Increasing Student Employability Through Strategic Curricular Innovations

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Employability is an important indicator of the success of academic programs, and it can be improved through intentional curricular adjustments. This paper describes three case studies, all of which are aimed at increasing student employability during and after the completion of academic credentials at a university with open admissions that champions access to higher education among underserved populations. In case one, the goal was to bridge disciplines by developing a credential that would be relevant within multiple industries. Case two focused on aligning the content of a credential with industry certifications to prepare students to enter their chosen field of study more easily. In the final case, an industry certificate was incorporated into an academic program to support students' entry into their chosen field before completing their degree. Lessons learned and next steps are discussed in the context of employability theory.

Keywords: employability, online education, curriculum, curricular innovation, student success, certifications, certificates

INTRODUCTION

In recent years, higher education institutions, for a variety of reasons, have experienced increasing challenges when attempting to demonstrate value to students. For instance, college costs have increased in recent years, and student debt has also increased. Higher education does lead to better employment outcomes in many cases, but employment prospects have decreased due in part to a saturated market, which has led to increased competition for positions. Further, the pandemic contributed to overall decreases in job opportunities for many (García-Morales, Garrido-Moreno, & Martín-Rojas, 2021). These and other challenges have made it even more important for higher education institutions to develop innovative programming that targets employability. In this paper, three case studies are presented that focus on increasing the employability of graduates.

LITERATURE REVIEW

Employability Models

The concept of employability refers to one's ability to obtain and maintain employment, and it can be impacted by many factors, including the possession of a college education (National Center for Education Statistics, 2024). Several relevant models of employability have been proposed in recent years. Eimer and Bohndick (2023) presented a literature review and analysis of employability models in higher education. Twenty-one models emerged from the review, with no one presenting itself as more dominant. The authors recommend that those aiming to implement teaching interventions to increase employability clarify an approach and then select an appropriate model based on alignment. Donald, Baruch, and Ashleigh (2024) operationalized a capital growth model for conceptualizing employability. These authors identified nine types of capital with relevance to employability, including cultural, social, personal identity, psychological, scholastic, health, career identity, economic, and market value. Results of the analysis indicated that the aforementioned forms of capital, combined with external factors and personal outcomes, can impact employability at the graduate and undergraduate levels.

Fakunle and Higson (2021) explored theoretical and empirical approaches to employability by region. These authors argued that an approach focused solely on outcomes does not adequately explain experience. Multiple approaches that focus on outcomes, processes, and conceptual frameworks more fully encapsulate the complex concept of employability. Isopahkala-Bouret and Tholen (2023) applied theories of positional competition and conflict to analyze relative employability. The authors posit that interactions among positioning in the labor market, educational positioning, and social positioning combine to influence employability. Another relevant parameter that influences levels of employability is skill.

Skill Gaps

Skill gaps can lead to lower employability; such a finding is frequently reported in the literature (Wijesinghe & Jayawardane, 2023). Adamu and Abdu Shakur (2023) examined the impacts of skill gaps among individuals trying to launch businesses. They found that targeted training combined with access to relevant equipment was associated with entrepreneurial success. The association between reflective skills and employability has also been demonstrated (Asiedu, Malcalm, Boakye, & Amoah, 2024). Zhang, Khaskheli, Raza, and Masood (2023) examined university reputation as a potential moderator of the relationship between skills and employability. These authors found a significant moderating relationship, which indicated that, for students attending institutions with good reputations, skills are less related to employability. However, students attending institutions with poor reputations must have additional skills to maintain employability.

Wei and Sotiriadou (2023) examined the impacts of training in heretical skills and found that expertise in key skill areas was associated with increased levels of employability. Other research supports this contention, identifying core skill attainment as a significant predictor of employability (Wijesinghe & Jayawardane, 2023). Hassan, Alaliyat, Sarwar, Nawaz, and Hameed (2023) used deep learning and big data as tools to identify relevant skills. Another important factor that has been shown to impact employability is pedagogy.

