



International Journal of Business Performance Management

ISSN online: 1741-5039 - ISSN print: 1368-4892

<https://www.inderscience.com/ijbpm>

Bridging the gap between academia and industry: a case study of collaborative curriculum development

Tamilselvan Mahalingam

DOI: [10.1504/IJBPM.2024.10063237](https://doi.org/10.1504/IJBPM.2024.10063237)

Article History:

| | |
|-------------------|------------------|
| Received: | 01 June 2023 |
| Last revised: | 08 February 2024 |
| Accepted: | 08 February 2024 |
| Published online: | 02 July 2024 |

Bridging the gap between academia and industry: a case study of collaborative curriculum development

Tamilselvan Mahalingam

Faculty of Business,
Higher Colleges of Technology,
Dubai Men's Campus,
Dubai International Academic City, Dubai, UAE
Email: tmahalingam@hct.ac.ae

Abstract: This study investigates the alignment of academic curricula with industry requirements through the implementation of an industry-driven curriculum (IDC) framework within a higher education institution. The study involved engaging subject matter experts (SMEs) from various industries to provide feedback on the course syllabus and identify gaps in the curriculum to meet expected competencies. Employing a qualitative case study approach, the research examines the integration of IDC in curriculum design and delivery, focusing on how it bridges the gap between academic offerings and industry needs. The findings suggest that collaboration between academia and industry is critical for developing relevant and effective curricula and that the IDC framework can be a useful tool for facilitating this collaboration. The research contributes to understanding the role of IDC in higher education and provides actionable insights for educators and policymakers aiming to foster industry-academia collaboration.

Keywords: industry-driven curriculum; IDC; industry-academia collaboration; university-industry partnership; curriculum evaluation.

Reference to this paper should be made as follows: Mahalingam, T. (2024) 'Bridging the gap between academia and industry: a case study of collaborative curriculum development', *Int. J. Business Performance Management*, Vol. 25, No. 4, pp.589–603.

Biographical notes: Tamilselvan Mahalingam is a Lecturer and Quality Assurance Manager at the Higher Colleges of Technology, UAE, holding a PhD in Management. He specialises in quality management, project management, and teaching with technology. As a Senior Fellow of Advance HE, UK, and recipient of the ACBSP Teaching Excellence Award, he demonstrates a commitment to educational excellence. He also holds a PMP, CMQ/OE, and Six Sigma Black Belt certifications, reflecting his expertise in quality and project management.

1 Introduction

Aligning academic curricula with industry needs has long been a challenge acknowledged by educators and practitioners (Frolund et al., 2018; Marens, 2009; Sutliff, 2000). One promising solution is co-creating curricula with industry stakeholders, involving their active participation in shaping academic programme content and delivery

(Cossham and Irvine, 2021). Co-creating a curriculum can foster mutual learning, knowledge exchange, and social impact between universities and industries (Bovill et al., 2021). Collaborative efforts like these help to better understand industry needs and requirements, which improves the quality and relevance of academic programmes (Edmondson et al., 2012). Co-creation of curricula also equips students with practical skills and knowledge valued by the industry, easing their transition into the workforce (Ankrah and AL-Tabbaa, 2015).

Co-creation of curricula is not a novel concept, and educational institutions worldwide have adopted this approach to varying degrees of success (Azevedo et al., 2012; Baumann et al., 2014; Borglund et al., 2019; Edmondson et al., 2012; Shrivastava et al., 2022). The literature reports increasing benefits from co-creating curricula between higher education institutes and businesses (Borglund et al., 2019; Plewa et al., 2015; Shrivastava et al., 2022). While the approach to engaging industry partners in curriculum development can vary significantly among higher education institutions, including differences in structure and format, clear governance from the institution for co-creating curricula with industry partners can prove advantageous (Fini et al., 2011).

Several studies have examined collaboration between universities and industries, primarily focusing on developing generic frameworks and good practices for collaboration rather than providing specific recommendations for co-creating curriculum with the industry (Burnside and Witkin, 2008; Ehrismann and Patel, 2015; Edmondson et al., 2012; Greitzer et al., 2010; Prigge, 2005). A team of researchers, including 20 external collaborators, participated in a study by the Australian National University to develop a framework to improve collaboration between universities and industries. The team conducted an extensive literature review, but the recommendations were generic and leaned toward research collaboration (Awasthy et al., 2020). Due to the lack of an existing framework or a model to co-create curriculum with the industry partner, the Faculty of Business, Higher Colleges of Technology (HCT) developed a purpose-built industry-driven curriculum (IDC) framework integrated with the existing governance system for continuous course improvement. This paper emphasises the development and implementation of the IDC framework, providing insights into the practical application of the framework for co-creating curricula with industry partners.

