is "leakage". This model uses recent and historical data to identify student characteristics associated with:

- Entrance into majors related to engineering and computer science
- Retention in those fields of study/programs
- Completion of those credentials from those programs
- Subsequent employment in Idaho

This modelling relies on student-level datasets of three cohorts. Overall, there were over 94,000 individuals represented in the data from Idaho OSBE.

Idaho Public High School Graduates for the Progression Modeling

A primary focus of the progression analysis in this report relates to Idaho public high school graduates of the Classes of 2012–13 and 2017–18, and their postsecondary enrollment and completion (Note: WICHE initially requested a third, earlier cohort year, but there were limitations in the data prior to 2013–14, particularly K–12 data).

	TOTAL	NOT COLLEGE-GOING		WENT TO COLLEGE WITHIN ACADEMIC YEAR			WENT AT LATER POINT	
2012–13	16,731	4,688	28%	9,254	(AY 2013–14)	55%	2,789	17%
2017–18	18,926	7,116	38%	9,668	(AY 2018–19)	51%	2,142	11%

While they were not the primary focus of the analysis presented in the report, there were additionally almost 14,000 Idaho public high school graduates available to analyze from graduating classes 2004–05 to 2021–22, who were in the sample because they either enrolled in college or university for the first (known) time in the 2013–14 or 2018–19 academic years (related to Cohort 2 on page 73) or received a postsecondary credential in 2016–17 or 2021–22 (related to Cohort 3 on page 73).

Notes: *Distribution of Idaho public high school graduates from years other than 2012–13 and 2017-18 is not tabulated, because they were incidentally included in the drawn cohorts and do not describe comprehensive patterns for those other graduating class years. 'Received a (related) credential' within nine years for 2012–13 high school graduates, within four years for 2017–18 high school graduates. City-to-rural schema in use by the National Center for Education Statistics for representing the geographic nature of schools' populations. 'Related field' and 'Credential' were CIP 11, 14, or 15, as throughout this report*

- Idaho public high school graduates from regions four and six were the most under-represented among the high school graduates who completed an engineering or computer science/information services credential, in this sample; high school graduates from region three were over-represented.

- High school graduates from schools categorized as 'city' or 'suburb'
- Male high school graduates were less likely (62%) than females (73%) to enroll in postsecondary at any point covered by the sample, but were significantly over-represented among those who ever majored in (male: 88%) or completed an engineering or computer science/information services credential (male: 81%).

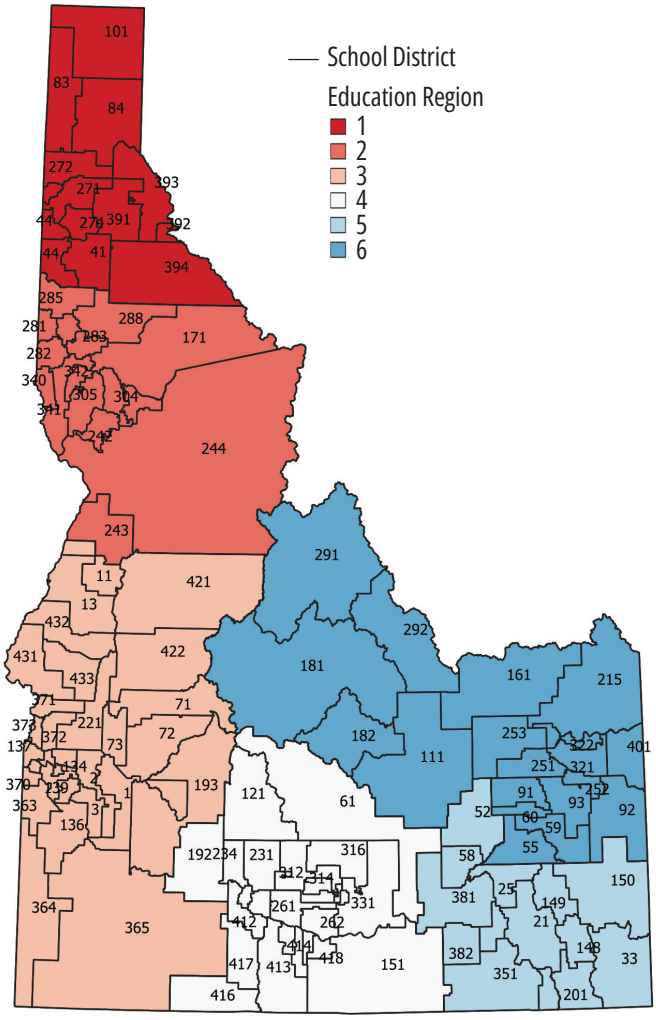
By Education Region

			FIELDS OF INTEREST	
	PERCENT OF TOTAL	ENROLLED POST-SECONDARY (AT ANY POINT)	MAJORED (IN ONE OR MORE TERMS)	RECEIVED CREDENTIAL
One	11%	11%	12%	11%
Two	5%	5%	5%	5%
Three	44%	44%	43%	54%
Four	12%	12%	10%	9%
Five	9%	9%	9%	7%
Six	16%	16%	19%	12%
Virtual	0%	0%	0%	0%
Total	35,567	23,897	1,117	661

By Locale/Urbanicity

			COMP. SCI. OR ENGINEERING	
	PERCENT OF TOTAL	ENROLLED POST-SECONDARY (AT ANY TIME)	MAJORED IN A RELATED FIELD (EVER)	RECEIVED A RELATED CREDENTIAL
City	24%	25%	30%	34%
Suburb	26%	27%	26%	29%
Town	25%	24%	22%	18%
Rural	22%	21%	20%	17%
Virtual	3%	2%	2%	2%
Total	35,657	23,897	1,117	661

Distribution of the 2012-13 and 2017-18 Public High School Graduates (Selected Characteristics)



Map source: https://boardofed.idaho.gov/resources/map-of-education-regions-in-idaho/.

Postsecondary Entrants for the Progression Modeling

The second set of student cohorts for the progression modeling were those first-year (undergrad or graduate) or first year as transfer students in Idaho public institutions in 2018–19 (Summer term 2018 to Spring term 2019) and 2013–14 (Summer term 2013 to Spring term 2014).

These cohorts encompass the Idaho public high school graduates from Cohort 1, who enrolled in postsecondary within the first academic year after their high school graduation, as well as other students who entered the covered postsecondary institutions in that year:

		FIRST-TIME STUDENTS OTHER THAN IMMEDIATE COLLEGE-GOING IDAHO PUBLIC HIGH SCHOOL GRADUATES		IDAHO PUBLIC HIGH SCHOOL GRADUATES		
FIRST ENROLLED	TOTAL	STUDENTS WITH TERM-LEVEL DETAIL	LESS DETAIL (FOR CREDENTIAL AWARDS)	IMMEDIATE COLLEGE-GOING	OTHER GRADUATING CLASS	ID HSGs % OF ENROLLED POST-SECONDARY STUDENTS
AY 2013–2014	31,002	19,577		9,254	2,171	37%
AY 2018–2019	26,520	14,047	24,506	9,668	2,805	47%
Other Year	24,506					
Total Post-Sec. Students	82,028					

Notes: *Students categorized as First-time enrollees in AY 2013–14 or 2018–19 are those which were part of the defined cohorts for which term-level detail was received. A portion of additional students appear to have first enrolled in either of these two years, as indicated in the less detailed data about students who received a postsecondary credential in 2016–17 or 2021–22, which also included students who first enrolled in any year beginning 2001–02 ('Other Year').*

Related to the focus of this report:

- 30% of the entering students in 2013–14, and 38% in 2018–19, were Idaho public high school graduates who enrolled within the year after their high school graduation.
- 38% of the entering postsecondary students in 2013–14 and 2018–19 who ever declared a major in engineering or computer science/information services were graduates of Idaho public schools. The enrollment data indicates that the share of entering postsecondary students who ever declared a major in engineering or computer science/information services and were Idaho high school graduates increased from 29% in 2013–14 to 48% in 2018–19 (albeit this was in the context of fewer students who declared these majors, 2,236 and 1,825, respectively).
- 42% of the entering postsecondary students from 2013–14 and 2018–19 who received a credential in engineering or computer science/information services were graduates of Idaho public schools. Among the 2013–14 entering postsecondary students who had received a credential in engineering or computer science/information services (875), 47% were Idaho public high school graduates. (The data only cover credentials/degrees awarded through 2021–22, too few years elapsed to report completion outcomes for 2018–19 entering students). Postsecondary Graduates in 2016–17 and 2021–22

- The third set of cohorts for progression analysis were students who were awarded a postsecondary credential in 2016–17 or 2021–22 (any major, to allow some comparison of how non-engineering/ computer science completers enter into the workforce).
- These data about credentials awarded in two academic years provide a snapshot of annual engineering or computer science/information services graduate production by Idaho public postsecondary institutions:

Postsecondary Graduates in 2016–17 and 2021–22

The third set of cohorts for progression analysis were students who were awarded a postsecondary credential in 2016–17 or 2021–22 (any major, to allow some comparison of how non-engineering/ computer science completers enter into the workforce).

These data about credentials awarded in two academic years provide a snapshot of annual engineering or computer science/information services graduate production by Idaho public postsecondary institutions:

	2016–17				2021–22			
	ASSOCIATE'S	BACHELOR'S	MASTER'S	DOCTOR'S	ASSOCIATE'S	BACHELOR'S	MASTER'S	DOCTOR'S
COMPUTER AND INFORMATION SCIENCES AND SUPPORT SERVICES								
Idaho High School Graduate	35	62	0	0	97	103	4	0
Other Postsecondary Entrant	81	136	26	3	48	121	19	10
Total	116	198	26	3	145	224	23	10
ENGINEERING								
Idaho High School Graduate	14	139	5	0	13	25%	30%	34%
Other Postsecondary Entrant	9	27%	26%	29%	26%	27%	26%	29%
Total	23	24%	22%	18%	25%	24%	22%	18%
ENGINEERING/ENGINEERING-RELATED TECHNOLOGIES/TECHNICIANS								
Idaho High School Graduate	14	139	5	0	71	6	33	0
Other Postsecondary Entrant	9	361	122	9	20	215	94	30
Total	123	31	5	9	33	400	127	30
OTHER FIELD OF STUDY								
Idaho High School Graduate	1,078	1,927	106	–	1,976	2,710	369	5
Other Postsecondary Entrant	1,702	3,705	1388	79	1275	3649	1603	78
Total	2,780	5,632	1,494	79	3,251	6,359	1,972	83

In 2016–17, about 80% of credentials for computer/information sciences and support services or engineering and related technologies/technicians among previous Idaho public high school graduates in one of the target fields were to white non-Hispanic students, 12% were to students of another race or ethnicity (8% were unknown race or ethnicity). The proportions in 2021–22 were 77% white non-Hispanic, 18% other race or ethnicity and 5% unknown.

Employer Survey

Survey Administration and Response Follow Up

The survey was delivered in partnership with the Idaho Technology Council (ITC), with respondents solicited from the ITC membership, membership of the industry advisory boards of the state university's engineering and computer science programs, the Idaho chapter of American Council of Engineering Companies, and individual recommendations from the project's industry advisory team. The survey was distributed to 684 companies.

Email invitations to the survey were distributed by the Idaho Technology Council beginning January 5. The survey remained open for responses through March 15, 2023 while follow-up was conducted to get responses from as many and diverse respondents as possible. By March 15, 2023, surveys were initiated by 116 respondents, 44 of which were largely incomplete or were responses from more than one respondent from the same company, resulting in 72 unduplicated and mostly complete responses, which are tabulated below.

Results

Shown below are basic distributions of the responses received.

NOTE: *The tables show results among those who answered; numbers may vary based on survey completeness.*

Survey Introduction

Your cooperation with this 5 minute survey will help us estimate the magnitude of Idaho businesses' needs for employees with engineering and computer science postsecondary education. We will use the responses collected to supplement existing occupational demand estimates so that the state has up-to-date information about current and anticipated demand as they consider engineering and computer science education investments and programming.

Your responses will be kept secure and confidential and company names will not be shown in connection with any specific results.

If you need to consult records or another individual for the requested information, you can suspend and resume this survey form using the link provided.

1. **Company name**: Check here ☐ if you do not want your company name shown in the published list of responding companies.

2. **In what Idaho county is your company located?**: If you have employees in more than one location in Idaho, please indicate the county of the location where the majority of Idaho employees are employed.

COUNTY	NUMBER	PERCENT
Ada County	42	59%
Ada County, and other locations	6	8%
Bannock County	2	3%
Boise County	1	1%
Bonner County	1	1%
Bonneville County	2	3%
Canyon County	2	3%
Caribou County	1	1%
Gooding County	1	1%
Idaho County	1	1%
Kootenai County	1	1%
Latah County	5	7%
Nez Perce County	1	1%
Washington County (and Ada County)	1	1%
Multiple locations, including outside of Idaho	4	6%
TOTAL	**71**	**100%**

3. **Industry sector**: Please choose from these nationally standardized sectors. If your firm spans more than one industry sector, please select 'Other' and specify below

NAICS CODE	DESCRIPTION	ADDITIONAL INFORMATION (NOT PROVIDED BY ALL RESPONDENTS)	NUMBER	PERCENT
54	Professional, Scientific, and Technical Services	Analog Encryption for Storage and Communication. Department of Defense. Embedded Systems Design/Sales of Product. Engineering. Engineering and Construction. Geotechnical Engineering. Legal Technology. Structural Engineering Consultation. Technology Services, Solutions and Global Internet.	33	46%
33	Manufacturing	Aerospace. Mining and Manufacturing.	12	17%
51	Information	Data Analytics and Visualization. Software as a Service.	8	11%
45	Retail Trade	Also Wholesale, Transportation and Aviation Sectors.	3	4%
52	Finance and Insurance		2	4%
61	Educational Services		2	4%
62	Health Care and Social Assistance		2	3%
22	Utilities		1	1%
92	Public Administration		1	1%
81	Other Services, except Public Administration	IT and Related Technology.	1	1%
11	Agriculture, Forestry, Fishing and Hunting	Lumber.	1	1%
11	Other	Architecture and Engineering Consulting. Industrial, Mining, Food, Wood and Dairy, in combination. Legal. Utilities, Manufacturing, Professional Scientific and Technical Services, in combination.	4	6%
	Total		71	100%

4. **How many employees (total, engineering, and computer/IT) do you have assigned to your Idaho operations and do any percentage of these employees work remotely from outside of Idaho?** Please approximate as necessary. Include full-time, part-time, contract, and seasonal employees. If you are responding on behalf of more than one site doing business in Idaho, include employees across these multiple sites.

   Please use your best estimation of the "Engineering" and "Computer and Information Technology" employee categories. If you hire technicians in either category, please include them in your count. Software engineers should be counted under Engineering Employees. Examples of Computer and Information Technology Employees include but are not limited to: website developers, IT project managers, IT product owners, and tech support personnel.

