

Data-driven decision-making in Hungary: Case of the University of Pécs, Faculty of Business and Economics

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THE AIM OF THE PAPER

This paper delves into data-driven decision-making in higher education, focusing on a business school in Hungary. The aim is to explore the incorporation of data into the decision-making processes, identify the tools employed, and uncover the challenges faculty members face in adopting data-driven decision-making.

METHODOLOGY

A qualitative study was conducted following a hermeneutic methodology. The research employs a qualitative approach, conducting 14 in-depth semi-structured interviews with faculty members.

MOST IMPORTANT RESULTS

Analysis of the interviews reveals insights into the faculty's decentralized decision-making process across operations, marketing, and strategic directions. The study also explores DDDM practices in the classroom, emphasizing the continuous adjustment of courses based on feedback and the integration of DDDM into the curriculum. Six distinct DDDM tools are identified, ranging from classroom-related tools to financial accounting and marketing instruments. Challenges faced by the faculty include the impact of COVID-19, cultural and teaching challenges, data-related issues, management discrepancies, and systemic challenges. Furthermore, the study acknowledges the crucial role of international accreditation in promoting DDDM, which necessitates adherence to academic quality standards. The study also identifies opportunities to enhance capacity management, optimize data management, and develop interconnected systems at the university level.

RECOMMENDATIONS

A set of recommendations is generated for decision-makers at universities, including maintaining and enhancing accreditations, employing analysis tools that support individual-level data, and implementing a rewards-based system to boost survey response rates.

Keywords: data-driven decision-making, business school, challenges, data, tools

INTRODUCTION

Universities worldwide utilize DDDM in curriculum design, students' performance measurement, programs development and enhancement, and university facilities development (Teng et al. 2023). In this paper, we aim to shed light on the importance of DDDM in education, highlight the tools used, and identify the challenges faculty members face when incorporating DDDM practices.

The remainder of this paper will unfold as follows: first, a summary of the existing literature is presented; building on this foundation, the research methodology is then outlined. Subsequently, the paper turns to the analysis and discussion of the data. Finally, we the conclusions are presented synthesizing the main findings of the study.

LITERATURE REVIEW

Universities engage in data collection to shape their operations and evaluate the impact of implemented changes in curriculum (Teng et al. 2023).

Recent studies on DDDM in higher education (HE) reflect a growing interest in leveraging data to enhance university performance. The body of scholarship includes evidence from different contexts. In the Anglo-American and Northern European context, scholars examined the practical application of DDDM in HE. For example, Kaspi and Venkatraman (2023) highlighted the role of data in shaping academic evaluations' strategies in Australia. Similarly, Gaftandzhieva et al. (2023) emphasized the importance of DDDM tools in enhancing academic performance. The authors argue that despite the potential of these tools to significantly support monitoring, evaluation, and strategic decision-making, their adoption remains limited, indicating a need for broader research. This might suggest unfulfilled DDDM impacts due to early-stage DDDM maturity (Cech et al. 2018). Nwaimo et al. (2020) performed a mapping of maturity models of DDDM, including the Business Intelligence Maturity and the Data Management Maturity models, and developed a unified progression scale characterizing data maturity: from data denial to data-aware, data-led, and finally data-driven.

DDDM practices differ from one decision level to another. When it comes to operational decisions such as student monitoring and course scheduling, DDDM is often based on dashboards and standardized indicators, whereas strategic decisions usually require an interpretive approach to complex data (Berndtsson et al. 2020).

Zharova et al. (2023) investigated how aggregated university-level data do not yield

similar outcomes in different institutions in Germany. In this respect, Nwaimo et al. (2020) explain that the impact of DDDM is not uniform across all organizations due to differences in analytics maturity, which includes data quality, infrastructure, human competencies, and cultural readiness. Similarly, Szukits and Móricz (2024) underscored the importance of analytical culture in the development of DDDM.

Other studies from Asia and Africa include Kalim and Bibi's (2023) examination of DDDM practices at a leading Chinese university. Additionally, Mpofu and Chasokela (2025) provided a practical guide on how to use data to inform decisions and identify significant challenges of DDDM in Zimbabwe.

Furthermore, some studies focused on specific aspects of DDDM in HE. For instance, Du (2022) introduced an analytics-based system that aligns curriculum structures with the market needs and the students' interests. Sebestyén (2021) identified the affective factors that influence DDDM adoption in HE. Although the use of data in DDDM practices in HE has gained momentum, it is still considered a relatively new development (Hora et al. 2017).