Pedagogies

A great body of literature demonstrates how pedagogy influences the employability of graduates. Bennett, Knight, Dockery, and Bawa (2020) found value in skills in science, technology, engineering, and mathematics as well as in other fields. These authors posit that identifying pedagogical strategies for increasing science, technology, engineering, and mathematics-related skills increases employability outcomes. Grosemans, De Cuyper, Forrier, and Vansteenkiste (2023) evaluated perceived employability pre- and post-graduation, finding that degree completion increased self-perceived employability.

Other research demonstrates that elective coursework with context relevance supports the development of higher levels of employability (Zhang, Zhang, & Brewer, 2012b). Shah and Bharathi (2023) examined the impact of an educational training platform on performance in various industries and on ultimate

employability. Other research supports the contention that e-learning can increase skill acquisition and, consequently, improve employability (Thottoli, Islam, Ahamad, & Hassan, 2023). Chen and Nukulkij (2023) examined the impact of higher education supply on employability. These authors found that increased access to college opportunities increased the ease with which gainful employment could be obtained. Just as pedagogical approaches may be adjusted to increase the employability of graduates, innovative curricula have been identified as an important area of opportunity.

Curricular Enhancement

Bikar, et.al. (2023) studied the effects of several targeted programs on the employability of degree-program graduates, finding that up-skilling initiatives are valuable investments. Industry certifications demonstrate value to students, in part because they offer a relatively quick credential that positions them to attract the attention of hiring managers. Certification programs delivered virtually have become increasingly popular in recent years, due in part to their impact on levels of employability (Kiran, Manoharan, Durai, Ashtikar, & Kunchala, 2024). Mehlhorn, Cole, and Hatch (2023) present data and recommendations regarding the utility of industry certifications for business students.

In line with these recommendations, Quweider, Zhang, and Lei (2023) present data on the integration of industry certification domains into the curriculum of a degree program in cybersecurity. Szyjewski (2023) explored portability, credibility, and authenticity factors, offering an efficient solution through a hybrid approach.

Micro-credentials can also provide students with an advantage in the job market. Micro-credentials are bite-sized learning experiences that are practical, relevant, and tied to specific skills (Dennis, et.al., 2024). They are often verified with digital badges. A great body of research demonstrates that micro-credentials are valuable artifacts that demonstrate the acquisition of pertinent skills. For instance, H. Sharma, Jain, Mogaji, and Babbilid (2024) explore strategies for integrating micro-credentials into higher education. Another area with relevance to the goal of increasing the employability of graduates is the degree field. Institutions must offer degree programs in viable areas that are growing at a rate that will support sustained employment.

Degree Fields for Employability

Hospitality and tourism are both fields that are expected to grow, and, as such, graduates' employability evaluations are warranted. Crisostomo, Encarnacion, and Al Balushi (2023) applied a classification model to the prediction of employability among tourism graduates. They found that occupation and the job sector were the strongest predictors of employability. The field of marketing has also been examined in the context of employability. For instance, Muthuswamy and Sudhakar (2023) looked at employability in the field of digital marketing, finding that the examination of experiential learning, curricular enhancements, and third-party certifications impacted levels of employability. Vicera, Cruz, Fabon, Galigao, and Aboratigue (2023) looked at marketing graduates and found that communication skills were the best predictor of employability.

Engineering is another growing field in which employability analyses have been conducted. A. Sharma (2023), in an analysis of employer perceptions of the employability of engineering graduates, found that pro-activeness, practical and enterprising skills, and learning aptitudes were associated with higher levels of employability. Qostal, et.al. (2024) examined student perceptions of skills impacting levels of employability; three key skills were identified as predictors: personal management, teamwork, and work safety. Other investigations have focused on arts and sciences majors. Biology graduates tend to exhibit high levels of employability, partly due to their acquisition of career-relevant skills (Rhovian, et.al., 2023). Research has demonstrated that confidence, responsibility, passion, self-awareness, and micro- and macro-systems influence employability among liberal arts majors (G.A. Williams, Karanika-Murray, Reed, & Wiseman, 2024). McCormack and Baron (2023) examined employability in degree programs in the humanities, arts, and social sciences, finding that developing transferable skills and humanistic values contributed to career success among graduates. Kovačević, Dekker, and van der Velden (2023) examined

employability development in liberal arts undergraduate programs, finding that two key skills, creativity and personal initiative, had a positive impact.