	0	1–5	6–10	11–20	21–30	31–40	41–50	51–75	76–100	101–250	251–500	500+	CANNOT ESTIMATE, NOT APPLICABLE	EST. EMPLOYEES ACROSS RESPONDING COMPANIES*
Total Employees		7	6	5	7	5	3	1	2	11	7	16	1	13,434
Computer and Information Technology Employees	10	34	2	6	2	1	1	1	2	3	2	4	3	3,856
Engineering Employees	4	18	4	7	6	4	3	6	4	5	2	7	1	6,478

*** NOTE:** *Rather than asking for precise estimates, respondents were provided ranges in which to indicate their hiring demand. This table presents responses by range category. WICHE computed the estimated employees across responding companies from the mid value of the range. For example, for the range "41–50," low = 41, mid = 45, and high = 50.*

5. **Now, please anticipate the TOP 3 major fields of study you will most need among engineering and computer/IT employees to fulfill your hiring needs over the next year and up to 10 years into the future.** Include full-time, part-time, contract, and seasonal employees, and consider your need for employees to fill new positions as well as to replace turnover, retirements, etc. If you are responding on behalf of more than one site doing business in Idaho, include employees across these multiple sites.

			NUMBER OF RESPONSES			
	CIP Code	Program Title	#1	#3	#2	Chose as a Top 3 Major
Computer and Information Sciences and Support Services	11.07	Computer Science	9	3	1	13
	30.08	Mathematics and Computer Science	2	5	1	8
	11.0103	Information Technology	1	2	4	7
	11.09	Computer Systems Networking and Telecommunications	1	2	4	7
	15.1202	Computer Technology/Computer Systems Technology	3	1	2	6
	11	Computer And Information Sciences And Support Services	3	1	1	5
	11.0801	Web Page, Digital/Multimedia and Information Resources Design	0	1	3	4
	11.04	Information Science/Studies	1	1		2
	11.1001	Network and System Administration/Administrator	0	1	1	2
	11.0104	Informatics	1			1
	11.0804	Modeling, Virtual Environments and Simulation	0	1		1
	Number of Companies with Computer and Information Sciences and Support Services as One of the Top Hiriing Majors		**21**	**18**	**17**	**21**
Engineering	14.0801	Civil Engineering, General	16	4		20
	14.19	Mechanical Engineering	1	6	7	14
	15.0805	Mechanical Engineering/Mechanical Technology/Technician	5	6	2	13
	15.1304	Civil Drafting and Civil Engineering CAD/CADD	2	5	5	12
	14.47	Electrical and Computer Engineering	5	3	2	10
	15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	0	5	3	8
	14.01	Engineering, General	2	3	1	6

	CIP Code	Program Title	NUMBER OF RESPONSES #1	#3	#2	Chose as a Top 3 Major
Engineering	14.0805	Water Resources Engineering	0	4	2	6
	14.10	Electrical, Electronics and Communications Engineering	3	1	2	6
	14.99	Engineering, Other	3	1	2	6
	15.0613	Manufacturing Engineering Technology/Technician	2	1	3	6
	14.07	Chemical Engineering	1	2	2	5
	14.0901	Computer Engineering, General	4			4
	14.13	Engineering Science	1	1	2	4
	14.1801	Materials Engineering	0	1	3	4
	14.14	Environmental/Environmental Health Engineering	1		1	2
	14.27	Systems Engineering	0		2	2
	14.21	Mining and Mineral Engineering	0	1		1
	14.23	Nuclear Engineering	1			1
	Number of Companies with Engineering as One of the Top Hiring Majors		**47**	**44**	**3**	
		Unsure, cannot estimate*	1	1		

*** NOTE:** *One of the respondents, who could not classify the field of study, indicated demand for 'Intern' positions with a professional, scientific, and technical services establishment. The other respondent could not estimate demand but responded to other parts of the survey.*

6. **Please estimate for the #1, #2, and #3 education majors selected above: The preferred degree level for your firm's employees with that education major. Your recent ability to find employees with this education.**

NOTE: *The total number of responses for a given degree level may exceed the number of respondents, because companies could provide this information for up to three 'top' majors and therefore a given survey response may be reflected in up to three cells.*

6. **Please estimate for the #1, #2, and #3 education majors selected above: The preferred degree level for your firm's employees with that education major. Your recent ability to find employees with this education.**

NOTE: *The total number of responses for a given degree level may exceed the number of respondents, because companies could provide this information for up to three 'top' majors and therefore a given survey response may be reflected in up to three cells.*

			PREFERRED DEGREE LEVEL (NUMBER OF RESPONSES)				RECENT ABILITY TO FIND EMPLOYEES (NUMBER OF RESPONSES)		
	CIP Code	Program Title	Associate	Bachelor	Master or Higher*	Something Else or NA	Generally Able to Fill	Somewhat challenging to fill	Very challenging or unable to fill
Computer and Information Sciences and Support Services	11	Computer And Information Sciences And Support Services		3	2	1		3	
	11.0103	Information Technology	1	6			1	1	3
	11.0104	Informatics		1					1
	11.04	Information Science/Studies		2				1	
	11.07	Computer Science	1	10	1	1		7	2
	11.0801	Web Page, Digital/Multimedia and Information Resources Design		4			2	1	
	11.0804	Modeling, Virtual Environments and Simulation		1					
	11.09	Computer Systems Networking and Telecommunications	2	5				1	1
	11.1001	Network and System Administration/Administrator		2			1		
	15.1202	Computer Technology/Computer Systems Technology	1	3	2	1	1	2	1
	30.08	Mathematics and Computer Science		4	4			2	2

*** NOTE:** *Three respondents indicated that a Doctoral degree was the preferred degree level for employees with Computer Technology/Computer Systems Technology, Electrical and Computer Engineering, and Engineering (Other) degrees. And three indicated a Doctoral degree was preferred for employees with a Mathematics and Computer Science major.*

			PREFERRED DEGREE LEVEL (NUMBER OF RESPONSES)				RECENT ABILITY TO FIND EMPLOYEES (NUMBER OF RESPONSES)		
	CIP Code	Program Title	Associate	Bachelor	Master or Higher*	Something Else or NA	Generally Able to Fill	Somewhat challenging to fill	Very challenging or unable to fill
Engineering	14.01	Engineering, General	1	4	1			1	3
	14.07	Chemical Engineering		5			1		2
	14.0801	Civil Engineering, General		12	8		2	6	7
	14.0805	Water Resources Engineering		3	3				4
	14.0901	Computer Engineering, General		4		1	1	2	
	14.10	Electrical, Electronics and Communications Engineering		4	2		1	4	
	14.13	Engineering Science	1	3				3	
	14.14	Environmental/Environmental Health Engineering		1	1				
	14.1801	Materials Engineering			4			2	
	14.19	Mechanical Engineering		10	4		5	3	1
	14.21	Mining and Mineral Engineering		1				1	
	14.23	Nuclear Engineering			1			1	
	14.27	Systems Engineering	1	1				2	
	14.47	Electrical and Computer Engineering	2	4	5		1	1	2
	14.99	Engineering, Other		3	3			1	3
	15.0303	Electrical, Electronic and Communications Engineering Technology/Technician		6		2	2	4	
	15.0613	Manufacturing Engineering Technology/Technician	1	5				2	
	15.0805	Mechanical Engineering/Mechanical Technology/Technician	2	10		1	3	4	1
	15.1304	Civil Drafting and Civil Engineering CAD/CADD	5	4	2	1		3	5
		Unsure, cannot estimate top majors		2					1

7. **About how many employees with that education do you expect to hire in the next 12 months, between now and 5 years from now, and between now and 10 years from now (approximate as necessary).**