Elugbaju et al. (2024) highlighted the importance of exploring and sharing best practices for implementing DDDM and identifying major challenges related to specific contexts. In this respect, research on the various practices and challenges that universities face when implementing DDDM in Central and Eastern Europe still receives limited scholarly attention. Moreover, the majority of the current research relies on institutional analysis, often overlooking how data-driven practices are perceived and enacted at the faculty level. To address this gap, our study investigates how DDDM is employed and experienced by academic staff at a selected Hungarian business school.

This study aims to address the following research questions:

1. In what manner does a Hungarian business school incorporate data in its decision-making processes?
2. What tools are used in the data-driven decision-making process?
3. What challenges do faculty members encounter while making data-driven decisions?

By examining these questions, the study intends to provide insights into the practices, tools, and challenges associated with DDDM within a specific context, such as a Hungarian business school. While this topic has been studied in Western contexts, little research has focused on Central and Eastern Europe. This paper fills the gap by providing first-hand qualitative evidence about local challenges and tools.

METHODOLOGY

Given the limited existing literature, we opted for the use of semi-structured interviews. The interviews, averaging 30 minutes each, were all recorded with the participants' consent and were later transcribed. This study urged participants to reflect in detail on their experiences using focused questions shaped by theoretical frameworks on specific topics.

Our sample comprised faculty members directly or indirectly involved in DDDM within a Hungarian business school, which has pioneered in developing and implementing DDDM initiatives at the university level. We reached out to 36 professors

across various departments at the school. The response rate was 57.14%, with 21 responses, of which 14 were positive. The final sample included a diverse group of faculty members with differing experiences and careers. Most interviewees held leadership roles at the school (e.g., program directors, head of department, vice dean), which enabled them to gain firsthand experience on how strategic decision-making is being practiced and the different challenges arising from the process. Table 1. provides detailed information on the sample's characteristics.

Table 1. Sample details of the study

Interviewee	Discipline	Gender	Administrative role
P1	Marketing	Male	Yes
P2	Management	Female	No
P3	Finance	Female	Yes
P4	Statistics	Male	No
P5	Marketing	Male	Yes
P6	Statistics	Female	Yes
P7	Finance	Female	No
P8	Management	Male	Yes
P9	Regional economics	Male	No
P10	Marketing	Female	Yes
P11	Tourism management	Male	No
P12	Regional economics	Male	Yes
P13	Operations management	Female	Yes
P14	Human resources	Female	Yes

Source: Own elaboration

Livian (2018) stated that hermeneutics places the interpretation of observations and the speeches of social actors at the center of the researcher's work. Consequently, we have chosen hermeneutic phenomenology as our research methodology.

We adopted a five-step process in hermeneutic phenomenology from Clarke (1999).

Transcription

Clarke (1999) argues that the first step is to hear and write the story. We video-recorded all interviews and meticulously transcribed the full statements of our interviewees. Each transcription underwent a cross-check with the recording to ensure accuracy.

Interestingly, lecturers mentioned DDDM both at the faculty level and the classroom level. We followed this segmentation in our analysis. The participants discussed tools used atv both the

classroom and management levels and brought up various challenges. They also shared insights into various DDDM initiatives implemented at the faculty level, including their respective outcomes and applications. We inquired about their definition of DDDM to explore how they perceive DDDM within the faculty. The respondents consistently displayed a profound understanding of DDDM and its significance and their awareness of the importance of DDDM in education was evident in their statements.

The analysis began with an extended familiarization phase. We read the interview transcripts multiple times and revisited again the recordings when necessary. Hermeneutic interpretation and construction

The second and third steps in the hermeneutic analysis, namely hermeneutic interpretation and

construction, were seamlessly integrated to facilitate a cohesive analysis. Following Clarke’s approach (1999), this step aims to identify clusters related to DDDM and categorize them accordingly. During this stage, we analyzed the statements separately to identify individual categories. The initial coding involved an inductive clustering of meaning units. These clusters were subsequently compared across interviews and iteratively refined. Later, conceptually similar clusters were grouped, while overlapping ones were merged before assigning them into individual categories.

Aggregated Construction

Once individual categories were formed, the transcripts were revisited to assess the coherence and analytical fit of each category. Categories that were overly general were split into more specific ones, while underdeveloped categories were merged with related categories. Categories’ labels were then refined to reflect their underlying codes.

In a final step, primary categories were developed by integrating individual categories. To support analytical rigor, we referred to our supervisor at the time to validate the categories.

