

Promoting Efficiency in Education: The Cost-Aware Curriculum Model. An Efficient and Purposeful Approach to Curriculum Design

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How to cite: Demedts, L.; Soogen, G.; Brusselle, H.; Vanacker, D.; Van Puyenbroeck, H.; Vanderstraeten, N. 2024. Promoting Efficiency in Education: The Cost-Aware Curriculum Model. An Efficient and Purposeful Approach to Curriculum Design. In: 10th International Conference on Higher Education Advances (HEAd'24). Valencia, 18-21 June 2024. <https://doi.org/10.4995/HEAd24.2024.17294>

Abstract

There is a growing need for efficient and purposeful curriculum design. The Cost-Aware curriculum Model emerges as a transformative approach, optimizing the educational effectiveness.

Through comprehensive analysis, we optimize the efficiency, quality and sustainability of educational programs while responsibly managing resources. By considering student dynamics, variations in study programs and staff dynamics, we ensure a curriculum that meets diverse needs. This approach reflects our commitment to excellence and fiscal responsibility. The Cost-Aware Curriculum Model aims to harmonize key parameters enhancing curriculum development efficiency and resource utilization. It seeks to strike a balance between resource efficiency and educational quality, fostering insights for optimal curriculum design.

The opportunity of this model is the creation of adaptable, responsive curricula that not only meet current demands but also anticipate and address future challenges in education. This model serves as a tool for higher education institution management to foster a more cost-conscious mindset and approach in the (re)design of curricula.

Keywords: Curriculum (Re)Design, Curriculum Development, Cost-Awareness, Effectiveness, Decision-making

1. Introduction

Flemish Higher Education Institutions face the dual challenge of delivering high-quality education while concurrently managing the costs of academic programs (Vlor, 2021). At

Artevelde university of Applied Sciences, we have developed the Cost-Aware Curriculum Model to address this imperative. This model is designed to guide decision-makers in (re)designing curricula, emphasizing an efficient and purposeful approach. Importantly, this model is not about cost-cutting our valuable curricula, but about making deliberate choices in curriculum development.

When designing future-proof curricula, it is crucial to consider various criteria, such as (1) aligning with the needs of the labor market, (2) integrating transversal competencies, (3) reflecting inclusive higher education, (4) ensuring accessibility, (5) Linking to secondary Education, (6) preparing for and connecting with lifelong learning and (7) effective use of resources. (Rationalization of the Free Universities of Applied Sciences in Flanders project within the Recovery and Resilience Facility, 2023).

The last criterion '*effective use of resources*' was specifically examined in-depth for this model, as it had the least available material, both in the literature and internally within Higher Education Institutions. The Cost-Aware Curriculum model can be viewed as a tool and reflective instrument to critically evaluate one of the seven optimization and rationalization criteria. It is essential to note that the other criteria were not included in the further analysis but are necessary for a comprehensive examination of curricula.

The demand for optimal curricula is substantial to ensure organizational feasibility in education. The 'Cost-Aware Curriculum Model' serves as a tool enabling us to pose the right questions and offer a more efficient and quality-driven educational portfolio. In this article we introduce the Cost Aware Curriculum Model, focusing on making informed decisions in curriculum design. This model presents an efficient and targeted approach to curriculum development.

2. Methodology

In the first phase, it is essential to address the existing gap in academic literature regarding comprehensive models for Cost Aware Curriculum Design in Educational Programs. (OECD, 2021). Recognizing this scarcity, our model is designed to create a bridge between critical elements in curriculum design, students and teaching practices. By integrating these dimensions, our model not only fills a void in the current literature, but also contributes to an innovative perspective to reshape discussions about cost-aware curriculum (re)design and management strategies within higher education institutions.

The second phase of our methodology involved refining and validating the initial model through a systematic process. After crafting the preliminary design, we gathered feedback from key stakeholders, including various heads of department, to assess the efficacy of the model in practical educational settings. This collaborative evaluation provided valuable insights into what aspects were effective and where refinements were necessary.

Following the initial model development and validation process with key stakeholders. Our focus shifted towards transforming the conceptual model into a practical tool that translates the complex data into a user-friendly dashboard format (De Boeck, F; Fruru I. & De Clercq, S., 2023).

The data used was gathered from 32 educational programs. These data were systematically analyzed to identify various parameters, which were subsequently utilized in the development of the Cost-Aware Curriculum model. Furthermore, and building upon the insights provided by the financial experts, our objective was to establish a strategic approach that optimally allocates resources, foster fiscal responsibility, and ensures the long-term viability of each educational program. The design of the model involved three distinct design sprints¹ within the data hub in collaboration with data experts and quality assurance peers. (De Boeck, F; Fruru I. & De Clercq, S., 2023) Throughout these design sprints, iterations were undertaken. These iterative feedback loops were instrumental in fine-tuning the visual aspects of the model, guaranteeing its utility as a support tool for decision-makers (De Boeck, F; Fruru, I., & De Clercq, S., 2023). The visual representation serves as a dynamic and accessible resource for educational leaders, enabling them to make informed decision grounded in a comprehensive understanding of the educational programs, the students and the according teaching staff within the higher education institution.

