

Creating an Interdisciplinary Program to Foster Innovation. The Case of the Baltic IT Leadership Program

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ABSTRACT

Interdisciplinary education continues to be a topic of continued research and attention. This paper provides a short case study of an interdisciplinary bachelor's program in information technologies leadership, developed jointly in 2019 by Riga Technical University, and the University of Latvia, in Riga, Latvia. The authors summarize the approach used to develop the program and highlight challenges in governance, staffing and funding, as well as factors to be considered when integrating traditional coursework into interdisciplinary curricula.

1. INTRODUCTION

In 2019, the two leading universities in Latvia, Riga Technical University and University of Latvia, created one of the first interdisciplinary bachelor programs in Latvia. The Baltic Information Technology Leadership (BITL) program. In this paper, we aim to investigate why this program has gained significant support from relevant stakeholders including the Government of Latvia, the business community, academia and students. Therefore, the research question of this paper is **“what are the factors that support the successful launching of an interdisciplinary undergraduate program.”**

The BITL program depends on different elements contributing to its implementation. Based on the OECD framework for building a world-class university [8], the three pillars of any Higher Education Institution are governance (favorable governance), staff (concentration of talent), and funding (abundant resources). All these elements should be taken into consideration as the success of a complex project like BITL relies on a smooth interconnection between faculty members, students, and industry.

When planning the BITL program, it was crafted around these three elements. The authors will outline in this paper

the main characteristics of the program, how one of the courses (Accounting) has been introduced and the first lessons learned from this project.

2. INTERDISCIPLINARITY IN IT EDUCATION

Proper governance

A program like BITL, that is essentially built to serve the needs of the market, should be governed by its most important players. In this sense, there was consensus on the need to validate its relevance. Two primary arguments were found that are topical among market leaders:

Automation: emerging economies like the Baltic states are where job markets will be most impacted by the process of automation. An OECD report [6] has indicated that countries like the Czech Republic, Slovenia, Lithuania, and Slovakia are risking more than 45% of their jobs due to the ongoing automation process.

Sustainability: graduates should not only be aware of the United Nation aspirations, but they should also understand the impact of aligning corporate and social goals. A recent study by the University of Oxford and Arabesque Asset Management [3] has found the following:

- 90% of the studies showed that sound sustainability standards lowered the cost of capital
- 80% of the studies showed that stock price performance was positively influenced by good sustainability practices.
- 88% of the studies showed that Environmental, Social and Governance (ESG) practices resulted in better operational performance.

Addressing the skills of the future

In this regard, BITL follows the example of leading institutions, like MIT, which in its mission statement indicates: “Committed to a rigorous and **interdisciplinary** approach throughout the program, our students are challenged to be creative, innovative, and responsible **LEADERS** in the field.”

The main objective of a program like BITL is to develop behavioral and intellectual skills among our graduates that supports their capacity to undertake responsibility on complex problems. There are many classifications of skills used as a benchmark. One that is particularly comprehensive has recently been published by MIT J-WET:



Figure 1: The Human Skills Matrix [11]

Crafting each course for interdisciplinarity – the case of Accounting

While the practice of an education in accounting is systematic in its approach [10], similar to courses such as programming and mathematics, those courses are focused on defined inputs and concrete outcomes. For example, proper coding and application of mathematical formulas produce a precise result. Conversely, the discipline of accounting uses, and produces, estimates. The preciseness of these approximations, or more appropriately, the robustness of support for the estimates used or produced, are grounded in the experience of the practitioner, and their judgement in interpreting and applying established standards and principles, such as International Financial Reporting Standards [7].

The discipline of accounting is often described as autopoietic in discussing the challenges of introducing differing curriculums [4]. This self-contained system poses a challenge to educators when introducing new material “outside of the system” and, in the case of BITL, determining which elements to take from the discipline of accounting and integrate into the program.

Of significant importance to the leadership aspects of the BITL program was agility, and the correlation of successful organizations (employers) and their ability to adapt and respond to uncertainty [5]. Uncertainty in accounting refers to the difficulty of predicting outcomes because of limited experience or knowledge, to

produce estimates. Financial statements, and the accounting records supporting them, often contain estimates and other information that can affect future financial reporting and underlying transactions [2].

3. THE BITL PROGRAM

Governance

BITL is governed by a board-type body where the most relevant stakeholders take part: industry, government, universities involved, faculty members and students. The following principles guide the composition and operation of this board:

- Relevance for industry: the board have undergone an extensive public assessment of the future needs of the regional industry in terms of talent and skills. In this sense, with the support of leading players like Accenture [9], the projected future headcount demand for future specialists in IT areas in different sectors: business, start-ups, research, and government.
- Relevance for national government: as BITL would need financial and other support (accreditation) from the State, the public impact of the program was assessed in terms of employability, productivity, and public finance. This assessment was based on previous research by faculty members and researchers at Domnīca Certus [1],
- Alignment with the sustainability movement: BITL will prepare the future leaders of IT-related projects and organizations. Therefore, it is important to ensure the underlying philosophy of the program fits the aspirations of global society in terms of sustainability. This philosophy is overseen by the BITL board. In practical terms, BITL will be reporting at least every two years on how the United Nations SDG is being implemented through the PRME program (www.unprme.org).