NOTE: *Rather than asking for precision estimates, respondents were provided ranges in which to indicate their hiring demand: 0, 1–5, 6–10, 11–20, 21–30, 31–40, 41–50, 51–75, 76–100, 101–250, 251–500, and more than 500. For feasibility, this table summarizes responses by broader categories. WICHE computed the estimated Jobs from the mid value of the range. For example, for the range "'1–50," low =41, mid = 45, and high = 50. Also, the total number of responses for a given program may exceed the number of respondents, because companies could provide this information for up to three 'top' majors and therefore a given survey response may be reflected in up to three cells.*

a. In the next 12 months

			PROJECTED NUMBER OF EMPLOYEES			PERCENT OF ESTIMATED JOBS			
	CIP Code	Program Title	1–50	51–100	100 or more	Associate	Bachelor	Master or PhD	ESTIMATED JOBS
Computer and Information Sciences and Support Services	11.0103	Information Technology	6		1	1%	99%		541
	11.09	Computer Systems Networking and Telecommunications	5		1	94%	6%		533
	11.07	Computer Science	12	1		1%	79%	7%	202
	30.08	Mathematics and Computer Science	6	1			92%	8%	118
	11.0801	Web Page, Digital/Multimedia and Information Resources Design	3	1			100%		97
	11	Computer And Information Sciences And Support Services	5				51%	49%	37
	15.1202	Computer Technology/Computer Systems Technology	6			9%	40%	9%	35
	11.0804	Modeling, Virtual Environments and Simulation	1				100%		8
	11.1001	Network and System Administration/Administrator	2				100%		6
	11.04	Information Science/Studies	2				100%		6
	11.0104	Informatics	1				100%		3
	COMPUTER AND INFORMATION SERVICES AND SUPPORT SERVICES								**1,586**

	CIP Code	Program Title	PROJECTED NUMBER OF EMPLOYEES 1–50	51–100	100 or more	PERCENT OF ESTIMATED JOBS Associate	Bachelor	Master or PhD	ESTIMATED JOBS
Engineering	15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	7		1		98%		396
	15.0613	Manufacturing Engineering Technology/Technician	4	1	1	1%	99%		280
	15.0805	Mechanical Engineering/Mechanical Technology/Technician	11		1	2%	97%		260
	14.0801	Civil Engineering, General	19	1			75%	25%	210
	14.47	Electrical and Computer Engineering	8		1	88%	8%	4%	209
	14.1801	Materials Engineering	3	1				100%	119
	14.10	Electrical, Electronics and Communications Engineering	5	1			95%	5%	115
	14.19	Mechanical Engineering	14				84%	16%	74
	15.1304	Civil Drafting and Civil Engineering CAD/CADD	11			24%	58%	12%	50
	14.23	Nuclear Engineering	1					100%	45
	14.01	Engineering, General	6			20%	73%	8%	40
	14.0901	Computer Engineering, General	3				74%		31
	14.27	Systems Engineering	2			11%	89%		28
	14.0805	Water Resources Engineering	5				22%	78%	27
	14.99	Engineering, Other	6				61%	39%	23
	14.07	Chemical Engineering	5				100%		20
	14.13	Engineering Science	4			18%	82%		17
	14.14	Environmental/Environmental Health Engineering	2				50%	50%	6
	14.21	Mining and Mineral Engineering	1				100%		3
	ENGINEERING								**1,953**
		Unsure, cannot estimate	1				100%		3

b. Between now and 5 years from now, and between now and 10 years from now:

	CIP Code	Program Title	5 YEARS FROM NOW NUMBER RESPONDING BY RANGE AND TOTAL ESTIMATED				10 YEARS FROM NOW* NUMBER RESPONDING BY RANGE AND TOTAL ESTIMATED			
			1–50	51–100	100 or more	Estimated Jobs	1–50	51–100	100 or more	Estimated Jobs
Computer and Information Sciences and Support Services	11.0103	Information Technology	5	1	1	643	5		2	762
	11.09	Computer Systems Networking and Telecommunications	4	1	1	640	3	2	1	720
	11.07	Computer Science	10	1	1	475	7	1	3	1188
	30.08	Mathematics and Computer Science	6	1		110	4	1	1	319
	11.0801	Web Page, Digital/Multimedia and Information Resources Design	3			19	3			38
	11	Computer And Information Sciences And Support Services	5			151	2	2	1	374
	15.1202	Computer Technology/Computer Systems Technology	6			89	4			120
	11.0804	Modeling, Virtual Environments and Simulation	1			45			1	175
	11.1001	Network and System Administration/Administrator	2			11	1			3
	11.04	Information Science/Studies	2			18	2			23
	11.0104	Informatics	1			15				0
	COMPUTER AND INFORMATION SERVICES AND SUPPORT SERVICES					**2,216**				**3,722**

*** NOTE:** *WICHE heard that it is difficult to estimate demand at 5 years and particularly 10 years out, and a diminished number of responses are reflected in the longer timeframes. The estimate demand was distributed similarly across degree levels as at 12 months, so for feasibility, it is not repeated in this table.*

	CIP Code	Program Title	5 YEARS FROM NOW NUMBER RESPONDING BY RANGE AND TOTAL ESTIMATED				10 YEARS FROM NOW* NUMBER RESPONDING BY RANGE AND TOTAL ESTIMATED			
			1–50	51–100	100 or more	Estimated Jobs	1–50	51–100	100 or more	Estimated Jobs
Engineering	15.0303	Electrical, Electronic and Communications Engineering Technology/Technician	7		1	413	7		1	445
	15.0613	Manufacturing Engineering Technology/Technician	4		1	545	3	1	1	598
	15.0805	Mechanical Engineering/Mechanical Technology/Technician	11	1		202	9	2		232
	14.0801	Civil Engineering, General	19		1	579	13	4	1	916
	14.47	Electrical and Computer Engineering	9		1	594	6	1	1	651
	14.1801	Materials Engineering	2	1	1	582	2		1	512
	14.10	Electrical, Electronics and Communications Engineering	4	1	1	502	3	1	2	795
	14.19	Mechanical Engineering	13	1		165	11	1		234
	15.1304	Civil Drafting and Civil Engineering CAD/CADD	11			109	10			130
	14.23	Nuclear Engineering		1		88				0
	14.01	Engineering, General	5		1	244	5			103
	14.0901	Computer Engineering, General	4			86	1	1	1	266
	14.27	Systems Engineering	1			3	1			8
	14.0805	Water Resources Engineering	5			72	4	1		129
	14.99	Engineering, Other	6			81	4			98
	14.07	Chemical Engineering	5			52	4	1		117
	14.13	Engineering Science	4			44	3			68
	14.14	Environmental/Environmental Health Engineering	1			8	1			8
	14.21	Mining and Mineral Engineering	1			8	1			15
	Engineering					**4,377**				**5,325**
	14.21	Unsure, cannot estimate	2			6	2			11

8. **Any additional information about your anticipated engineering and/or computer/ information technology hiring needs you would like to share.**

Respondents with (primarily) Computer and Information Sciences and Support Services demand:

- Data Management, Data Integration, Data Security
- Had multiple job openings for 2 years now and unable to fill. Lack of interested candidates and lack of qualified candidates.
- Hire people for non-technical positions in customer success with some background in software (ex. bootcamp) or OTJ in cybersecurity (ex. from National Guard experience) that they can over time train up.
- We need all types of knowledge workers.
- Most of our positions are required to work on-site at one of the National Labs or in Washington DC which can make hiring more challenging.
- Need to include analytics, business intelligence and artificial intelligence/machine learning.
- The above are approximate numbers for our Idaho-based business unit. My personal hiring needs skew more strongly towards highly educated research professionals (small number of PhDs or Masters with demonstrable research experience)
- The most important skill is not math and the process, it is all of that in addition to creativity, critical thinking, and communication. We need people who are coachable.
- We are struggling to hire in the Idaho market. Most new hires are either in other states or outside the country. We've been investing in establishing development centers in other cities to find talent.
- We have found that we have to settle for people outside of Idaho and people without degrees, but with the right experience, in order to fill our job openings.
- We hire mainly from out of state. We actively recruit outside of Idaho.
- We're finding that computer programming, UI/UX, product management, and other 'build software application' positions are generally very hard to find in Idaho and much easier to find in other areas so we hire remote. We also find that local code schools are generally preparing employees better for real world needs better than the universities in this sector.
- We've hired many persons remotely to expand our options and diversity. Even locally living persons prefer to work remote so we are comfortable with remote workers.