2 Research methodology

The research methodology applied in this study is a mixed-methods (Creswell, 2023) case study approach, which is particularly effective for investigating complex phenomena within their real-life contexts. This approach combines the quantitative rigour of descriptive statistics and the qualitative depth of content and thematic analysis, providing a comprehensive understanding of the collaborative curriculum development process.

Content analysis was initially used to analyse the qualitative data collected through open-ended questions in the survey. This method involved categorising the textual data into systematic and quantifiable aspects, providing a structured approach to the initial analysis. Following content analysis, thematic analysis was employed to explore the qualitative data, identifying and interpreting patterns within it. This interpretative method allowed for a better understanding of the feedback, uncovering underlying themes and broader implications beyond the surface-level categorisation.

Several research methodologies were considered in exploring the effectiveness of the IDC in bridging the academia-industry gap. Quantitative approaches, such as surveys or experimental designs, offer broad generalisability but may lack the depth and contextual richness required to understand complex educational frameworks. Qualitative methodologies like ethnographies provide detailed insights but can be less focused on the specific outcomes of curriculum changes. The case study approach was selected as it strikes a balance, allowing for an in-depth examination of IDC implementation within a specific institutional context. This approach provides rich, detailed data that is crucial for understanding the interactions between academic curricula and industry requirements, which might be lost in broader quantitative studies or overly detailed ethnographies. The case study method, therefore, offers the most relevant and practical insights for this particular research focus.

Overall, the case study approach provided a valuable method for investigating the collaborative curriculum development process and evaluating the effectiveness of the IDC framework. It also allowed us to identify key challenges and opportunities for improvement in the curriculum development process. The combination of content and thematic analysis within this framework ensured a comprehensive and multi-layered understanding of the qualitative data.

The following sections highlight the context of the case study and the results of implementing a framework to co-create nine business courses with industry experts, including its impact on the curriculum.

3 The context of the IDC project

The case study focuses on the IDC project implemented by the Faculty of Business at the HCT, which serves as the UAE's largest federal government higher educational institute. As of spring 2023, HCT has a total student population of 22,745, including 6,800 business students, and has 14 campuses spread across the country. The Faculty of Business offers nine bachelor's degree programmes in various business disciplines, making it a significant contributor to business education in the region. The IDC project aligns with one of the HCT Strategic Vision 2026 Aspiration, 'Education towards wealth-creating careers', emphasising the importance of an IDC that aligns with market needs and anticipates future market demands.

The Faculty of Business, HCT conducts Industry Advisory Committee (IAC) meetings with a group of representatives from the industry. These meetings are usually for about two hours, during which IAC members provide feedback and comments on the programme structure, courses, technology, and current trends, to name a few. The academic programme chairs (APCs) and system course team leaders (SCTLs) are tasked with incorporating the suggestions into the programme and respective courses. This approach is suitable for performing a macro-level analysis of the programme. However, the courses that make up the programme do not go through an in-depth analysis of weekly content, course learning outcomes (CLOs), assessment strategies and instruments, course activities and projects. At the grassroots level, content does not go through the lenses of the subject matter experts (SMEs), which might lead to a lack of relevance and currency. These shortcomings are due to limited interactions and IAC members lacking subject matter expertise at a course level.

Considering these challenges, the Faculty of Business has initiated an IDC project to co-create course curricula with industry SMEs. As listed in Table 1, nine business courses from year four were selected for the project in the fall of 2022, representing the same number of bachelor's degree programmes. Each of the nine business courses selected for the project has an SCTL and APC, who collaborate with the SMEs from the industry to redesign and improve the course content, aligning it with industry expectations and authentic competency-based assessments. The project was led by the quality assurance manager (QAM), who reports to the executive dean of the Faculty of Business.

Table 1 Courses selected for the IDC project

| <i>Code</i> | <i>Title</i> | <i>Programme</i> |
|-------------|--|--|
| ACC 4033 | Accounting for decision making and control | Bachelor of Accounting |
| BNA 4023 | Big data and advanced data mining | Bachelor of Business Analytics |
| FIN 4003 | Bank management | Bachelor of Finance |
| HRM 4143 | Strategic HRM and HR analytics | Bachelor of Human Resource Management |
| ENT 4033 | Startup lab | Bachelor of Innovation and Entrepreneurship Management |
| MRK 4113 | Data-driven B2B marketing | Bachelor of Marketing |
| QMT 4053 | Lean management | Bachelor of Quality Management |
| SLM 4003 | Supply chain risk management | Bachelor of Logistics and Supply Chain Management |
| TRM 4103 | Event management for tourism | Bachelor of Tourism Management |