Basabe, Estella, Ferolino, and Cataraja (2023) examined employability rates in graduates of an information technology bachelor's degree program, finding that aspects of the curriculum, such as alignment with industry standards, were perceived as pertinent. A related field, information management, was identified as an area that could use marketing to increase awareness regarding prospective employers (Khusaini & Habidin, 2023). The financial sector tends to provide ample employment opportunities. Tri Nguyen, Tri Nguyen, Han Nguyen, Dao Nguyen, and Linh Le (2023) explored factors impacting the selection of an economics major, finding that influences, interests, financial resources, and career opportunities were pertinent. Interdisciplinary teaching practices have been shown to align with employability among financial engineering majors (Xiong, Dong, & Fang, 2023). Long (2023) explored the need for quality optimization for the self-directed training of applied accounting majors.

Another factor that impacts employability is the ease of entry into degree programs. Recent models guide the transfer credit process, emphasizing the need for transparency, empowerment, attainable solutions, mentorship, and sustainability (Dennis & Montagnino, 2024). In addition to transfer credit models that support ease of entry, credentials play an important role in improving student employment outcomes by creating multiple on- and off-ramps (Meyer, Bird, & Castleman, 2022). Stackable credentials make it easier for students to earn their degrees. As credentials are smaller than degrees, they also tend to be more affordable, providing students with an easy on-ramp. After obtaining a credential, students may find it easier to obtain employment, which could make obtaining additional credentials more feasible. For instance, Barselai-Shaham and Yaish (2022) reported on a stackable credentials plan, finding that it supported degree attainment. Bozick, Anderson, and Daugherty (2021) found that most credential graduates enroll in additional credential coursework. Anderson and Daugherty (2023) propose the introduction of new programming as a strategy for increasing credential stacking within community colleges. Stackable credentials have been demonstrated to be beneficial for employability (Yieng & Haron, 2023). Meyer, et.al. (2022) report that stackable credentials contribute to employment success by preparing students to meet the needs of the labor market.

METHOD

Three case studies were conducted to center the issue of student employability as an outcome of academic credential completion. The first case study focused on bridging the disciplines of psychology and business to provide students with an avenue to enter either field. In the second case study, the design of an information technology auditing specialization for a Master of Accounting and a Master of Science in cybersecurity program is explored with attention focused on building multiple opportunities for students to earn industry certifications into the experience. The third case focused on incorporating an industry certificate into a baccalaureate program in project management.

Case Study 1: Bridging Disciplines

The first case study described in this analysis focused on bridging the fields of business and industrial and organizational psychology. The specific subject area, behavioral economics, can be defined as the study of human behavior, particularly consumer behavior, as informed by the disciplines of economics and psychology (Challoumis, 2024; Thaler, 2016). Behavioral economics is concerned with predicting economic behavior, such as saving and spending. One key principle of behavioral economics is loss aversion, which is the tendency for humans to define events in terms of wins and losses. Another principle associated with the field of behavioral economics is the sunk cost fallacy, which states that people tend to stay in situations or arrangements that are no longer beneficial to them because they have already invested time and do not want that time to have been wasted. The field of behavioral economics has many potential career options.

One career opportunity for students of behavioral economics is advertising. Studying the principles of behavioral economics places individuals in a good position to design and deliver advertising campaigns

due to their understanding of human economic behavior. Finance is another key area of employment for students of behavioral economics; they might work to create, evaluate, or improve investment tools based on behavioral patterns of users, for instance. Financial advising is another career field within the finance sector that might be attractive for a behavioral economics student.

Policy is another career field for students of behavioral economics; they may work to implement policies that protect individuals from financial exploitation, for instance. Further, they might work to create prevention campaigns to reduce the harm of excessive reliance on credit. Market research is another area in which students of behavioral economics could thrive, due to their expertise in profiling sectors of the population and targeting their needs. A quick search online clearly demonstrates that behavioral economics programs are few and far between in the present day, and so it is important to provide this subject matter within an open admissions institution, thereby increasing access. Developing the behavioral economics program described in this case study began with a cross-disciplinary team of faculty and academic leaders.