Respondents with (primarily) Engineering demand

- Any type of engineer, plus another specialty do not wish to disclose; demand would really increase if a big project they're working on happens; would really shift these numbers
- CAD technicians are more difficult to locate/hire than engineers.

- I'm a Boise State Alumni and I will NOT hire anyone without a direct referral from that college. I'm personally utterly embarrassed by the lack of basic embedded systems knowledge from our local university. The level of industry targeted knowledge is beyond lack luster. Every - single - one of my interviews with a BSU alumni that has applied through LinkedIn or any other medium that wasn't directly selected by me has turned into me educating the interviewee rather than them answering the most basic of questions. i.e. "show me a circuit that will allow a microcontroller to read the resistance of a potentiometer". Seriously BSU, please update your program. I'm tired of recommending employers as well as students go elsewhere - in fact - anywhere else (CWI, U of I, etc.).
- More advanced analytic background is critically important going forward.
- These numbers cover anticipated hiring for three current locations, but are not inclusive of all our technical hiring. As an engineering and environmental firm, all our hires outside of administrative, financial, and support staff have a technical background.
- We have more problem finding highly knowledgeable analog engineers.
- Will hire at Bachelor's level, but prefer masters - also a big shortage at associate's degree level for surveyors and CAD

9. **Are there any licenses, certificates, industry certifications, or other credentials outside of the postsecondary degree types listed above that are critical for your firm's employees to hold?**

Respondents with (primarily) Computer and Information Sciences and Support Services demand:

- A variety of certifications in IT and computer networking, as well as cloud computing certifications (can't recall the names offhand, but there are several cloud certifications from Microsoft, Google, and AWS that I think would be immensely useful for us).
- Actual portfolio of Project results. Most Computer science can be self taught from online resources and is best learned when applied.
- AWS certified cloud practitioner Certified cloud security professional (CCSP) Certified data privacy solutions engineer (CDPSE) Certified data professional (CDP) Certified ethical hacker (CEH) Certified information security manager (CISM) Certified information systems security professional (CISSP) Cisco certified internetwork expert (CCIE) Cisco certified network professional (CCNP) CompTIA (A+, Cloud+, Security+) Microsoft Certified Azure Solutions Architect Microsoft certified solutions associate/ expert (MCSA/MCSE) Information technology infrastructure library (ITIL) Oracle database and MySQL administration certifications Project management professional (PMP) Salesforce certified development lifecycle and deployment designer
- AWS credentials are valuable. Web technology certificates are also good.
- CISSP (need 5 years of experience to take the test), Security+, Offensive Security Certified Professional (OSCP)
- Cloud platform certifications (AWS, GCP) are desirable but not required for all positions.

- Depends on the position - Safety certifications, health physics, etc. as needed.
- For more experienced positions additional credentials might help, but we don't have any requirements today.
- I am less concerned about 4 year degrees and more concerned about people who know how to write code. The code camp schools are leaving plenty to be desired in most candidates.
- Network Certifications, IT Certifications, Sales, Business and SAP ERP certifications
- There are a lot of options and pathways, but nothing that is critical.
- We have hired engineers that have been through bootcamps and some with four year degrees. The education that they receive is so behind that we've found, more often than not, we're better off to hire those that dropped out and are self-taught.
- We're finding that real world experience and/or code schools are generally producing employees with skill sets closer to what we need for our software application positions. These don't typically correspond with licenses, certificates, etc.

Respondents with (primarily) Engineering demand:

- All of our engineering/geology staff are required to pass the Fundamentals of Engineering/ Fundamentals of Geology to obtain their Engineer-in-training (E.I.T.) or Geologist-in-training (G.I.T.) certification, AND then pass their respective professional license exams to become licensed as a Professional Engineer (P.E.) or Professional Geologist (P.G.).
- All staff need certifications, and some need to attain professional engineering licensure
- Construction inspector certifications, HAZWOPER, OSHA 10-hour, CADD and BIM certificates, Civil 3D skills
- Construction testing certifications, WAQCT
- EI, PE
- Fundamentals of Engineering (FE), Professional Engineer (PE), Structural Engineer (SE)
- Fundamentals of Engineering exam. PE exam and licensure.
- HAZWOPER, WAQTC Certifications
- Licenses: Professional Engineer, Professional Land Surveyor, PTOE, AICP

- Multiple cybersecurity specialized certifications.
- None required, professional licenses are encouraged.
- P.E., ENV SP, LEED
- PE is great but not necessary
- PE license for Civil Engineers
- PE licenses for engineers
- PE seal
- PE, various IT Certifications
- PE's, EIT's, structural Engineering
- PMP, PE
- Professional Engineer
- Professional Engineer (PE).
- Professional Engineer License (PE)
- Professional Engineer, Professional Geologist.
- Professional Engineer; IT and cyber security credentials;
- Professional Engineering license preferred but not critical/required.
- Professional Engineers (PE), Professional/Registered Geologist (P/RG), Licensed Engineer Geologist (LEG)
- Tech certs of all kinds
- United States Patent and Trademark Office registration (strong preference); state bar registration (strong preference); J.D. degree (strong preference)
- We seek engineers with experimental graduate research experience

10. **What role do Idaho colleges and universities—or other sources—play in producing the engineering and computer/information technology employees you need?**

		NUMBER					PERCENT				
		Strongly Agree	Somewhat Agree	No Opinion or N/A	Somewhat Disagree	Strongly Disagree	Strongly Agree	Somewhat Agree	No Opinion or N/A	Somewhat Disagree	Strongly Disagree
Computer and Information Sciences and Support Services	We prefer to hire locally and/or have employees on premises	8	10	1	2	1	36%	45%	5%	9%	5%
	Hiring graduates from Idaho colleges and universities is important to us	8	9	4	1	0	36%	41%	18%	5%	0%
	There are sufficient applicants from Idaho universities for our needs	0	1	3	10	8	0%	5%	14%	45%	36%
	There are sufficient applicants from Idaho community colleges for our needs	0	0	10	3	9	0%	0%	45%	14%	41%
	There are sufficient applicants from non-college training programs for our needs	2	3	11	3	3	9%	14%	50%	14%	14%
	We rely on training provided by Idaho colleges or universities to upskill our current workforce	1	8	4	5	4	5%	36%	18%	23%	18%
	Colleges or universities outside the state provide skillsets that Idaho colleges and universities do not	5	6	3	6	2	23%	27%	14%	27%	9%
	We have specific strategic targets that are hard to fulfill from Idaho colleges or universities (e.g., grant requirements, diversity goals, etc.)	4	2	8	5	3	18%	9%	36%	23%	14%
	Other factors are more important than where the employee originates (please specify)	11	6	4	0	0	52%	29%	19%	0%	0%

		NUMBER					PERCENT				
		Strongly Agree	Somewhat Agree	No Opinion or N/A	Somewhat Disagree	Strongly Disagree	Strongly Agree	Somewhat Agree	No Opinion or N/A	Somewhat Disagree	Strongly Disagree
Engineering	We prefer to hire locally and/or have employees on premises	30	12	2	1	0	67%	27%	4%	2%	0%
	Hiring graduates from Idaho colleges and universities is important to us	26	11	4	2	2	58%	24%	9%	4%	4%
	There are sufficient applicants from Idaho universities for our needs	1	10	5	16	13	2%	22%	11%	36%	29%
	There are sufficient applicants from Idaho community colleges for our needs	0	5	12	14	14	0%	11%	27%	31%	31%
	There are sufficient applicants from non-college training programs for our needs	0	8	18	11	8	0%	18%	40%	24%	18%
	We rely on training provided by Idaho colleges or universities to upskill our current workforce	8	12	8	9	8	18%	27%	18%	20%	18%
	Colleges or universities outside the state provide skillsets that Idaho colleges and universities do not	7	15	12	8	3	16%	33%	27%	18%	7%
	We have specific strategic targets that are hard to fulfill from Idaho colleges or universities (e.g., grant requirements, diversity goals, etc.)	7	9	17	9	3	16%	20%	38%	20%	7%
	Other factors are more important than where the employee originates (please specify)	19	9	13	2	0	44%	21%	30%	5%	0%