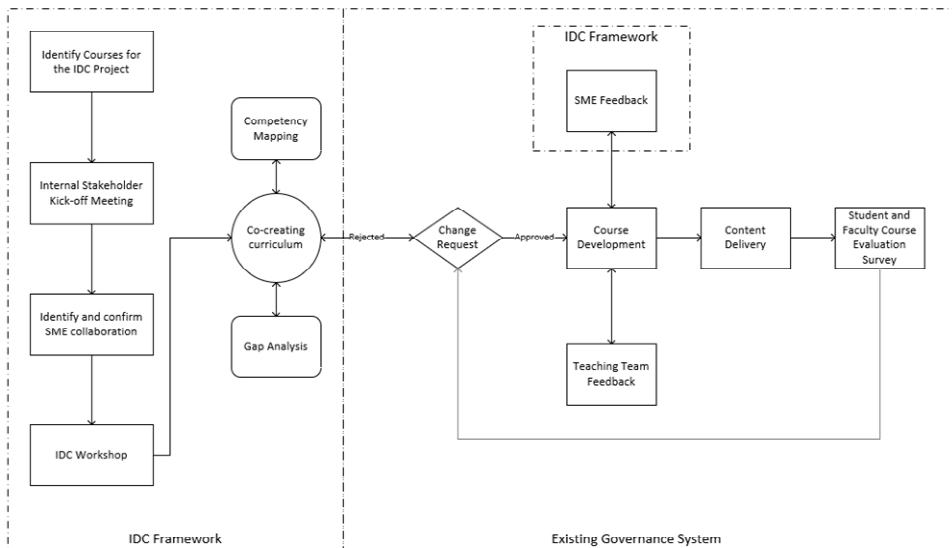
The selection of the nine courses for the IDC project was a deliberate and strategic decision, emphasising the critical stage of these courses in the curriculum and the pivotal role of SCTLs who voluntarily participated in this initiative. Each course, representing a distinct programme, was carefully chosen for its delivery in the final year (year 4), a crucial period for equipping students with essential competencies for their transition into the professional world. This stage is significant in offering opportunities to impact students' industry readiness significantly. The involvement of SCTLs was key, as it ensured the chosen courses were not only strategically placed in the academic journey but also supported by experienced faculty, enhancing the relevance and impact of the IDC initiative. This approach was instrumental in aligning academic content with industry requirements, thereby bolstering student employability and readiness for professional challenges.

3.1 The IDC framework

While the HCT had policies and guidelines in place for its IAC, there was a need for a framework tailored to the specific context of the organisation and the IDC project for the system-wide course team leaders (SCTLs) and APCs. To meet this need, the QAM proposed an initial purpose-built integrated IDC framework, incorporating the existing governance structure within HCT (see Figure 1). This framework was developed to provide a systematic approach to collaboration between academia and industry, focusing

on bridging the gap between academic curricula and industry requirements. It was designed to facilitate identifying industry needs, mapping competencies, gap analysis of existing curricula, and developing a competency-based curriculum in partnership with industry experts. The executive dean and the APCs have accepted the proposed framework, providing a structured approach for co-creating curriculum with industry partners that align with market needs and anticipate future market demands.

Figure 1 The integrated IDC framework



The IDC framework serves as an extension to the existing HCT governance system for continuous course improvement. As depicted in Figure 1, the IDC framework triggers the change control mechanism the Faculty of Business already practices for any course changes. Various factors, such as student course evaluations, faculty course evaluations, accreditation feedback, industry standards and guidelines, the professional certification body of knowledge, special task force reports, and course council feedback, trigger this mechanism. The IDC framework also introduces a new process involving SMEs during course development, which is implemented if the trigger is the IDC project. Involving SMEs in every course change due to various triggers is not sustainable.

Nine business courses were selected based on the SCTLs volunteering to pilot their courses for this project. An internal stakeholder kick-off meeting was held and attended by the ED, QAM, APC, and the SCTLs. During this meeting, the IDC framework and its alignment with the school vision were articulated with clearly defined roles and responsibilities and the project goal. APCs and the SCTLs are tasked to identify the SMEs specific to the nine selected courses through LinkedIn, recommendations from the IAC members and professional associations. A formal invitation letter was sent to the shortlisted SMEs. The invitation letter clearly stated the SMEs' time, workshop, meeting, workload and deliverables commitment. Fifteen SMEs have agreed to participate in the project. For example, the vice president of artificial intelligence and machine learning of a reputable bank and a data scientist from a machine learning consulting firm agreed to

participate in the IDC project for one of the nine business courses ‘big data and advanced data mining’ which belongs the Bachelor of Business Analytics programme.