Faculty engaged in the envisioning process for the new program represented the fields of economics, psychology, human development, marketing, and learning science. Through visioning, topics such as content, level of study, and overall goals were explored, and it was determined that student opportunities could be maximized by offering a graduate level specialization through multiple degree programs across several schools. Course details and outcomes were defined within the brainstorming sessions, and subject matter experts and reviewers representing the relevant fields were selected. The group anticipated several key benefits of bringing together students from different disciplines into the same courses.

First, in terms of institutional benefits, courses relevant to multiple programs can maximize resources. For example, one faculty member is needed per course. As a second example, course enrollment tends to be higher, as the pool of potential students is larger. This makes the courses easier to facilitate due to the larger number of perspectives being shared on the discussion boards. Finally, when launching a new program, the practice of cross-program launches spreads out risk. If the specialization is not successful in one program, then perhaps it will be successful in another. This case study involved launching both the specialization and certificate in four distinct programs across three unique schools. Some benefits can be seen from the perspective of employability.

One such benefit is that students can connect with peers with diverse backgrounds, which helps build professional networks. Having a network of peers who are working in a wide variety of fields can be very helpful when aiming to find or change jobs post-graduation. A related benefit is that students who are taking courses with peers from fields that differ from their own often learn about more career opportunities. For example, students who are taking business courses with other students from the business department will likely learn about business careers, but they may not have any idea what students of psychology can do following their graduation. Placing business and psychology students in a course together creates opportunities for synergies to be formed through shared experiences, deepening the experience of all students involved. The decision to launch a certificate in the same subject area simultaneously was made based on several key considerations.

The first consideration was access. Adding more options creates multiple on- and off-ramps, making the program more accessible to a wide variety of students. Some prospective students are hesitant to sign up for a full master's degree program due to factors such as cost, time, or uncertainty regarding their ability to dedicate the energy needed to fully engage. Individuals who are in this situation may be much more amenable to a three-course certificate, which would provide them with a credential that would help them gain employment following completion. The exposure to graduate level work would then allow them to ascertain whether a master's degree would work for their current goals and lifestyle. Students who earn the certificate and want to leave can do so. Students who earn the certificate and want to apply to the master's degree program are welcomed, and their three completed courses are applied to the specialization component of their degree requirements. An additional benefit of offering a specialization and certificate with the same courses is that certificate students can take courses with students enrolled in the degree programs, thereby increasing section size, and consequently improving student engagement through exposure to multiple perspectives from students with diverse backgrounds. A final benefit is that certificate

students may receive mentorship from students enrolled in degree programs, which could be a significant value add.

Case Study 2: Aligning With Industry Certifications

The main objective of this case was to identify a degree program that would be amenable to incorporating one or more industry certifications. Criteria utilized to evaluate potential fit included career opportunities for certification holders within the field, interdisciplinary relevance, and program length. First, in terms of opportunities for certification holders, the team was presented with a wide variety of potential degree fields, given the focus of the college in which the analysis was conducted: business, engineering, and technology. Despite the plethora of opportunities, some were more clearly aligned than others. Cybersecurity, for example, provided multiple opportunities for connecting industry certifications. Moving to point two, pairing cybersecurity with a supported field intended to build enrollments on both sides.

Accounting was once considered a top field of study, due in part to the opportunity graduates had to earn the Certified Public Accountant credential. Today, the profession and the CPA certification are suffering, as evidenced by decreasing enrollments. Further, the Certified Public Accountant examination coverage has evolved, necessitating changes to coursework in accounting programs. Along with this, the profession of accounting is being revolutionized by the demand for artificial intelligence (Al) and cybersecurity compliance. For example, Thody (2024) argues that AI impacts students of accounting in several ways, creating opportunities for personalized learning and instant feedback. Other research elucidates the demand for AI proficiency among graduates of accounting programs (K. Williams, 2024). AI represents only part of the necessary skill set, which has been described as the ability to identify data breaches and act as a first line of defense against attacks (Levin, 2022). In alignment with this literature, the CPA exam has incorporated a section on technology. Due to extensive literature elucidating the ways in which the field of accounting is moving into alignment with core principles of cybersecurity, the aforementioned subject areas were considered for the case.