11. **Other information:**

Respondents with (primarily) Computer and Information Sciences and Support Services demand:

- Ability to deliver results, innovation, and demonstrated initiative.
- Culture, acumen, knowledge
- Even local employees often work remote. Being humble, hungry, and people smart far outweighs location.
- I grew up in Idaho and attended an Idaho college for a short time. However, the education was not at all what I needed to be successful in my field. It fell very short. I would be surprised to find a candidate from an Idaho university that would meet the needs of my organization.
- Qualifications: areas of study and practical experience from projects or (preferably) internships.
- SAP has an Alliances University offering for free. Dozens of US universities leverage this program to help certify SAP resources. In short, the business community is screaming for this need. Idaho universities can get content for free and quickly generate Business Certification Revenue.
- Skills are the most critical thing for hiring, they assess these during their interview process
- Skillset matters most.
- total compensation requirements, skill sets, and experience are still the most important factors for hiring.
- Training and experience are more important than origination. For my teams' positions I would rather hire a strong researcher from an out-of-state institution than an Idaho-trained individual with no research experience.
- We are an early stage startup company so assessing these questions is somewhat hard at this stage.
- We have non-college training candidates but very few of them have the requisite skills.
- We target employees who are capable in data management (set theory, Structured Query Language - SQL, Dimensional Data Modeling, Data Vault Data Modeling). While Idaho's employment laws are often superior from an employer perspective, we look elsewhere because these skills are not produced from standard ID universities and colleges.
- We're most interested in qualifications. We like the idea of hiring software engineers with four-year degrees, but we have not been able to find them from our recruiting at BYU-Idaho and Idaho State.

Respondents with (primarily) Engineering demand:

- Applicable skills in: Education Experience
- Because we cannot find/hire sufficient students from Idaho Colleges and Universities to meet our current staffing needs, we also recruit from other schools in Utah and Washington.

- Best qualified individual for the need. U of I graduates routinely meet that need and in many areas excel over graduates from other universities.
- Candidates are evaluated on their skills and potential to fill the need of the specific position, regardless of where they are from or which university they attended.
- Credentials, experience, and cultural fit are important factors regardless of where the employee originates.
- For the specific skills like communications circuit engineering (analog transmitter/mixer/modulator) work at high frequencies hiring someone with experience is safer.
- If an employee originates from outside the state but is very qualified and meets/exceeds our expectations, that's more important than location.
- If we can find people with a seismic background that is very important, and there is little in any Idaho curriculum to support that (U of I does some, BSU used to have a structural dynamics course, but it has not run for some time).
- ISU could, or should, provide engineering focus on PE end goal for graduates.
- It is sometimes difficult to draw people to north Idaho, so drawing people who are local is helpful for retention. But the biggest factor is really just getting the right individuals and team fit, which can be from most anywhere. Aerospace engineering is a skillset that Idaho colleges don't offer, so that would be useful -- but mechanical and electrical engineering degrees are usually acceptable.
- My company's main office is outside of Idaho. Some employees work remotely FROM Idaho. On-site preference is for non-Idaho employees.
- Need to be willing to live in a small town
- Other factors- education, skillset, and diversity are more important than where the employee originates
- Passion about the field and baseline embedded systems knowledge.
- Previous experience is typically more important than where the degree comes from. Idaho degrees are not specifically a hiring criteria
- Quality of candidate
- Soft and team/collaborative skills, as well as effective communication are critically important.
- The graduate research programs in Idaho do not produce the skillsets or experience we require in our advanced engineering business. Consequently, our senior hires have had to come from out of state. We obviously can preference origin location over the requisite skills for our positions.
- Their skillset and availability.
- Upper bound of estimated hires is impossible to say – we will hire engineers wherever. People can be anywhere now – could theoretically hire as many as came out of programs.

- We hire all qualified candidates no matter where they went to school but prefer ones from Idaho.
- We like the small town background for work ethic and hands-on experience. Workers from larger cities seem to have slightly better education.
- Where they are from is not important at all. proximity to clients/office is more of a factor in choosing to hire, as is CV
- Work ethic, experience & previous training

NCHEMS Student Flow Model

Project/Model Description

NCHEMS was contracted to modify their base Student Pipeline Model to accommodate data provided by the Idaho Office of the State Board of Education to track the progress of Idaho students from 9th grade through college completion and to allow users to adjust performance at selected points along the pipeline to ascertain the overall impact on postsecondary enrollments and completions for selected program areas (computer science, engineering, and engineering tech) out to the year 2030.

User Note

NCHEMS Base Student Flow Model strictly utilizes publicly available data and publications to generate the dashboard metrics and background calculations for the model. Sources of data include the National Center for Education Statistics (NCES), the NCES Integrated Postsecondary Education Data System (IPEDS), Western Interstate Commission for Higher Education (WICHE) secondary enrollment and high school graduate projections, Census Bureau population estimates, and the Census Bureau's American Community Survey (ACS). For this project, the Idaho Office of the State Board of Education was able to provide program-level enrollment and completions data by sector (public 4-year, public 2-year) to help inform the model to produce program-level enrollments and completions. Although the model inputs and outputs enrollment and completions numbers in precision, there is inherently error propagating through the model due to imperfect data and missing data elements. Differences in the multiple data sets used within the model create some error as does lack of detail at the institution level and on the various types of students moving through the pipeline. Users should focus on the magnitude of change and directional patterns observed in enrollment and completions distributions when drawing conclusions.

College Participation Metrics (User adjustable within the model)

High School Graduation Rates

Sources: National Center for Education Statistics (NCES) Digest of Education Statistics, public high school 4-year adjusted cohort graduation rate (ACGR). Idaho Office of the State Board of Education, 9th grade and high school graduate numbers 2010–11 through 2021–22 (projections calculated by WICHE).

Description: The adjusted cohort graduation rate (ACGR) is the percentage of public high school freshmen who graduate with a regular diploma within 4 years of starting 9th grade. Students who are entering 9th grade for the first time form a cohort for the graduating class. This cohort is "adjusted" by adding any students who subsequently transfer into the cohort and subtracting any students who subsequently transfer out, emigrate to another country, or die. Additional high school graduates entering postsecondary education 2022–23 through 2029–30 are calculated using 9th grade and high school graduate projections.

In-State College-going Rates Directly Out of High School

Sources: NCES, IPEDS Fall Residency and Migration Surveys for Fall 2016, 2018, and 2020 (mandatory reporting in even years only). Western Interstate Commission for Higher Education, Knocking at the College Door: Projections of High School Graduates, 2020. https://knocking.wiche.edu/data/knocking-10th-data/. High school graduates for academic years 2015–16, 2017–18, and 2019–20.

Description: In-State Fall first-time students directly out of high school (within the past year) as a percent of recent high school graduates (the previous spring), 3-year weighted average 2016, 2018, and 2020.

Out-of-State College-Going Undergraduates Directly Out of High School

Sources: NCES, IPEDS Fall Residency and Migration Surveys for Fall 2016, 2018, and 2020 (mandatory reporting in even years only).

Description: Number of out-of-state first-time undergraduates directly from high school attending Idaho Title IV institutions.

First-Time Participation Rate of 20–44 Year Olds

Sources: NCES, IPEDS Fall Residency and Migration Surveys for Fall 2016, 2018, and 2020 (mandatory reporting in even years only). U.S. Census Bureau July 1 Population Estimates by age, 2016, 2018, and 2020.

Description: Fall first-time students not directly out of high school as a percent of 20–44 year-olds (3-year weighted average 2016, 2018, and 2020).