In this section, we consolidated the individual categories to formulate the primary categories of this study. The study encompasses four main components: (i) the definition of DDDM for education, (ii) DDDM practices, (iii) DDDM tools, and (iv) challenges in DDDM’s application.

DATA ANALYSIS

This section represents the last step in Clarke’s (1999) hermeneutic phenomenology analysis, which is the conceptual model of the phenomenon.

Toward a definition of DDDM in education

The participants provided diverse perspectives on the definition of DDDM for education:

Table 2. Understanding of DDDM

Definitions
<i>“When you collect and use data, and you try to make a decision based on the data you receive.”</i>
<i>“When I am thinking about decision making, there is the intuition-based one and there is the decision-making when you are using tools and statistical data and various information from databases that could be useful for supporting decisions.”</i>
<i>“I think that DDDM is a process where we are relying our reasoning on actual data and not on our instinct. This means that if we are talking about data-driven decisions, it means that the conclusions we made based on the data can be repeated.”</i>

Source: Interview transcriptions

The statements of the interviewees aligned closely with the existing literature on DDDM. The consensus is that DDDM relies on data rather than instinct, emphasizing the need for reliable data. The process involves extracting specific patterns from data, which are then interpreted to guide decisions.

DDDM practices

This section summarizes various aspects of DDDM in the faculty, including faculty management, marketing activities, strategy, decentralization, hierarchy, and information dissemination.

DDDM is typically decentralized through different layers of hierarchy and regularly disseminated to the parties involved. DDDM is employed in managing faculty operations, such as student admissions based on financial data indicating program returns, and in curriculum design using data collected from student feedback and considering recent trends in the labor market. Additionally, DDDM is significantly integrated into the faculty’s marketing strategy. For example, by

utilizing data from the students’ online applications, the faculty’s management can plan marketing activities that are relevant to their target.

DDDM also plays a crucial role in strategic decision-making. Relevant data assists the faculty in benchmarking similar programs, comparing them with current ones, determining the future directions of faculty projects, maintaining competitiveness, and staying updated on changes in the labor market. Moreover, the decision-making process at the faculty is decentralized, with power delegated to academic and administrative staff throughout the hierarchy, specifically to heads of departments and program leaders. Within the faculty, various layers of management make decisions that align with the senior management’s directions. Information dissemination involves two main types of periodic meetings: decision-making meetings typically involving senior management (dean and vice-deans) or the superior board of the decision-making (senior management and heads of departments), and information-sharing meetings including all

academic and administrative staff. Outputs of these meetings are shared internally, and major decisions are communicated during faculty council meetings.

The second application of DDDM in education is related to practices in the classroom. DDDM is used to adjust courses by incorporating students' feedback and recommendations from management. Another use of DDDM is in course preparation and administration. Lecturers are required to conduct research, create course content, maintain attendance lists, and manage grades.

Integrating DDDM into the curriculum is another classroom practice. Professors do not only use DDDM as a tool to prepare and administer courses but also teach it to students. DDDM is also employed to monitor students' understanding in the classroom. With online education, it has become possible for professors to track digital footprints of their students, such as when they joined meetings, how often they participated, and how frequently they downloaded course content. However, despite the availability of this data, it is not yet fully utilized. The data provided to professors is aggregated, characterizing trends in the classroom rather than providing individual data. Therefore, lecturers are unable to track the progress of every student simultaneously.

DDDM Tools

Six DDDM tools were identified overall.

- Classroom-related tools: These include in-class questionnaires, examination, and evaluation methods. In the online teaching format, professors utilize instant feedback forms, such as Padlet. Lecturers use various educational platforms, including Moodle, Microsoft Teams, Neptun¹, Kahoot! and Mentimeter to conduct classes and share information and materials.
- Financial accounting tools: The financial accounting system allows for financial flows tracking within departments and programs.
- Management tools: These encompass the overall performance measurement system for professors, students' feedback surveys, a social entrepreneurship attitude measuring survey used to evaluate entrepreneurial events and the incubation program within the school, the graduates' career tracking system (GCTS) for monitoring the careers of fresh graduates, services evaluation surveys, labor market needs research, and student admission metrics.
- Marketing tools: These include students' satisfaction surveys.

- Recording systems: The Hungarian storage of scientific publications and the library's scientific publications system help in keeping track of the scientific activities of professors.
- Security management tool: Developed by the security and safety department, this tool aims to check all digitally available data of potential students.

DDDM Challenges

Seven DDDM challenges were identified in this study.