Tolulope (2024) provides an evaluation of the fields of accounting and cybersecurity, comparing the main competencies associated with each career field. Results of the analysis demonstrate significant differences paired with core similarities. Due in part to an increased emphasis on digital work, the protection of financial data through implementing cybersecurity practices is clearly needed. The rise of the cyber-CPA is also addressed in Schuman's (2023) work; the author argues that the new technology-focused CPA requirements will produce accountants with the ability to engage in multiple tasks with relevance to cybersecurity. A cybersecurity accountant can evaluate financial data through a different lens, one that combines financial acumen with cyber knowledge. They are adept at spotting irregularities in financial transactions or patterns that may signal a cybersecurity threat, such as unusual financial flows that could indicate a breach or fraud. This hybrid expertise allows them to detect subtle abnormalities that might be overlooked in standard cybersecurity protocols. For instance, inconsistencies in financial reporting or unexplained deviations in financial trends could be early indicators of a cyber incident, which cybersecurity professionals might miss.

Finally, in terms of the last goal, selecting a program with parameters aligned with a reasonable completion time, a specialization/certificate was selected. This positioned students to complete coursework within three courses or nine credits. There were several considerations regarding the selection of specific certification(s) with which to align program content given the wide variety of options. First, in terms of content, the goal was to avoid incorporating excessive content to avoid impacting workload within the courses—thus necessitating the removal of pertinent lessons and/or assignments. Next, the presence of exam preparation materials and the ease with which these could be shared within the online course room was determined. Finally, the likely increase in earnings potential associated with the completion of the industry certification was considered during the selection process. Based on the aforementioned criteria, it was determined that content would be aligned with the five domains of the certified information system auditor credential.

Case Study 3: Integrating Industry Certificates

National University offers degree programming in a wide variety of subjects, all of which have been vetted to determine that they align with career opportunities and growth. This supports accountability to students, and it provides graduates with the opportunity to secure gainful employment after completing their degrees. One program, a bachelor's degree program in project management, was recently launched due to the projected growth of the field and the many career opportunities available to graduates. Individuals holding a bachelor's degree in the area of project management can work in roles such as project manager, project coordinator, project scheduler, project director, operations manager, portfolio manager, and chief project manager. The median salary for project managers with a bachelor's degree is just under $100,000 and is expected to grow by 7% over the next 10 years. Despite these incredibly positive statistics, most college students need to earn money while working towards their degrees, particularly the working adult students that make up the majority of the student population at National University. Earning a bachelor's degree takes time, and adding a credential that could be used sooner can increase student value through improved employment opportunities. One relevant credential is the Google Project Management Certificate. The certificate is a self-paced online course that focuses on project management artifacts and skill sets and essential business acumen skills like stakeholder management, influencing, critical thinking, and effective communication. The course curriculum is designed with input from top project management employers. This certificate serves as a valuable credential that complements a student's educational path, offering the potential to earn academic credits for prior learning that can be applied to a wide range of undergraduate and graduate degree programs.

The Google Project Management Certificate incorporates a compilation of case studies, audio-visual materials, discussions, formative and summative assessments. General discussion topics are effective project management, working effectively with teams and stakeholders, maintaining project quality, and data-informed decision-making. The main learning outcomes incorporate the creation of project documentation and artifacts, skills needed to succeed in entry level project management roles, agile project management, and strategic communication.

Upon completion of the 126-hour, self-paced Google Project Management Certificate, the student is awarded a National University Workforce Education Solutions Professional and Continuing Education Certificate of Progress and Credly digital badge for all six units. Additionally, 24 National University continuing education units and 100 or more required professional development units are obtained for the project management institute. After completion, the credits may then be used to replace a Bachelor of Science project management course. The replaced project management essentials course includes all the elements of the Google certificate, as it supports the project management framework, management, methodologies, planning, implementation, and closure. It directly covers two modules, such as foundations of project management, project initiation: starting a successful project, and project execution: running the project.

