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A Case Study in Developing a Graduate Studies Course Focusing on Soft Skills in Teamwork

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This paper describes the first phase of developing a new graduate studies course that focusses on the soft skills associated with the effective functioning of construction project teams. An examination of the literature regarding the need for the course is compared to the expectations of industry and a gap between employer needs and graduate capabilities is identified. The paper describes the processes involved in developing a course to fill the gap including securing funding, finding appropriate expertise, establishing the course aim and learning outcomes, designing the structure, determining the pedagogical approach, assessment strategy, and preparation for delivery. The paper concludes with an explanation of the next steps in the second phase.

Key Words: Soft skills, Teamwork, Leadership, Conflict, Negotiation

Introduction

This paper describes the first phase of the development of a new graduate studies level course at École de Technologie Supérieure (ETS) in Montreal, Canada – part of the Université de Québec. The course is being created under the direction of Gabriel Lefebvre, the Program Director, from the Department of Construction Management. The Department has offered a graduate program in construction project management for several years and the new course will be offered as part of that program. The first phase of the case study covers the design and development of the new course, and a subsequent paper will present findings on the effectiveness of the course in operation.

The Department of Construction Management is part of a college that has a strong engineering and technology focus and the background of the majority of faculty, therefore, is rooted in science and engineering. The portfolio of courses available to students naturally reflects the interests of the faculty and the subject and/or professional disciplines they represent. The course portfolio is constantly changing and the debate on what courses should be included is a fierce one as there are always more possible courses than can reasonably be accommodated in the program. Professional bodies and institutional requirements/restrictions play a part in any discussion about courses and the final decision rests with the departmental board, whose membership includes all the professors. Inevitably, therefore, there is a tendency to stick with what is known and genuine innovation in subject material

is a challenge to achieve. However, the director for the graduate program in construction project management was able to present the evidence of need for a course in soft skills and persuade the board that the time was right to consider its inclusion in the program.

Gabriel Lefebvre completed his doctoral studies on the impact of the psychological characteristics of construction project team members on team performance in 2009 (Lefebvre 2009). Since then, he has been working towards the development of a new course in soft skills for inclusion in the graduate studies program.

Methodology

The research strategy is a case study methodology. Yin (2009) defined a case study as an empirical inquiry which investigates a phenomenon in its real-life context. Creswell (2014) added that a case study is a qualitative design where the researcher explores an event, activity, or process in depth. In this instance, the study focusses on the development of a new course from inception to delivery and subsequent evaluation of its effectiveness. The research is in two phases and the outcome of each phase will be presented in separate papers.

Research process

In the first phase the focus is on the design of the new course and preparation for first delivery. The methodological approach taken is:

1. Secure the funding for the development of the course – institutional bidding process.
2. Review the literature to establish the landscape of existing thinking around soft skills in teamwork in construction – desk study.
3. Define the problem and establish the principles that will shape the design of the new course – ideation sessions with a panel of experts.
4. Develop the course structure and content – course leader and course tutors
5. Prepare for first time delivery – course tutors

1 Securing the funding

ETS has, through its office of the Dean of Academic Studies, an established system for bidding for projects that would support the aims of the institution. The process required a proposal to be submitted with a description of the project including a justification and benefit together with a proposed budget and timeline for delivery. The invitation for bids was always open, but decisions were taken periodically – typically twice a year.

The Program Director put together the proposal with assistance from PhD students. The bid included evidence of need in the form of data previously presented at conferences and five letters of support from industry organizations. A budget was developed for funding the contract to engage the specialist advisor and an indication of the timeline for delivery was given, but by this time COVID had become an issue and it was unclear how this would impact on delivery.

The proposal was approved by the Dean of Studies in May 2019 and negotiations with the specialist advisor regarding a contract began. Since the preliminary discussions with the proposed specialist advisor had included agreements in principle regarding costs and time allocations, the only outstanding issue was related to intellectual property in the course. ETS has a mandatory policy that

foreground intellectual property in the outcome of the development must be retained in any contracts. Consequently, the proposed contract included this provision and the specialist advisor after some discussion accepted it and was formally engaged in on a 12-month contract in September 2020

2 Review of literature

The quality of the outcome of a construction project is significantly influenced by the effectiveness and performance of the project team. Studies have consistently identified team performance, both collectively as a team and individually as team members, as critical to the quality of the outcome of the project. This issue was recognized towards the end of the last century by Chan & Kumaraswamy (1996), Kaming *et al* (1997), Love & Gunasekaran (1998), Moore & Dainty (1999), among many others. The key finding is that the effectiveness of teams significantly affects the outcome of construction projects.