3.2 The IDC workshop

The IDC workshop, conducted via Zoom on September 30, 2022, was a critical component of the IDC project. It began with an introductory session that set the context by outlining the project’s objectives and its overarching significance. This initial phase was essential in framing the subsequent breakout sessions, each tailored to a specific programme and course.

In the nine breakout rooms, corresponding to different courses across nine programmes, APCs, SCTLs, and SMEs from the industry were brought together. Their collaboration focused on completing the competency mapping and gap analysis for each course. The competency mapping and gap analysis documents were central to the workshop’s activities. Participants received an hour of training on how to effectively utilise these tools, ensuring a clear understanding of their application in the breakout sessions. This preparatory segment was critical in aligning everyone’s approach to the analysis process.

In the course-specific focus groups, SMEs, SCTLs, and APCs performed an in-depth examination of their assigned courses. This analysis, lasting two hours, culminated in each group producing and submitting documents that included detailed competency mapping and gap analysis. The QAM, in the role of facilitator, played a key role in the workshop’s success. By visiting each breakout room, the facilitator provided real-time support and answered queries, facilitating a smooth and effective workshop experience.

The competency mapping document commenced with basic course information, leading into sections where SMEs suggested job roles relevant to each course. For instance, an SME identified the role of ‘event coordinator’ as pertinent to the ‘event management for tourism’ course. Following this, the job profile section detailed the responsibilities and competencies associated with these roles. The gap analysis document was instrumental in evaluating the course syllabus against the identified competencies. It included prefilled information such as CLOs, delivery framework, assessment strategies, and spaces for SME feedback on job profiles and competencies.

The workshop concluded with each team submitting their completed documents, marking a significant milestone in the IDC project.

4 Case analysis

The following four sections provide an overview of the feedback SMEs provided during the gap analysis process in four key sections: CLOs, course delivery framework (weekly content), schedule of activities and assessment strategies. Later, a summative thematic analysis is performed to identify common themes and patterns in the SMEs’ feedback on the relevance and alignment of the course content with industry expectations and the competencies required to perform tasks in the professional workplace.

4.1 Course learning outcomes

SMEs provided feedback on CLOs for each course. The analysis shows that five out of nine courses did not require any changes to their CLOs, as they aligned with industry expectations. The thematic analysis highlights the importance of collaboration with industry SMEs to ensure that CLOs align with the current market needs and trends, making the curriculum more relevant and up-to-date. For the BNA 4023 – big data and advanced data mining course, SMEs recommended adding cloud computing concepts and applications (Azure, AWS, IBM Watson). For ENT 4033 – startup lab, SMEs recommended adding four revised CLOs, including identifying business ideas in line with passion, assessing business ideas in line with market opportunities by conducting market research, adding minimum viable product (MVP), and using the business model canvas. For MRK 4113 – data-driven B2B marketing, SMEs recommended more hands-on opportunities to use tools such as SPSS and Tableau to build a deeper understanding of the theoretical base for students. For QMT 4053 – lean management, SMEs recommended more clarity on the transformation and the impact on the organisation, emphasising the human element and human-centric cultures for improvement.

4.2 Course content

The SME feedback on course content for the nine courses reveals several recommendations for improvement. In ACC 4033, no changes were recommended for the weekly topics. However, in BNA 4203, SME recommended adding cloud computing concepts, machine learning Azure tools, data governance and sustainability, and deep learning concepts/algorithms/solutions like the neural network. For FIN 4003, SME suggested incorporating content on UAE rules and regulations, comparing them to their international counterparts, and shedding some light on (ESG) environmental risk, social risk, and governance risk and the resulting impact on banks' P&L and liquidity. For HRM 4143, SME suggested emphasising the dynamics of the industry, supporting students with social theories related to organisational change and diversity, emphasising learning that focuses on the dynamics of the industry, and differentiating between strategies crafted for growing and dying industries. In ENT 4033, SME suggested exploring entrepreneurial DNA further, mentioning tools, focusing marketing research on UAE trends, and training students on pitch deck development, among other things. In MRK 4113, SME recommended emphasising the value students should draw from the course for their future careers, exposing students to real-world problems, and bringing in guest speakers from industry. For QMT 4053, SME suggested adding more information about lean transformation and how it impacts an organisation, using more visual capabilities, and identifying waste as one of the basic aspects of lean. In SLM 4003, SME suggested including subtopics such as cultural/professional risk, enhancing corporate social responsibility to SCRM, contingency plan, risk register and supply management risk. Finally, for TRM 4103, SME recommended eliminating some topics, adding project management and follow-up, and identifying the right sponsor for the event.