Further, this certificate provides industry-recognized credentials demonstrating project management skills while enhancing students' employability across multiple sectors like technology, healthcare, and finance. This training prepares our students for entry-level project management roles while advancing future marketability and credibility. This matters for our population of students at National University because of the ease of transferring credits towards degree programs and supporting an ideal alignment with the university's career-focused educational model. Further, this partnership signals a strong commitment to professional skill acquisition while enhancing the student's employability in national and international project management roles. These benefits support National University's mission of preparing students for competitive professional environments by integrating practical, industry-recognized credentials into academic progression.

The Google Project Management Certificate is a fully online project management training program that provides learners with the skills needed to begin or enhance their career in project management. The certificate program is a full-scale program that does not require prior project management experience and helps learners gain knowledge with developing project plans, estimating costs and schedules, identifying, and managing risk, leading, and managing teams, negotiating, and mediating problems, and applying agile

and scrum frameworks. The program is designed to build from concept-to-concept, providing opportunities for learners to demonstrate their knowledge and skills throughout. Those who successfully complete the certificate have the opportunity to not just qualify for jobs but also access a network of jobs available through Google's employer network, helping to provide learners with the opportunities to transition to a role in project management such as that of a project coordinator, project manager, project assistant, or program manager.

While the Google Project Management Certificate can be standalone, National University strategically decided to embed it directly into three courses in our project management certificate. This allows students to earn additional credentials while they progress towards either a master's in business administration or a Master in Public Administration. The work to embed the certificate was tactical, requiring alignment with course learning outcomes and revisions to the courses to ensure students were not being asked to do more coursework. The goal was to make it a seamless experience for learners, augmenting existing coursework while providing students with tangible credentials and the ability to demonstrate applied knowledge.

To accomplish this, we used a multi-step approach that included the following steps. We:

1. Identified the courses to embed the credential.
2. Gathered the academic course(s) outcomes and the credential outcomes and completed an alignment analysis.
3. Gathered the prerequisite information for the credential and compared it with prerequisite requirements for the considered academic courses.
4. Confirmed the selection of the final academic course(s) for credential integration.
5. Calculated the credential's contact and non-contact credit hours using the standard National University methodology.
6. Verified the itemized credit hours for the selected academic course(s).
7. Determined the credit hour impact of adding the credential to the course(s) and the necessary revisions to meet the course outcomes and required credit hours.
8. Completed course revision by reviewing and revising readings and assignments to incorporate certificate material into the reading and assignments, augmenting existing content, removing redundancy, and refining the learning elements for learners.
9. Launched the revised program for learners.

The integration work was intentional, tying each lesson within the Google program into the course learning outcomes and the lessons for each unit. Assignments were modified to require content from the Google Certificate, which included a mix of concepts, sources, tools, and case studies. The assignments in the course, while already a mix of applied and theoretical assignments, were enhanced to become more applied in nature, allowing learners to showcase their skills, which then allows them to incorporate final projects into a portfolio for future employers.

LESSONS LEARNED

Lessons learned are centered around the need for intentionality, practical applications of shared specializations, diverse perspectives, and alignment with student access factors.

Intentionality

Integrating content with relevance to industry certifications requires intentionality. Throughout the planning process involved in Case Study 2: Aligning With Industry Certifications, it became clear that several parameters would impact the degree to which content could be aligned. One key factor was workload. Many industry certifications require the completion of specific content. In cases where content for courses has already been developed, industry certification content cannot simply be added or workload may get out of hand. Additionally, any content related to an industry certification must directly align with course objectives or cohesiveness will be compromised. As such, intentionality is needed from the start. Beginning with the end in mind is a relevant strategy. The first step is selecting relevant industry certifications and exploring their requirements. Next, partnering with organizations that offer the

certification can provide additional insight into opportunities. The next step is to create a matrix that compares objectives from the industry certification with objectives from the course where the content will be offered. These steps can effectively position the content in a way that learners can easily absorb it. Additionally, content coverage must be ensured.

For instance, if content is being removed to include additional content required for an industry certification, the degree to which coverage of necessary program content by the impacted course must be evaluated to ensure all concepts remain clear. If these steps are not taken, the integrity of the original degree or certificate is threatened. A related consideration is the need to be intentional regarding marketing materials. Programs that include industry certifications that require examinations and/or payments to entities that differ from the university offering the course(s) must be clearly indicated.