3. Cost-Aware Approach: The Practical Application of the Cost-Aware Curriculum Model

The objective of this model is to promote cost-consciousness while simultaneously ensuring the quality of education. Prioritizing workable conditions for fostering a healthy and productive work environment. The model encompasses three overarching parameters.

Firstly, it collects information about the students, including student numbers and the accumulated credit points. This provides insights into the distribution of credit points amongst students across various course components and programs.

The second parameter focuses on the educational offerings, providing details about allocated credit points, course components, the proportion of smaller course components, and the variety of trajectories.

The third parameter offers insights into the staff, including the student-to-staff ratio, the number of staff in different roles (Administrative and Technical Personnel, Academic Personnel, and others), and their correlation with student enrollment.

¹ Design sprints are rapid iterations of the design process aimed at quickly identifying and addressing flaws in the outcome, as opposed to a sequential step-by-step approach.

The Cost-Aware Curriculum model contextualizes these three overarching parameters within the educational reality. It is imperative to consider these factors when interpreting the data and exploring potential courses of action. Are the infrastructure and scheduling conducive to specific measures? What does the Flemish legislation on education state on this matter? Does the applied Education Workload lead to a different interpretation of the situation? These questions emphasize the need to contextualize the findings within the broader educational landscape and institutional frameworks.

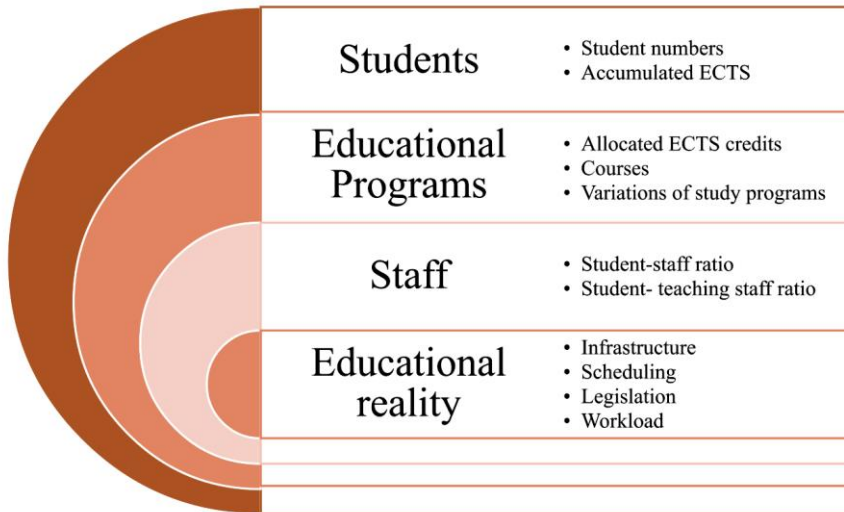


Figure1: Cost-Aware Curriculum Model. (2024).

The Cost-Aware Curriculum Model (2024) is grounded in the pursuit of more efficient resource allocation, without compromising the quality of education.

By students' numbers and their accumulated ECTS, educational programs, and staff-ratio as crucial parameters and aligning them harmoniously, educational programs can forge a balanced and cost-effective curriculum. This approach not only empowers students to realize their full potential but also ensures the financial sustainability of the institution.

4. Examining the Parameters: Students, Educational Programs, and Staff

4.1. Parameter 1. Students

The initial focus centers on the number of FTE (full-time equivalent) students², capturing the evolution over multiple academic years. This longitudinal approach, spanning from t-7 to t-2³ for professional bachelor programs and t-5 to t-2⁴ for associate degree programs, provides insights into the accumulated credit points for specific programs.

Understanding the average number of accumulated credit points is also essential. However, due to the initial scarcity of data to identify students who enter later in their program separately, the average number of accumulated credit points was examined for generation students⁵.

Additionally, parameters such as the proportion of new students entering the program and the proportion successfully graduating are examined closely. This analysis enables programs to comprehend trends in academic progress and make cautious predictions regarding potential growth or contraction within the program.

Accurately estimating the market share of students empowers Artevelde University of Applied Sciences to make strategic decisions, allocate resources more efficiently, and optimize the learning environment for diverse target audiences. This alignment with the expectations of the target audience enhances the institution's ability to meet its goals effectively.

4.2. Parameter 2. Educational Programs

Upon analyzing the educational offerings, it was initially noted that there were no foundational parameters readily available to provide a comprehensive overview. To address this gap, a careful examination of the available datasets was conducted, and essential factors were meticulously mapped out.

The number of organized course components and their evolution delineate the growth of our curriculum—how many course components and credit points (ECTS) do we organize, and which ones are deemed necessary. Additionally, a short list of courses was applied to identify

² FTE (Full-Time-Equivalent) student refers to a student enrolled in a program who completes 60 ECTS (European Credit Transfer and Accumulation System) within an academic year.