4.3 Schedule of activities

The SME feedback on the schedule of activities shows that some courses require adjustments while others require no changes. The feedback on the activities highlights the need to incorporate relevant and practical activities that enhance students' learning and understanding of the course content. Some suggestions include adding relevant industry case studies, reinforcing lecturing with blended learning, and introducing data analysis and visualisation tools. Other recommendations include aligning business ideas with the UAE innovation strategy and marketing research with UAE trends.

Table 2 Key summary of SME feedback

| <i>Code</i> | <i>CLO</i> | <i>Course content</i> | <i>Course activities</i> | <i>Assessment</i> |
|-------------|---|---|--|--|
| ACC 4033 | No changes | No changes | No changes | No changes |
| BNA 4203 | Add cloud computing concepts | Add neural network apps in week 6 | No changes | Group strategy: small groups (30%), oral defence (10%) |
| FIN 4003 | No changes | Add ESG risks, UAE rules comparison | No changes | No changes |
| HRM 4143 | Include: understand industry dynamics, alignment, budget, and data analysis | Emphasise industry dynamics, social theories, industry maturity | Case study, blended learning, practice session | Situation-based case studies |
| ENT 4033 | Include: identify and assess business ideas, MVP, business model canvas | Add entrepreneurial DNA, UAE marketing research, product design, and pitch deck | Align with UAE innovation strategy | Idea justification, product design, pitch deck competition |
| MRK 4113 | Include: emphasise value, guest speakers, real-world exposure | Establish instructor database usage | Mix individual/group, industry panellists | Mix individual/group, industry panellists |
| QMT 4053 | Include: lean transformation, human-centric cultures | Add lean basics, tech implementation, value stream mapping | Introduce visualisation, AI tools | Oral assessment, tangible case study, group exercise |
| SLM 4003 | No changes | Add risk management, CSR, ISO 31000:2018 | No changes | Performance review, competency-based assessment |
| TRM 4103 | No changes | Adapt activities based on topics | No changes | Event audit report (20%), event production (40%), digital portfolio (25%), oral presentation (15%) |

4.4 Assessment strategies

Overall, the SME feedback on assessment strategies for the nine courses is mixed. The feedback suggests creating assessments that test knowledge and application and incorporate industry practices and current trends. While some courses require no changes to their assessment methods, others suggest incorporating external reviewers or industry experts, adding more group work, and emphasising knowledge testing. Additionally, courses like HRM 4143 and ENT 4033 suggest using case studies that delve deeper into problems rather than surface-level analysis. On the other hand, TRM 4103 recommends eliminating the midterm exam and adding a project for event production and an oral reflection and presentation to the assessment criteria.

5 Thematic analysis

Thematic analysis was chosen as the primary method for analysing the feedback provided by SMEs due to its flexibility and effectiveness in identifying, analysing, and reporting patterns within qualitative data. This approach allowed for a better understanding of the SMEs' perspectives, ensuring that the insights gathered were both comprehensive and relevant to the course enhancements. Thematic analysis is particularly adept at capturing the complexities of qualitative data, making it an ideal tool for distilling diverse feedback into actionable insights for curriculum development.

Following the selection of this methodology, the process began with the identification of initial themes from the SME feedback. This stage involved an open coding technique, where the data was examined without preconceived categories, allowing for an organic emergence of themes directly from the SMEs' insights. The emergent themes were then subjected to axial coding, involving a detailed examination and reassessment of the initial codes to explore interrelationships and patterns.

The final stage of the analysis involved selective coding, focusing on the most salient and representative themes. This process ensured that the themes developed were deeply grounded in the data and reflective of the key patterns and insights provided by the SMEs.

The thematic analysis yielded the following key themes:

- 1 *Application-focused learning*: SMEs emphasised incorporating practical and application-based learning in courses. This includes using case studies, inviting industry guests, providing hands-on practice sessions, and focusing on real-world issues and scenarios.
- 2 *Emphasis on technology*: SMEs recommended including more technology-related topics and tools in courses, such as cloud computing, data governance, and data visualisation tools like Power BI. Additionally, they suggested incorporating tools like the Microsoft School of AI, statistical software, and artificial intelligence algorithms in courses.
- 3 *Collaboration and group work*: SMEs suggested moving away from individual assessments and incorporating more group work and collaboration in courses. This includes group projects, assessments, and inviting external reviewers to judge student work.

- 4 *Focus on industry and local relevance*: SMEs emphasised the importance of making courses relevant to the local industry and regulations, including UAE rules and regulations, ESG risks and UAE innovation strategy. Additionally, they suggested using marketing research that is in line with UAE trends and ensuring that the course content and activities align with the dynamics of the industry.