College Retention and Progression (User adjustable within the model)

Postsecondary Progression Rates by sector, student type, program, and postsecondary year of enrollment

Sources: Idaho Office of the State Board of Education, year-to-year progression of undergraduate students by student type, sector, program, and postsecondary year, 2016–17 through 2021–22 (overall average figures for this period calculated by NCHEMS). NCES, IPEDS fall 2020 enrollment files (fall 2020 retention rates by sector). NCES, IPEDS 2018–19, 2019–20, and 2020–21 instructional activity files. NCES, IPEDS 2018–19, 2019–20, and 2020–21 Completions files.

Description, Public 4-year: Average enrollment and progression rates for first-to-second, second-to-third, and third-to-fourth year undergraduate enrollment for selected programs (computer science, engineering, and engineering tech). These three progression years are used to model overall enrollment trends at public 4-year institutions. IPEDS awards, enrollment, and first-to-second year retention for public 4-year institutions were used to inform an estimated split of the Idaho progression data into public research and public comprehensive institutions.

Description, Public 2-year: Average enrollment and progression rates for first-to-second and second-to-third year undergraduate enrollment for selected programs (computer science, engineering, and engineering tech). These two progression years are used to model overall enrollment trends at public 2-year institutions.

Description, Private Institutions: IPEDS enrollment, completions, and retention were used to compare with public 4-year institutions to estimate progression of undergraduate students for first-to-second, second-to-third, and third-to-fourth year for selected programs (computer science, engineering, and engineering tech). These three progression years are used to estimate overall enrollment trends at private institutions.

College Completion (User adjustable within the model)

Undergraduate degrees and certificates produced per 100 FTEs

Sources: Idaho Office of the State Board of Education, completions and FTE enrollment by program and postsecondary year, 2016–17 through 2021–22 (overall average figures for this period calculated by NCHEMS). NCES, IPEDS 2017–18, 2018–19, and 2019–20 instructional activity files (total FTE enrollment by sector). NCES, IPEDS 2017–18, 2018–19, and 2019–20 completions files (total undergraduate awards by sector).

Description: Undergraduate credentials (certificates of at least 12 weeks in length, associates, and bachelor's) awarded per 100 full-time equivalent undergraduates by sector and program (computer science, engineering, and engineering tech). Idaho figures by sector and program are an average for 2016–17 through 2021–22. IPEDS figures for sector totals are a 3-year weighted average for 2017–18, 2018–19, and 2019–20.

ENDNOTES

1 The relatively close relationship between bachelor (and above) degree holders in engineering and computer-related fields and employer hiring demand for these types of roles was less clear for engineering technologists (who might be hired at the bachelor's or associates level, or trained on the job), therefore, these data are not presented in the executive summary.

2 Bureau of Labor Statistics. (2022, September 8). *Occupational outlook handbook: Architecture and engineering occupations.* U.S. Department of Labor. https://www.bls.gov/ooh/architecture-and-engineering/home.htm

3 WICHE analysis of IPEDS data & data provided by the Idaho State Board of Education. The research presented here utilizes SLDS Data from the Idaho State Board of Education (SBOE) and the Idaho State Department of Education (SDE). Any errors are attributable to WICHE.

4 Krebs, B., McHugh, C., & Mehl, A. (2023, January). *Educated in Idaho, employed in Idaho.* Idaho State Board of Education. https://boardofed.idaho.gov/resources/educated-in-idaho-employed-in-idaho/

5 Bureau of Labor Statistics. (2022, May). Occupational employment and wage statistics. U.S. Department of Labor. https://www.bls.gov/oes/tables.htm

6 ACEC Research Institute. (2023, May). *Engineering business sentiment 2023 Q2.* American Council of Engineering Companies. https://programs.acec.org/impact-report-21

7 While WICHE generally prefers precision in using defined terms, there are substantial gray areas in usage on the ground, so further analyses will provide substantial analysis of this point. For additional context, please see National Center for Education Statistics. (n.d.). *The classification of instructional programs: Detail for CIP code 11, computer and information sciences and support services.* U.S. Department of Education Institute of Educational Sciences. https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=88073.

8 Bureau of Labor Statistics. (2022, September 8). *Occupational outlook handbook: Architecture and engineering occupations.* U.S. Department of Labor. https://www.bls.gov/ooh/architecture-and-engineering/home.htm.

9 Within the Bureau of Labor Statistics' *Occupational employment and wage statistics* tables, "Computer" occupations include all occupations within SOC Code 15-1200 "Computer Occupations" (due to changes to the SOC Classification system between 2010 and 2018. Computer Occupations were defined as 15-1100 from 2010 to 2017 and use 15-1200 beginning in 2018. These data generally reflect the same "bucket" of occupations although specific detailed occupations were added and deleted over this time period as well as 11-3021 "Computer and Information Systems Managers" within 11-3000 "Operations Specialties Managers." According to the BLS occupational profiles, entry-level work in each of these fields typically requires a bachelor's degree. Bureau of Labor Statistics. (2022, May). Occupational employment and wage statistics. U.S. Department of Labor. https://www.bls.gov/oes/tables.htm

10 Bureau of Labor Statistics. (2022, May). *Occupational employment and wage statistics.* U.S. Department of Labor. https://www.bls.gov/oes/tables.htm

11 Bureau of Labor Statistics. (2023). *Occupational employment and wage data, May 2022.* Idaho Department of Labor. https://lmi.idaho.gov/data-tools/oews/

12 Bureau of Labor Statistics. (2023). *Occupational employment and wage data, May 2022:* Table 1.05. Idaho Department of Labor. https://lmi.idaho.gov/data-tools/oews/

13 Idaho Department of Commerce. *Key Industries.* https://commerce.idaho.gov/site-selection/key-industries/

14 Becker, M., Pace, L., & Spolsdoff, J. (2022, October). Utah's engineering and computer science workforce: Higher education and economic trends. Kem C. Gardner Policy Institute, University of Utah. https://gardner.utah.edu/wp-content/uploads/ECS-Report-Oct2022.pdf

15 National Center for Education Statistics. (n.d.). The classification of instructional programs: Detail for CIP code 11, computer and information sciences and support services. U.S. Department of Education Institute of Educational Sciences. https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=88073

[16] National Center for Education Statistics. (n.d.). The classification of instructional programs: Detail for CIP code 14, engineering. U.S. Department of Education Institute of Educational Sciences. https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=88196

[17] National Center for Education Statistics. (n.d.). *The classification of instructional programs: Detail for CIP code 15, engineering technologies/technicians.* U.S. Department of Education Institute of Educational Sciences. https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=88196

[18] The relatively close relationship between bachelor (and above) degree holders in engineering and computer-related fields and employer hiring demand for these types of roles was less clear for engineering technologists (who might be hired at the bachelor's or associates level, or trained on the job), therefore, these data are not presented in the executive summary.

[19] National Center for Education Statistics. (2023, May). *Postsecondary education: Undergraduate enrollment. U.S. Department of Education Institute of Educational Sciences.* https://nces.ed.gov/programs/coe/indicator/cha/undergrad-enrollment

[20] Idaho State Board of Education. *College-Going Dashboard.* https://dashboard.boardofed.idaho.gov/CollegeGoingDashboard.html

[21] National Center for Education Statistics. (2023, May). *Immediate college-going rate of high school completers.* U.S. Department of Education Institute of Educational Sciences. https://nces.ed.gov/programs/coe/indicator/cpa/immediate-college-enrollment-rate

[22] Western Interstate Commission for Higher Education. (2020, December). *Knocking at the college door: Projections of U.S. high school graduates.* WICHE. https://knocking.wiche.edu/
National Center for Education Statistics. (n.d.). *Digest of education statistics.* U.S. Department of Education Institute of Educational Sciences. https://nces.ed.gov/programs/digest/d17/tables/dt17_304.10.asp)
Utah System of Higher Education. (2023). *Headcount.* https://ushe.edu/institutional-data-resources-headcount/

[23] WICHE cleaned the data using transparent and appropriate processes. For specific detail on the approaches used, please see the appendix. Because of these cleaning approaches, data presented here may differ slightly from other sources and reports.