Dainty *et* al (2004) identified that 'superior managers' ranked teamwork and team leadership first and second in the skills and competences needed to perform well. Whereas 'average managers' scored these factors much lower. Additionally, Sumner & Slattery (2010) conducted a case study that used industry professionals to assess the performance of teams and concluded that organizations should provide individuals with training in team building and team dynamics as this would help create successful teams. Ahmed *et al* (2014), in a study aimed at improving the curricula for undergraduate construction management programs, identified that the top two professional attributes that required improvement were hands on experience of projects and teamwork skills. This issue was revisited by Vaz-Serra and Mitcheltree (2021) in a study into the key competences that industry needs from graduates of master's programs in construction project management in Australia. They found that the skills of communication, project management, team management, and leadership all ranked higher than many of the professional and technical competences usually associated with the discipline. The key finding is that skills and competences in teamwork and leadership – soft skills - should be included in educational programs.

Recent studies have looked at the effectiveness of educational programs in delivering soft skills and competences. Bhattercharjee *et* al (2013) established that there are differences between industry expectations and student perceptions of what they need for their careers. However, both groups identified teamwork and leadership in the top ten skills and competences. McCord *et al* (2023) investigated the reviews of student internships and found that teamwork was ranked third by employers for improvement in the professional skills domain. In a study based on the construction industry in Finland, Moradi *et al* (2020) found that 'teamwork and cooperation' ranked first when measured by references in academic literature but found that the current level of soft skills when measured through project managers in practice fell short of this ranking. In a study into the ability of graduates to hit the ground running in Australia, Borg & Scott-Young (2020) found weaknesses in many graduates who lack confidence and were unable to deal with conflict. They called for more industry engagement with educational programs and the opportunity for embedded practice.

The key findings from the review of literature are that more programs need to include soft skills development, and for those that already do, something needs to change to improve the effectiveness of graduate outcomes. Employers expect graduates to have these capabilities and the underlying question was why this expectation is not being met in full.

3 Defining the problem

As set out in the introduction, the Department was running a successful graduate studies program in construction project management, but industry feedback had identified soft skills in teamwork as an area that needed to be strengthened. The previous doctoral studies of Gabriel Lefebvre also confirmed this, and it had become a long-held ambition to develop a suitable course for inclusion in the portfolio. However, to develop the type of course industry needed, specialist expertise would be required.

Finding the expertise

The lack of expert knowledge of softs skills in teamwork among the faculty of the Department meant this would need to be brought in from an external institution. The criteria used for the search for a suitable person were: 1) a background in psychology that included a specialism in teams and teamwork, 2) demonstrable evidence of teaching to students of engineering, and 3) a facility in the language in use in the Department – although this was not essential, it was considered desirable.

The Program Director conducted the search that included exploring websites and using existing academic and industry networks to identify experts. Several possible experts were identified, and each was followed up to confirm whether they met the criteria for selection and, crucially, whether they were interested in taking part in the development of the course.

Eventually, an expert was identified as the proposed specialist advisor to the development of the course. The specialist advisor is a professionally qualified psychologist with over 30 years' experience of developing and teaching courses in psychology to students – including on engineering programs. Additionally, the advisor is a specialist in action-based learning and has published extensively on the subject. Preliminary discussions took place over the next few months during which ideas were exchanged and the plan for the development of the course was fleshed out with a timeline and funding requirement.

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Ideation sessions

The expert panel comprised the Program Director and the specialist advisor. The Program Director brought extensive experience of construction project management both in practice and in education, and a doctoral thesis in the psychological characteristics of project teams. The specialist advisor brought similar experience of teaching and practice in psychology with an expert knowledge of teams.

Three ideation sessions were held over the next six months where the key findings of the literature review were discussed and debated. The conclusion was that conventional approach within psychology to the teaching of soft skills would not work in a construction context. Additionally, a new course must address the unique circumstances that pertain to project teams in construction. These unique circumstances were identified as:

- The temporary nature of construction project teams – recognizing that in some instances the duration could be measured in weeks and in other cases – years.
- Individual members of teams:
    - Bring different professional and technical skills to the team
    - Bring different psychological characteristics to the team
    - Often do not belong to the same organization

    - May be members of several teams at the same time
    - May perform different roles in different teams
- That the organizations involved
    - Often have divergent aims and objectives
    - May occupy different positions within the supply chain, causing mis-aligned power relationships
- High potential for conflict requiring resolution though negotiation and compromise

The conclusion of the ideation sessions was to develop a hypothesis that if a course in soft skills could be developed that delivered the knowledge and skills associated with teams and leadership and at the same time addressed the unique circumstance in which construction project teams operate, then students would be more capable at the point of graduation and employer expectations would be met. The testing of this hypothesis in the case of this new course will be the subject of the second phase of research and a future paper. The remainder of this paper looks at how the course was developed.