The IDC framework, which includes competency mapping, gap analysis, and workshops, effectively gathered feedback from SMEs on the course content, delivery and assessment strategies. Competency mapping was crucial in identifying the required skills and knowledge that students should acquire from the course. The gap analysis helped identify the gaps between the expected competencies and the current course content, delivery and assessment strategies. The findings from the gap analysis were then discussed in the workshop, which provided a platform for SMEs to share their expertise and suggestions. This allowed for an open discussion and feedback process that involved multiple perspectives, including industry insights and educational best practices. Overall, the IDC framework successfully obtained valuable feedback from SMEs, allowing for the enhancement of the courses to meet the needs of students and the industry. The framework can be applied to other courses in various fields to gather SME feedback and improve educational offerings. The success of the IDC framework demonstrates the importance of involving SMEs in the course design and development process, as it ensures that the courses remain relevant, up-to-date, and effective in preparing students for their future careers.

6 Scope of work

After receiving feedback from SMEs, the SCTLs reviewed the gap analysis to prepare a scope of work for meeting the SMEs' recommendations. The SCTLs then submitted a change request form to the programme academic committee (PAC) for approval. The PAC, composed of faculty members of a specific programme, reviewed and evaluated the change request before approving it. Finally, the change request was further reviewed and approved by the faculty academic committee (FAC), represented by the executive director, QAM and nine APCs. The process ensured that the change request was properly evaluated and approved by relevant stakeholders in the academic programme, enabling the implementation of the changes recommended by the SMEs to improve the curriculum.

6.1 IDC framework governance

The IDC framework improvement project demonstrated a strong focus on governance through the involvement of multiple levels of oversight and stakeholder engagement. This ensured that the proposed changes were grounded in industry expectations and would result in graduates with the necessary competencies to succeed in the workforce.

The PAC and FAC provided an additional layer of governance to the project, ensuring that the proposed changes aligned with academic standards and programme requirements. The change request form, used to document and track proposed changes, further supported governance by providing a systematic approach to managing modifications to the IDC framework. The involvement of a QAM and an executive dean

in the approval process added a layer of oversight. It ensured that the changes aligned with the institution's academic goals and strategic direction.

Overall, the governance approach to the IDC framework improvement project ensured that proposed changes were grounded in industry expectations, met academic standards, and aligned with the institution's strategic goals.

6.2 IDC framework effectiveness survey

To gather additional feedback on the effectiveness of the IDC framework, a survey was conducted with both SMEs and SCTLs. The survey aimed to obtain their perspectives on the overall framework elements, including competency mapping, gap analysis and workshop. The survey consisted of several open-ended questions, such as selecting the level of course alignment with industry expectations and providing suggestions for improving the templates and the workshop. The survey was designed to capture qualitative and quantitative feedback on the framework's effectiveness and identify improvement areas. The survey results provided valuable insights into the areas where the IDC framework successfully met its objectives and where improvements could be made. The survey provided a comprehensive overview of the IDC framework's strengths and weaknesses. The feedback will be used to refine and enhance the framework.

The survey instruments include three questions on the Likert scale to measure the level of the course alignment (CLOs, course content and assessment) with the industry expectations. We assigned numerical values to each response, where 'very strong' was assigned a value of 5, 'strong' a value of 4, 'moderate' a value of 3, 'weak' a value of 2, and 'very weak' a value of 1.

Based on the survey responses from both SMEs and SCTLs, the overall level of course alignment with industry expectations was good, with an average score of 3.9 out of 5. The course content had the highest average score of 4.0 out of 5. In contrast, assessments had the lowest average of 3.7 out of 5, highlighting the gap between industry and academia in the assessment strategy.

Upon comparing the average scores of the three questions between SMEs and SCTLs related to course alignment with industry expectations, it can be observed that the SCTLs have rated the CLOs and course content more favourably than the SMEs. The average score for CLOs was 4.33 out of 5 for SCTLs compared to 4.07 for SMEs. Similarly, the average score for course content was 4.17 for SCTLs compared to 3.94 for SMEs. However, both groups rated the assessment component similarly, with an average score of 3.78 for SCTLs and 3.81 for SMEs.

This comparison suggests that the SCTLs may have a more positive perception of the course alignment with industry expectations, specifically regarding CLOs and course content. It is important to note that the difference in average scores for each question is relatively small, indicating that both groups generally agree on the alignment between the IDC framework outcomes and industry expectations.