Staff

The largest investments have been allocated into building a faculty roster to provide interdisciplinary learning experiences across the curricula. In our understanding, interdisciplinarity means that two or more disciplines are used methodologically and systematically to solve or analyze problems.

As a consequence, in the BITL program, faculty are expected to deliver the specific content of their subjects and to offer assignments where students are requested to search for valid solutions using one or more other disciplines.

To build this specific roster, the following initiatives were taken:

- Offer a year-long training and teaching practice program at one of our partner schools: University at Buffalo. This program is focused on exposing

prospective faculty members to best practices in interdisciplinary teaching and learning.

- All faculty members have access to all the syllabi to provide feedback and build interconnections between the subjects.
- Team teaching has been encouraged by faculty members from more than one discipline.
- A substantial portion of course assignments are problem-based that guide the students to consider other disciplines while searching for a solution.
- In several courses, BITL students are combined with students from another program as a way of fostering their dialogue.

The curricula of BITL offers subjects from three main areas: computer science; business and humanities, and; specializations in IT, health and cybersecurity. The BITL program attempts to maintain a balance of 1/3 per discipline; however, this balance depends on the major that the student selects.

Priority has been given towards preventing BITL becoming a multidisciplinary program where courses from one or more disciplines are offered independently from each other. Though this approach is valuable, the BITL's objective has been to create interdisciplinary minds that can think laterally at the time of solving digitalization related problems.

To guard the interdisciplinarity of the program, besides the previously mentioned initiatives in terms of faculty training and course design, significant work has been done around the "load balance" of assignments during the semester. The goal of building interdisciplinary minds requires the training of an intellectual habit. Students are challenged to think "habitually" in an interdisciplinary way, constantly solving problems in subjects from different disciplines.

Funding

A funding strategy has been designed following the recommendations of OECD for world-class higher education. The main principles have been the following:

- Funding should match the governance mix of the program. It means that shared funding by the different stakeholders should be provided. This strategy strengthens the commitment and responsibility for the program.
- Every EUR invested by the government should be matched with private funding. This approach leverages the role of the private sector in the decision process.
- A scholarship scheme based on merit has been built to support the academic commitment of the best students and reduce their motivation to obtain employment at the expense of academic devotion.

External funding is expected to be needed for the initial stage of the project over 5 years. Meanwhile, the aim is to sustain the operation of the program based on tuition fees.

These tuition fees could be paid by the students or by sponsors. In any case, the fundamental principle is that the program is established with the support of public funding but should be entirely sustained by private funding in the long run. The motivation behind this principle is that the program aims to serve mainly the private sector and, therefore, requires its full engagement.

4. A CASE ON POINT: AN INTERDISCIPLINARY ACCOUNTING CLASS

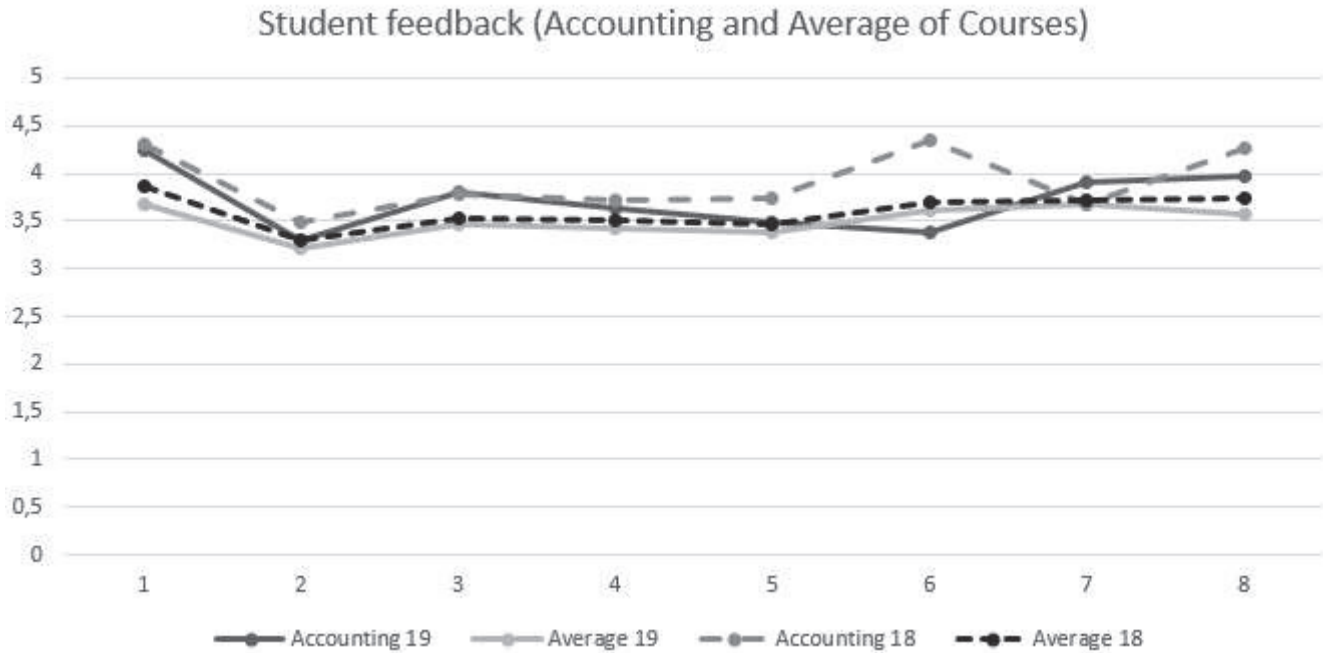
The 1st year of the BITL program is meant to be a blend of both quantitative disciplines, as well as liberal arts and sciences, in order to acclimate the students to the diversity of interdisciplinary education. Courses during their first semester include computer sciences and mathematics, with applied laboratory sessions, as well as international communications, financial accounting, and a group-oriented projects course.