4 Developing the content

Over then next six months a further series of meetings took place between the Program Director and the specialist advisor. The course title, aim and learning outcomes were agreed and are shown in fig. 1.

Title	Management of multidisciplinary project teams
Aim	To develop the knowledge and personal skills to effectively function in a team as leader or member
Learning outcomes At the end of the course, the student will be able to:	1. Analyze their interpersonal effectiveness 2. Manage the effects of their individual characteristics in their interpersonal relationships and role in project teams. 3. Demonstrate the relationship skills necessary for effective functioning of project teams. 4. Demonstrate an understanding of the role of an effective team leader.

Figure 1- Course title, aim and learning outcomes

ETS has requirements for master's level study, which should be considered when designing courses. The most significant of these was a strong preference for an intensive style of delivery where study is carried out over a short period rather than a full semester. This is, in part, because most of the graduate studies students are in work and the intensive study periods can be organized around their work commitments. Consequently, it was determined that the course would run in intensive mode, which means it is essentially delivered in three blocks that take place on Fridays and Saturdays spread out over the semester. The initial thinking was that the content should focus on the project manager (knowledge and know-how), team members (how to collaborate), and teamworking (how to be deliver effectively) and for each of these areas, three meetings were held where ideas were formed, reviewed, revised, and re-presented. Finally it was agreed that the blocks would each consider a question: 1) who am I in the team?, how can I lead and/or influence the team?, and how should I manage conflict? From these discussions, the course structure emerged as shown in fig. 2.

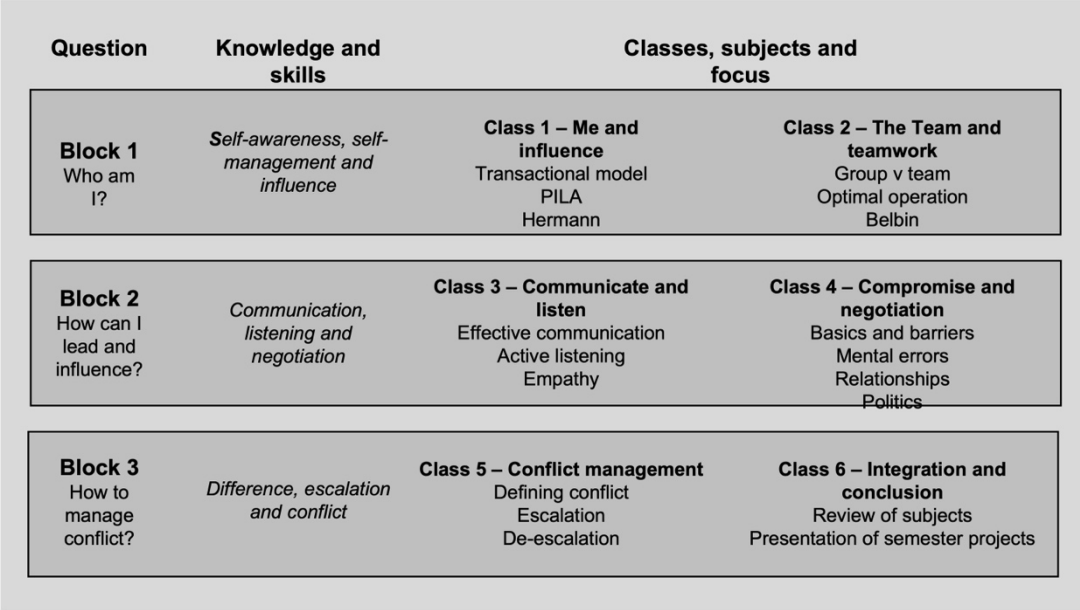

Figure 2 - Course structure

The draft course structure was presented at an industry conference to obtain comments and criticism. The feedback was positive, and this framework became the starting point for work on the course detail. A sidenote to the industry conference was that the Program Director was invited by a major company to make a presentation to its board of directors regarding the development of the course with a view to additional funding being made available. This was a competitive environment with other bids also invited to present to the board. The Program Director was successful in securing additional funding and a commitment to provide information to support the course in the form of real-world case studies.

Pedagogical approach

The specialist advisor made the recommendation, based on experience of teaching engineering students, that the pedagogical approach should be experiential. While the acquisition of knowledge relevant to the subject was important, the time given over to teaching this should be restricted so that emphasis could be given to experiencing the application of theory through role play.