7 IDC framework improvement recommendations

SMEs and SCTLs were asked to provide feedback on the IDC framework through three open-ended questions. The first question asked how to run the workshop better, and

both groups had similar suggestions. SMEs suggested circulating the CLO sheet in advance and having more industry networking opportunities. SCTLs recommended separating the discussions on CLOs and assessment strategies into separate workshops and allowing more time for the gap analysis process.

The second question was about improving the competency mapping template. SMEs suggested adding a column for real-life examples, while SCTLs suggested brainstorming with a larger group of participants and polling HCT graduates with work experience. Both groups agreed that the template was generally sufficient.

The third question was about improving the gap analysis template. SMEs recommended clearer linkages between CLOs and skills, while SCTLs suggested adding a column to determine how to bridge gaps. Overall, both groups found the gap analysis template well-developed.

Both SMEs and SCTLs provided constructive feedback to improve the IDC framework. They had similar suggestions on how to run the workshop better and agreed that the competency mapping template was generally sufficient. They also had similar suggestions for improving the gap analysis template, with SMEs focusing on linkages between CLOs and skills and SCTLs suggesting a column to determine how to bridge gaps. These suggestions can help improve the IDC framework and make it more effective for students and industry partners.

7.1 Lessons learned

- 1 Involving industry experts from the beginning is crucial for the success of the implementation of the IDC framework.
- 2 A joint workshop with clear requirements and structure is important for effectively engaging SMEs.
- 3 Providing detailed and clear instructions for completing templates can lead to more meaningful and useful SME feedback.
- 4 Ensuring adequate time for discussions and feedback is necessary to capture valuable inputs from SMEs.
- 5 Sharing the gap analysis and competency mapping templates well before the workshop ensures that SMEs are adequately prepared to provide constructive feedback.
- 6 Regular follow-up and updates with SMEs post-workshop are essential to maintain engagement and ensure the continuous relevance of the IDC framework.
- 7 Incorporating a feedback loop where SMEs can see how their input has been implemented enhances trust and collaboration in the IDC process.

7.2 Action plan

To put these lessons into action, a strategic plan will be implemented. This plan includes establishing a continuous communication channel with industry experts, scheduling regular update meetings, and creating a transparent feedback loop. Future workshops will be designed with an emphasis on interactive and dynamic participation, allowing more time for discussion and real-time feedback processing. The IDC framework will also be

updated to include mechanisms for regular reviews and updates, ensuring that the curriculum remains aligned with evolving industry trends and requirements.

This proactive approach will ensure that the IDC framework remains dynamic and responsive to the needs of both the industry and the academic community, fostering a collaborative environment that continually enhances the relevance and quality of education.

8 Conclusions

In conclusions, implementing the IDC framework involved multiple stakeholders, including industry experts, faculty members and programme leaders. The framework was designed to bridge the gap between academic programmes and industry needs by involving industry experts in curriculum development and implementation. The framework has been successful in improving the quality and relevance of the curriculum and enhancing the employability of graduates.

The survey responses from SMEs and SCTLs provided valuable feedback on the effectiveness of the IDC framework, which resulted in several recommended changes, including the need for more industry involvement in the curriculum development process, the provision of more practical case studies, and the need for continuous evaluation and improvement of the curriculum.

Lessons learned from the implementation of the IDC framework include the importance of involving industry experts early in the process, providing more time for workshop activities, sharing the gap analysis and competency mapping template well ahead of time before the workshop, ensuring effective communication among stakeholders, and providing adequate resources for the implementation of the framework.

Overall, the IDC framework has been a successful initiative in enhancing the employability of graduates and ensuring that academic programmes are aligned with industry needs. With continuous evaluation and improvement, the framework can continue to evolve and adapt to meet the changing needs of the industry and the workforce.

However, it is important to acknowledge the limitations of this study. The findings are based on a specific institutional setting, which may not be directly transferable to other contexts with different educational cultures or industry dynamics. Additionally, the perspectives of the SMEs and SCTLs involved may not encompass all relevant industry viewpoints, potentially limiting the breadth of insights. The scope of courses involved in the IDC framework was also limited, and a longer-term study would be beneficial to assess the sustained impact on student career outcomes and industry readiness. Recognising these limitations provides important context to the findings and highlights areas for further research and development in the future.