This is followed up in the second semester with further courses in computer sciences, mathematics (and mandatory application laboratories) and financial accounting, and broadened with introductory courses in discrete structures, psychology and general art. In addition, a number of electives are offered.

In reviewing the curriculum for BITL students, attention was given to core courses required to deliver the objectives of the interdisciplinary program, not only in the areas of IT, leadership and business, but specifically those courses which would broaden BITL students' perspectives, both from the subjects approached and the thinking processes required. One of these subjects introduced to BITL was financial accounting and reporting. Accounting and financial reporting data are at the core of many companies' information systems, and exposure to its fundamentals supports the business objectives of the program. At the same time, the non-linear nature of interpreting and applying accounting principles, and the accounting discipline's acceptance of uncertainty, correlates well with the leadership aspects of the program, where decisions must often be made with incomplete or changing information. Each semester, feedback is solicited from all RBS students at mid-term and semester end on the nature, structure and general impression of their courses, as well as specific feedback on workload and comprehension. Comparisons are made between each course and the average of feedback received for all courses, and provided to the instructors. The same was done with BITL students however, as this was the 1st year of the program, special emphasis was placed on certain factors that would allow administration and faculty to make more expedient modifications to the course messaging, as well as content and delivery.

Eight questions in particular were of focus in our first semester evaluation (the second semester is currently ongoing), with emphasis on students' career and course expectations, course load and content, and impressions of "learning". A table 1 showing the feedback on the accounting course vs the average of all courses during the semester follows:

Table 1: Student feedback



1. How much do you think this course will help you for your future career? (1 too theoretical - 5 too practical)
2. Proportions of theory and practical applications (1 too theoretical - 5 too practical)
3. How would you judge the pace of the course? (1 too slow - 5 very fast)
4. The workload for this course is: (1 too light - 5 very heavy)
5. The difficulty level of the course activities and materials is: (1 extremely easy - 5 extremely difficult)
6. How well the course syllabus provided by the instructor helped you to understand (1 very poorly - 5 very well)
7. Rate the usefulness of the outside assignments (case analysis, home assignments, and special projects) in helping you to learn more (1 almost useless - 5 extremely useful)
8. Overall, how much do you feel you have learned in this course? (1 very little - 5 a lot)

Also included above is the evaluation of the same course as well as all courses in the Bachelor of Business Administration (BBA) program in 2018. The reason is that BITL students share all business and humanities courses with the BBA program's students. As we can see there is not a significant difference in students' satisfaction across the selected questions, though the course is approached from a different angle and the student population includes engineering and business degree students. It was noted that the same has occurred in all other courses: despite the input of interdisciplinarity in terms of content and student population, the courses have continued to be positively evaluated by the students.

5. CONCLUSIONS AND FURTHER RESEARCH

As we are at the beginning of the BITL project, it is still too early to draw conclusive lessons. The student population is small (22 enrolled in the first academic year). However, the student satisfaction level indicates that the program is appreciated from the beginning. Even a course like Accounting, that is not intuitively popular among engineering students, receives enough positive feedback.

This paper summarizes the approach followed to launch the program, and which are the main factors that must be considered when building an interdisciplinary undergraduate program. Briefly explained is the angle a traditional course should take in order to be integrated in the curricula.

Moving forward in the implementation of BITL, further research will be required. Some of these areas of future research include the following: integration of students from different disciplines, cooperation of faculty members from several fields in one course (team teaching), impact

in the employability of the graduates and the level of engagement of key stakeholders in governance

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