The Program Director wanted to ensure that learning opportunities were relevant to the students, so, wherever possible, scenarios were set in the context of construction projects and students should have the opportunity to work on a several different projects and work with different team members as this would reflect the complexity of teamwork within the industry. Additionally, it was considered helpful if there could be industry involvement through the presentation of real case studies of project management issues and problems.

Taking account of these requirements, the instructional design was developed around a ‘tell me, show me, let me try’ that follows the first three elements of the revised Bloom’s taxonomy (Krathwohl, 2002). The ‘application’ phase involves project-based role play built around the experiential learning

cycle of Kolb, (1984). The review phase of the cycle being driven by the individual but with access to specialist tutors where appropriate or needed.

There was a further challenge that the learning strategy needed to address in that behavior is affected by the context and circumstances of the experience. There is no reason to think that a student working on a project with other students in a classroom would behave the same way as when facing a major problem on a real project where deadlines, profits and bonuses are on the line. This 'heat of battle' issue can be characterized as involving pressure of time, money, performance, and personal ambition, so the learning strategy should reflect this. In response, it was decided to ensure that the short projects were strictly time limited, that there were frequent disruptions to the projects with the tutors issuing revised instructions and/or information, and that students would be under observational assessment the whole time of their attendance on the course. The pedagogic approach is summarized fig 3.

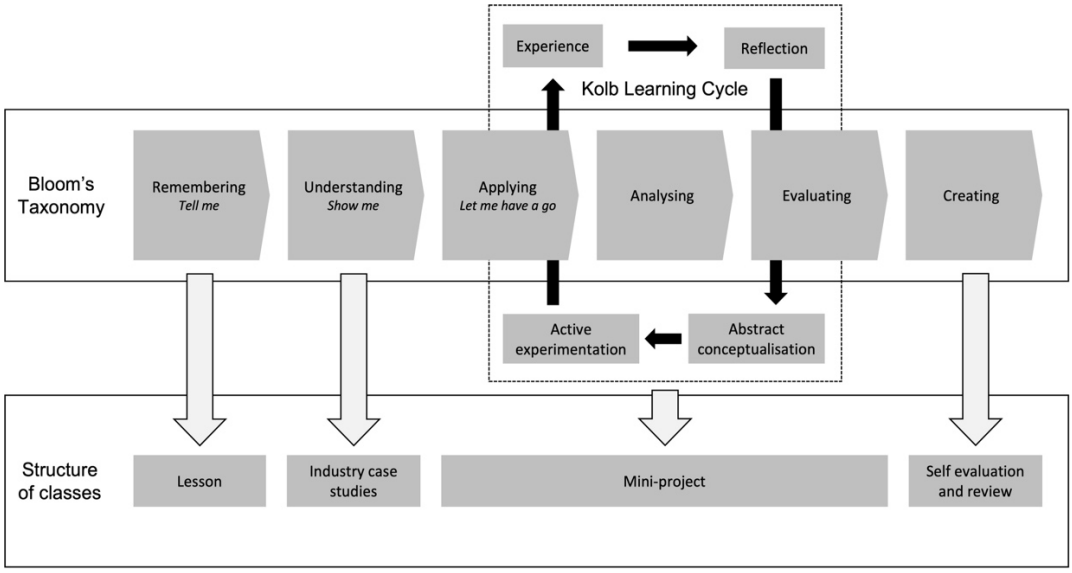

Figure 3 – Pedagogy and structure of classes

Assessment strategy

The assessment strategy reflects the pedagogic approach with the bulk of assessment grades being derived from project work. However, to meet institutional requirements a final examination at the end of the semester is required. The strategy has three elements:

- A semester long project, where students are organized into teams at the beginning of the course and given a project to work on. The team members remain the same throughout the duration of the project with team leadership and team roles being decided by the members. The students work on the activity outside the class times, however, there is time made available during the days of attendance for review and discussion with tutors where needed. Overall, each student is expected to commit around 45 hours of effort to this project. At the end of the semester, a team submission is made together with a self-evaluation and team evaluation of effort that identifies

each individual member's contribution, which may be used to moderate the grade across the individual students if necessary. This project contributes 30% towards the final grade.

- A series of short, time-restricted mini projects undertaken during the class times and under direct supervision and observation of the tutors. A total of four mini projects take place on four separate days. On each occasion, the students are allocated to different teams ensuring that they experience different roles and encounter different behavioral traits among the team members. At the end of the time allocated for the mini project, the students make a 10-minute presentation of their findings/outcomes to the project, together with self and team evaluations. The tutors review and assess the submissions and provide immediate grading and feedback. Each mini project contributes 10% to the final grade, with the four projects contributing a total of 40%.
- The final examination takes place at the end of the semester and is a two-hour open book paper aimed at assessing the student's knowledge and understanding of the underpinning theories encountered on the course. The final examination contributes 30% towards the final grade.