References

- Ankrah, S. and AL-Tabbaa, O. (2015) 'Universities-industry collaboration: a systematic review', *Scandinavian Journal of Management*, Vol. 31, No. 3, pp.387–408 [online] <https://doi.org/10.1016/j.scaman.2015.02.003>.
- Awasthy, R., Flint, S., Sankarnarayana, R. and Jones, R.L. (2020) 'A framework to improve university-industry collaboration', *Journal of Industry – University Collaboration*, Vol. 2, No. 1, pp.49–62 [online] <https://doi.org/10.1108/JIUC-09-2019-0016>.
- Azevedo, A., Apfelfthaler, G. and Hurst, D. (2012) 'Competency development in business graduates: an industry-driven approach for examining the alignment of undergraduate business education with industry requirements', *The International Journal of Management Education*, Vol. 10, No. 1, pp.12–28 [online] <https://doi.org/10.1016/j.ijme.2012.02.002>.
- Baumann, T., Harfst, S., Swanger, A., Saganski, G., Alwerfalli, D. and Cell, A. (2014) 'Developing competency-based, industry-driven manufacturing education in the USA: bringing together industry, government and education sectors', *Procedia – Social and Behavioral Sciences*, Vol. 119, pp.30–39, ISSN: 1877-0428, <https://doi.org/https://doi.org/10.1016/j.sbspro.2014.03.006>.
- Borglund, T., Prenkert, F., Frostenson, M., Helin, S. and Du Rietz, S. (2019) 'External facilitators as 'legitimizers' in designing a master's program in sustainable business at a Swedish business school – a typology of industry collaborator roles in RME', *The International Journal of Management Education*, Vol. 17, No. 3, p.100315, ISSN: 1472-8117 [online] <https://doi.org/10.1016/j.ijme.2019.100315>.
- Bovill, C., Cook-Sather, A., Felten, P., Millard, L. and Moore-Cherry, N. (2021) 'Do students experience transformation through co-creating curriculum in higher education?', *Teaching in Higher Education* [online] <https://doi.org/10.1080/13562517.2021.1928060>.
- Burnside, B. and Witkin, L. (2008) 'Forging successful university-industry collaborations', *Research-Technology Management*, Vol. 51, No. 2, pp.26–30.
- Cossham, A. and Irvine, J. (2021) 'Participatory design, co-production, and curriculum renewal', *Journal of Education for Library and Information Science*, Vol. 62, No. 4, pp.383–402 [online] <https://doi.org/10.3138/jelis-62-4-2020-0089>.
- Creswell, J.W. (2003) *Research Design: Qualitative, Quantitative, and Mixed Methods Approaches*, Sage Publications, USA.
- Edmondson, G., Valigra, L., Kenward, M., Hudson, R. and Belfield, H. (2012) *Making Industry-University Partnerships Work. Lessons from Successful Collaborations*, Science Business Innovation Board.
- Ehrismann, D. and Patel, D. (2015) 'University-industry collaborations: models, drivers and cultures', *Swiss Medical Weekly*, Vol. 145, No. 0506, p.w14086, <https://doi.org/10.4414/smw.2015.14086>.
- Fini, R., Grimaldi, R., Santoni, S. and Sobrero, M. (2011) 'Complements or substitutes? The role of universities and local context in supporting the creation of academic spin-offs', *Research Policy*, Vol. 40, No. 8, pp.1113–1127.
- Frolund, L., Riedel, M.F. and Schwab, K. (2018) *Strategic Industry-university Partnerships: Success-factors from Innovative Companies*, Frolund, L. and Riedel, M.F. (Eds.), Academic Press, an imprint of Elsevier, UK.
- Greitzer, E.M., Pertuze, J., Calder, E. and Lucas, W.A. (2010) 'Best practices for industry-university collaboration', *MIT Sloan Management Review*, Vol. 51, No. 4, p.83.
- Marens, R. (2009) 'From higher aims to hired hands: the social transformation of American business schools and the unfulfilled promise of management as a profession', *Eastern Economic Journal*, Vol. 35, pp.416–419, DOI: 10.1057/ej.2008.51.

- Plewa, C., Galán-muros, V. and Davey, T. (2015) 'Engaging business in curriculum design and delivery: a higher education institution perspective', *Higher Education*, Vol. 70, No. 1, pp.35–53 [online] <https://doi.org/10.1007/s10734-014-9822-1>.
- Prigge, G.W. (2005) 'University-industry partnerships: what do they mean to universities? A review of the literature', *Industry and Higher Education*, Vol. 19, No. 3, pp.221–229.
- Shrivastava, S., Bardoel, E.A., Djurkovic, N., Rajendran, D. and Plueckhahn, T. (2022) 'Co-creating curricula with industry partners: a case study', *The International Journal of Management Education*, Vol. 20, No. 2, p.100646, ISSN: 1472-8117.
- Sutliff, K. (2000) 'Integrating academics and industry: a challenge for both sides', *ACM Journal of Computer Documentation*, Vol. 24, No. 1, pp.33–38 [online] <https://doi.org/10.1145/330409.330415>.