³ The term t-7 to t-2 for professional bachelors in Flanders indicates the funding mechanism based on the average number of credits taken by students in the period spanning seven years prior to the current academic year (T) up to two years prior.

⁴ The term t-5 to t-2 for Associate Degree programs in Flanders indicates the funding mechanism based on the average number of credits taken by students in the period spanning five years prior to the current academic year (t) up to two years prior.

⁵ Generation students in Flanders refer to students who, at the bachelor level, are undertaking their first 60 ECTS credits in higher education.

course components with sufficient student enrollment in order to be financially sustainable independently, without relying on support from other course components. We also gained insights into the number of variations of the study program linked to the student count, enabling us to identify less lucrative variations of our study programs and optimize them based on societal needs and financial feasibility.

By closely examining the available resources and maintaining a balance between quality and practical feasibility, we aim to create a qualitatively robust learning environment that is also sustainable and accessible to all students. Striking this balance is crucial to align our aspirations in offering various trajectories with the actual possibilities within existing government funding.

4.3. Parameter 3: Staff

In the final phase of our optimization study, our focus extended to parameters related to staff members. The two key parameters considered in this context are the ratio of full-time equivalent (FTE) students per FTE staff member. This ratio provides insights into the workload of our staff and enables us to evaluate whether we can provide the necessary support to our growing student population.

Furthermore, specific attention was directed towards the ratio of FTE students per FTE instructional staff. The results of this analysis have generated a growing interest in implementing a standardized workload distribution across various programs. By adopting a standardized approach, we aim to achieve a more balanced teaching assignment of our instructional staff. While acknowledging the various Education Workload that allocate different resources to programs with varying student loads, we challenge ourselves to question whether significant differences in education still exist among diverse programs.

5. Conclusion: In-Depth Insights in Cost-Aware Curriculum Design

5.1. Integrating Cost-Awareness

In conclusion, the successful implementation of our model within the institution was a multifaceted process. Firstly, it involved proactive engagement with management and experts, ensuring their informed participation in the model's development through iterative feedback loops. This collaborative approach fostered a sense of ownership and commitment among key stakeholders.

Secondly, the integration of the model was facilitated by a comprehensive analysis and data preparation process. The collaborative efforts with our Data team, alignment with Quality Assurance colleagues, with Heads of different departments and insights from financial experts played crucial roles in ensuring the accuracy and relevance of the data underpinning the model.

Furthermore, the model served as a platform for knowledge exchange at the management level. Management teams were encouraged to learn from one another's experiences, fostering a culture of continuous improvement and shared insights.

Lastly, the integration of cost-awareness into the curriculum model emerged as a foundational step during the initiation, design or redesign of educational programs. This forward-looking approach ensured that financial considerations were embedded from the outset, emphasizing the importance of 'fiscal responsibility and sustainability throughout the entire life cycle of each educational program. Overall, the holistic implementation strategy emphasizes the model's dynamic contribution to enhancing educational quality, financial efficiency and strategic decision-making within the institution.

5.3. Cost-Aware Strategies

Attaining a precise understanding of the educational offerings is crucial in a Cost-Aware approach. This involves not only mapping out the number of variations of the study programs but also delving into their structural characteristics. At the forefront of a Cost-Aware Curriculum is the emphasis on thoughtful decision-making.

In our pursuit of a Cost-Aware curriculum, we advocate for decision-making in the development of diverse variations of the study programs. This involves strategically crafting a curriculum to place students in appropriate class groups, optimizing the educational experience.

In harmonizing these efforts, the curricular analysis serves as a roadmap for elevating the efficiency, feasibility, quality, and sustainability of our educational programs. By fostering a holistic perspective on the dynamic interplay between students, educational offerings, and staff, we lay the foundation for a curriculum that not only addresses to the diverse needs of our student body but also guarantees the responsible allocation of resources for long-term success. This comprehensive approach emphasises our dedication to delivering excellence in education while upholding fiscal responsibility.

In extending our commitment to continuous improvement, our focus on ongoing research and development remains unwavering. Looking forward, we aspire to refine our approach by developing a cost-based design tool for education. This tool, based on insights from our curriculum's details, will act as a guide, highlighting potential areas for improvement and optimization.

With a keen eye on the dynamic interplay between student enrollment, educational programs, and staff allocation, the envisioned tool will employ strategic indicators or "warning lights" in our curricula. These signals will prompt a proactive response, enabling us to propose new designs that not only align with Cost-Aware principles but also create space for a more comprehensive focus on the holistic development of our students.

In essence, our pursuit involves not just an analysis of the current state but also a proactive design approach that responds to emerging trends and challenges. By incorporating in the future, a cost-based design tool for simulating new curricula, we aim to continually refine and innovate, ensuring that our curriculum evolves in tandem with the ever-changing landscape of education. This forward-thinking methodology is grounded in our unwavering commitment to providing an enriching and well-rounded educational experience for our students.

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