5 Preparation for first delivery

Following approval of the course, work began on developing the detailed information for the course. The specialist advisor had moved jobs and was no longer able be involved in the preparation for delivery. However, he made a recommendation on appropriate tutors who had recently completed their doctoral studies at a nearby university. Guillaume Daigneault and Francis Painchaud were engaged as the primary tutors and they began developing material to support the course.

The tutors would prepare material and present it to the Program Director in a series of meetings. For each block (two days) there were three meetings; each typically lasting three hours. In the meetings the material was reviewed, revised and supplemented with additional information where appropriate. At the end of the meetings, the tutors were comfortable with the learning strategy, supporting materials, and assessments to support the achievement of the learning outcomes. The Program Director has secured a purpose designed space in which to deliver the module. The space had team workstations with meeting tables, display screens and whiteboards. Due to the number of teams the tutors could manage at a time and also the physical size of the space, the number of students who could enroll was restricted to 24, which would form into six teams of four students.

Summary and next steps

The course was first offered during the summer semester of 2023 and will be offered again in all subsequent semesters. Initial feedback is that the course is very well received, and interest is high among students to sign up. It was fully subscribed in its first and second offerings and, at the time of submitting this paper, already fully subscribed for the January semester in 2024. The quality of the course is currently being evaluated and the outcome of the evaluation together with a description of any changes made will be presented in a future paper.

References

Ahmed, S. M., Yaris, C., Farooqui, R. U. & Saqib, M. (2014). Key Attributes and Skills for Curriculum Improvement for Undergraduate Construction Management Programs, *International Journal of Construction Education and Research*, 10:4, 240-254

Bhattacharjee, S, Ghosh S., Young-Corbett, D. E. & Fiori, C. M. (2013) Comparison of Industry Expectations and Student Perceptions of Knowledge and Skills Required for Construction Career Success, *International Journal of Construction Education and Research*, 9:1, 19-38

Borg, J. & Scott-Young, C. M. (2020) Employers' perspectives on work readiness in construction: are project management graduates hitting the ground running? *International Journal of Managing Projects in Business,* Vol. 13 No. 6, 2020 1363-1379

Chan, D.W.M. & Kumaraswamy, M. M. (1996). An evaluation of construction time performance in the building industry, *Building and Environment*, Volume 31, Issue 6, 1996, Pages 569-578

Creswell J. W. (2014). *Research design: Qualitative, quantitative, and mixed method approaches* (4th ed.). SAGE Publications.

Dainty, A. R. J., Cheng, M. & Moore, D. R. (2004) A competency-based performance model for construction project managers, *Construction Management and Economics*, 22:8, 877-886

Kaming, P., Olomolaiye, P., Holt, G., & Harris, F. (1997). Factors influencing construction time and cost overruns in high-rise projects in Indonesia. *Construction Management Economics*, 15, 83–94.

Kolb, D. A. (1984). *Experiential learning: Experience as the source of learning and development*. Englewood Cliffs, NJ: Prentice-Hall

Krathwohl, D. R. (2002) A Revision of Bloom's Taxonomy: An Overview, *Theory Into Practice,* 41:4, 212-218

Lefebvre, G. (2009) *The Influence of the Psychological Characteristics of the Team Members on Construction Project Team Performance*, PhD Thesis, University of Salford, United Kingdom

Love, P. E. D. & Gunasekaran, A. (1998). Concurrent engineering: a strategy for procuring construction contracts. *International Journal of Project Management*, 16(6), 375–383.

McCord, K. H., Ayer, S. K., Lamanna, A. J., Eicher, M., London J. S. & Wu, W. (2023) Construction Education Needs Derived from Industry Evaluations of Students and Academic Research Publications, *International Journal of Construction Education and Research*, 19:1, 77-98

Moore, D. R. & Dainty, A. R. J. (1999). Integrated project teams' performance in managing unexpected change events. *Team Performance in Management*, 5(7), 212–222.

Moradi, S., Kahkonen, K. & Aaltonen, K. (2020) Project Managers' Competences in Collaborative Construction Projects, *Buildings*, 2020, 10, 50

Sumner, M. & Slattery, D. (2010) The Impact of Leadership Effectiveness and Team Processes on Team Performance in Construction, *International Journal of Construction Education and Research*, 6:3, 179-201

Yin R. (2009). *Case study research: Design and methods* (4th ed.). SAGE Publications.