Shared Specializations

As anticipated, the process of implementing a specialization shared by multiple units did indeed spread-out risks and maximize returns. As outlined in Case Study 1: Bridging Disciplines, a specialization and certificate were launched simultaneously in multiple programs across multiple schools. This reduced spending in terms of marketing, course design, and course scheduling. First, marketing materials only needed to be created once and could be easily integrated into each program. Additionally, introductory videos and other materials could be used by each program. In terms of course design, each course was designed only once and then reviewed by members of the schools in which it would be used. This led to robust courses with great applicability, and fewer resources were needed to develop the program. In terms of scheduling, expected enrollments across the programs and schools were evaluated, and courses were scheduled with ease, due to the number of faculty members across the schools who were qualified to teach each of the courses. Through the observed collaboration of subject matter experts and reviewers, it was clear that diverse perspectives led to significant constructive interaction and a top-notch product.

Diversity of Perspectives

The collaborative design of both the program and the courses certainly led to the incorporation of diverse perspectives. Including a voice grounded in learning science proved extremely helpful, supporting the incorporation of best practices for online courses; engagement; and student-student, student-instructor, and student-content interaction. Subject-matter experts and reviewers collaborated on resources to ensure that voices from multiple fields were included in each course. The collaborative cross-disciplinary group contributed to creativity and the development of quality learning experiences.

In terms of creativity, the visioning sessions that were held led to a wide variety of ideas being shared. When implementation questions arose, diverse ideas were shared, which led to synergistic conversations loaded with innovative strategies. The creativity with which the program was developed made it even more applicable to learners from a wide variety of disciplines. For instance, readings on topics within each discipline relevant to the field of study were included, and discussion questions centered around organizational issues relevant to each discipline were prioritized. As time goes on, student feedback will be used to assess the degree to which the courses are perceived as relevant to learners, and adjustments will be made as needed. Possibly the most important lesson learned relates to student access.

Student Access Factors

The two case studies evaluated here demonstrate that certificates can be very well aligned with student access factors, which is quite beneficial from a recruitment perspective. First, access to funding matters. Many students must pay their own way, and, as such, the cost counts. When developing any program that will be offered to students, return on investment should be a main priority, and so considerations like overall cost and time must be used to inform decisions. In Case Study 1: Bridging Disciplines, offering multiple on- and off-ramps aligned to increase access to the learning material and the opportunities associated with the completion of the credential. In Case Study 2: Aligning With Industry Certifications, including certification opportunities for students was intended to increase their access to employment both during and after the completion of the degrees. Access matters—access to quality higher education matters, and

employability can only be increased through higher education programs when students can actually access the programs. There are several ways that higher education institutions can increase the ease with which students can access their programming.

FUTURE DIRECTIONS

The future for integrating certificates is truly endless, and it is an important part of National University's approach to rich credential pathways. There are a number of considerations for this goal. First, in terms of relevance, hundreds of thousands of "certificates" and "certifications" are in the market, but not all of them add value for learners. The key is to identify the market value of certificates and certifications and identify the ones that are valuable to industries. This means collaborating with industry professionals and academic experts and conducting market research to identify the value of certifications before embarking on initiatives focused on embedding them into academic courses. In addition to integrating relevant certificates into additional degree programs, future directions of the work presented here can focus on quantifying impact.

First, in terms of Case Study 1: Bridging Disciplines, the next steps will involve the isolation of core skills, which can then be developed throughout the credential. This can be accomplished through a skills assessment informed by subject matter experts. The skill levels in each relevant area among those completing the credential could then be compared to those of other students to demonstrate the impact of the coursework. Additional assessments could be conducted to evaluate the impact of the core skills identified through the first analysis and the employability factors to provide data regarding the actual impacts of the program.

Moving towards exploring impacts related to Case Study 2: Aligning With Industry Certifications, the collection of completion data and the assessment of student feedback regarding experience would be useful. Additionally, evaluating the employment outcomes of students completing the credential with those in other programs would elucidate any material improvements associated with credential completion.

Finally, Case Study 3: Integrating Industry Certificates, the collection of employment data from students completing the program before and after integrating the Google certificate could inform impacts. Additionally, interviews with relevant employers could be used to assess the relative importance of the certificate for individual students.

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