[24] Department of Education. (2022.) *Understanding your student's scores on the i=Idaho standards achievement test in English language arts/literacy and mathematics.* State of Idaho. https://www.sde.idaho.gov/assessment/files/shared/isat/Understanding-Your-Student-Scores-ISAT-ELA-Math.pdf

[25] Research on the topic is voluminous. See for example: Lent, Robert W., Matthew J. Miller, Paige E. Smith, Bevlee A. Watford, Robert H. Lim, and Kayi Hui. "Social cognitive predictors of academic persistence and performance in engineering: Applicability across gender and race/ethnicity." *Journal of Vocational Behavior* 94 (2016): 79-88; and Lee, Hang-Shim, Lisa Y. Flores, Rachel L. Navarro, and Marlen Kanagui-Muñoz. "A longitudinal test of social cognitive career theory's academic persistence model among Latino/a and White men and women engineering students." *Journal of Vocational Behavior* 88 (2015): 95-103.

[26] Bureau of Labor Statistics. (2022, September 8). *Occupational outlook handbook: Architecture and engineering occupations.* U.S. Department of Labor. https://www.bls.gov/ooh/architecture-and-engineering/home.htm

[27] This conclusion is drawn from WICHE's analysis of IPEDS data & data provided by the Idaho State Board of Education.

[28] Krebs, B., McHugh, C., & Mehl, A. (2023, January). *Educated in Idaho, employed in Idaho.* Idaho State Board of Education. https://boardofed.idaho.gov/resources/educated-in-idaho-employed-in-idaho/

[29] Krebs, B., McHugh, C., & Mehl, A. (2023, January). *Educated in Idaho, employed in Idaho.* Idaho State Board of Education. https://boardofed.idaho.gov/resources/educated-in-idaho-employed-in-idaho/

[30] Krebs, B., McHugh, C., & Mehl, A. (2023, January). *Educated in Idaho, employed in Idaho.* Idaho State Board of Education. https://boardofed.idaho.gov/resources/educated-in-idaho-employed-in-idaho/

[31] Research on the topic is voluminous. See for example: Lent, Robert W., Matthew J. Miller, Paige E. Smith, Bevlee A. Watford, Robert H. Lim, and Kayi Hui. "Social cognitive predictors of academic persistence and performance in engineering: Applicability across gender and race/ethnicity." *Journal of Vocational Behavior* 94 (2016): 79-88; and Lee, Hang-Shim, Lisa Y. Flores, Rachel L. Navarro, and Marlen Kanagui-Muñoz. "A longitudinal test of social cognitive career theory's academic persistence model among Latino/a and White men and women engineering students." *Journal of Vocational Behavior* 88 (2015): 95-103.

[32] Although not reported here, WICHE performed numerous post-regression tests to assess the quality of the model, including goodness-of-fit; the discriminatory power of the model; the accuracy, sensitivity, and specificity of the model; and the functional form. The results of these tests suggest the model performs well and is correctly specified.

[33] Idaho State Board of Education. *College-Going Dashboard.* https://dashboard.boardofed.idaho.gov/CollegeGoingDashboard.html

[34] Idaho State Board of Education. (n.d.) *2022 The Facts: Facts about Idaho's public education system.* https://boardofed.idaho.gov/resources/fact-book/.

[35] Kolenovic, Z. & Strumbos, D. (2020, March). *ASAP Students in STEM Majors: Results from the Fall 2015 Cohort.* The City University of New York (CUNY) Office of Academic Affairs. http://www1.cuny.edu/sites/asap/wp-content/uploads/sites/8/2020/04/30099_CUNY_ASAP_STEM_Brief_2019_WEB_m2.-1.9MBpdf.pdf

[36] WICHE analysis of May 2010 through May 2021 BLS OEWS Occupational Profiles. For purposes of this analysis, Engineering" occupations are defined as all occupations within SOC Code 17-2000 "Engineers" and 11-9041 "Architecture and Engineering Managers".
Bureau of Labor Statistics. (2022, May). Occupational employment and wage statistics. U.S. Department of Labor. https://www.bls.gov/oes/tables.htm

[37] Cecil-Cantrell, C. (2017, May). *Licensed engineers and land surveyors.* Idaho Department of Labor Communications & Research. https://www.labor.idaho.gov/publications/Engineering_Surveyor_Study.pdf

[38] Idaho Department of Labor. https://lmi.idaho.gov/data-tools/oews/
Bureau of Labor Statistics. (2022, May). Employment Projections:
Table 1.2 Employment by detailed occupation, 2021 and projected 2031
(Numbers in thousands). https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm

[39] ACEC Research Institute. (2023, May). *Engineering business sentiment 2023 Q2.* American Council of Engineering Companies. https://programs.acec.org/impact-report-21

[40] Micron. (2022, September 1). *Micron to invest $15 billion in new Idaho fab, bringing leading-edge memory manufacturing to the U.S.* [Press release]. https://investors.micron.com/news-releases/news-release-details/micron-invest-15-billion-new-idaho-fab-bringing-leading-edge

[41] WICHE staff interview with Idaho Department of Labor staff.

[42] While WICHE generally prefers precision in using defined terms, there are substantial gray areas in usage on the ground, so further analyses will provide substantial analysis of this point.
National Center for Education Statistics. (n.d.). The classification of instructional programs: Detail for CIP code 11, computer and information sciences and support services. U.S. Department of Education Institute of Educational Sciences. https://nces.ed.gov/ipeds/cipcode/cipdetail.aspx?y=55&cipid=88073.

[43] Bureau of Labor Statistics. (2022, September 8). *Occupational outlook handbook: Architecture and engineering occupations.* U.S. Department of Labor. https://www.bls.gov/ooh/architecture-and-engineering/home.htm.

[44] Krebs, B., McHugh, C., & Mehl, A. (2023, January). *Educated in Idaho, employed in Idaho.* Idaho State Board of Education. https://boardofed.idaho.gov/resources/educated-in-idaho-employed-in-idaho/

[45] Krebs, B., McHugh, C., & Mehl, A. (2023, January). *Educated in Idaho, employed in Idaho.* Idaho State Board of Education. https://boardofed.idaho.gov/resources/educated-in-idaho-employed-in-idaho/

[46] Again, although not reported in detail here, the model performed appropriately on standard post-estimation diagnostic tests.

[47] Idaho Department of Labor. https://lmi.idaho.gov/data-tools/oews/
Bureau of Labor Statistics. (2022, May). *Employment Projections: Table 1.2 Employment by detailed occupation, 2021 and projected 2031* (Numbers in thousands). https://www.bls.gov/emp/tables/emp-by-detailed-occupation.htm

[48] Autor, D. H. (2016, July). *Why are there still so many jobs? The history and future of workplace automation and anxiety.* MIT Initiative on the Digital Economy. https://ide.mit.edu/sites/default/files/publications/IDE_Research_Brief_v07.pdf

[49] Smith, M. (2023, February 3). Despite big layoffs, it's still a great time to work in tech, experts say: 'I've seen bad job markets… this is not it'. *CNBC.* https://www.cnbc.com/2023/02/03/despite-big-tech-layoffs-its-still-a-good-time-to-work-in-tech.html ; https://www.ziprecruiter.com/blog/laid-off-tech-workers/

[50] Becker, M., Pace, L., & Spolsdoff, J. (2022, October). *Utah's engineering and computer science workforce: Higher education and economic trends.* Kem C. Gardner Policy Institute, University of Utah. https://gardner.utah.edu/wp-content/uploads/ECS-Report-Oct2022.pdf