- COVID-19 related challenges: Online education made it challenging for educators to establish and maintain a connection with their students.
- Cultural challenges: These encompass privacy risk aversion and unfamiliarity with the concept of decision-making.
- Teaching challenges: These include a lack of student interest in online learning, difficulties in measuring students' understanding, limited DDDM skills, insufficient knowledge of data collection and analysis, and a restrictive curriculum structure that hinders decision-making.
- Data challenges: This category involves challenges in data collection, exploitation, integration, preparation, privacy, processing, and quality.
- Management challenges: These include a mismatch between the needs in DDDM and the capabilities of existing information systems "*Processes are not designed to meet the needs of the university*", and the low response rate of students, which was suggested to be linked to the high number of surveys sent periodically.
- System-imposed time constraints: DDDM requires time-consuming operations, especially for data handling.
- Systemic challenges: These involve limitations in the existing systems and bureaucracy that hampers strategic shifts.

International accreditation

International accreditation is crucial for establishing a robust foundation for DDDM. It necessitates the fulfillment of specific academic quality standards at both the classroom and management levels. The faculty is mandated to systematically collect extensive data, documenting various aspects. These documents encompass data on students' achievements, relationship with alumni, and

¹ Neptun is an electronic educational Hungarian system that facilitates the administration of studies and communication within the faculty and/or university.

industrial partnerships, which are then shared with the partner university and discussed in meetings.

Opportunities in DDDM

During interviews, faculty members highlighted opportunities in capacity management, involving tracking students' competencies throughout their academic journey: from enrollment to graduation. Additionally, there is a suggestion to monitor students' performance during projects and access data about their behavior on educational platforms to enhance evaluation methods. Interviewees also mentioned that the challenge in data management lies in the absence of a widely adopted data management system that supports data integration, hindering the identification of implicit data patterns. Furthermore, it was suggested to develop interconnected systems at the university level that can generate relevant information for the faculty.

DISCUSSION

The research reveals that decision-making at the selected Hungarian business school is decentralized, involving various layers of management. The integration of DDDM in both management and the classroom are discussed. Decision-makers tend to use data to support their decisions, which is communicated during meetings with the different boards or stored internally online. In alignment with Gafandzhieva et al. (2023), our study confirms that DDDM is mainly used in strategy, marketing, and management. Aware that DDDM preserves competitiveness, the senior management is continuously collecting data that might serve as input for their decisions. As previously highlighted by Du (2022), DDDM is also utilized in the classroom, mainly to evaluate students, prepare and administer courses, and adjust and update the curriculum. Earlier, this was also confirmed by Akanmu and Jamaludin (2015). Faculty members not only leverage data for pedagogical enhancement but also integrate DDDM into the curriculum, with lecturers teaching students about DDDM and horizontally integrating DDDM practices in subjects.

The DDDM tools include classroom-related tools like in-class feedback, educational platforms, and a financial accounting system that calculates returns on different programs. While these tools provide an invaluable insight into student performance and tracking, they usually come in an aggregated form, enabling teachers to see general trends rather than specific areas of development for each student. In the same regard, Csapó and Molnár (2019) introduce the eDia system, a Hungarian support tool that helps

track students' progress in real-time and provides information on each student's development level.

Additionally, DDDM tools include management tools like the overall performance measurement system for professors, the GCTS system, services evaluation surveys for students, and labor market needs research. Dela Fuente and Dela Fuente (2023) highlighted the importance of the overall performance measurement system in fostering accountability and improving quality of teaching. Kuráth and Sipos (2015) emphasized the GCTS system as a strategic tool for management for institutional and faculty development. Additionally, labor market needs research systems are considered important tools that align academic programs with employment trends (Brandas et al. 2016).

Our study also identified marketing tools such as students satisfaction surveys. Similarly, Kobets et al. (2024) highlighted the use of DDDM in identifying the target group of applicants, enabling the effective allocation of resources for marketing. DDDM tools are also about recording systems, such as the Hungarian storage of scientific publications and the library's scientific publications system. Another tool highlighted is the security management system developed by the security and safety department, which is mostly used to support students in using different learning platforms safely and securely.

Various challenges were also identified, including COVID-19 related challenges. This was previously confirmed by Kaspi and Venkatraman (2023) as a significant challenge facing Australian universities.

Other challenges include cultural challenges involving privacy risk aversion and unfamiliarity with the concept of decentralized decision-making. This was earlier highlighted by Jones (2019), who proposed a model to address the growing privacy concerns regarding the collection and use of student data, and Tran (2014), who highlighted the lack of understanding of key concepts of decentralization as a major problem facing Vietnamese universities.

Another challenge is related to teaching, such as a lack of student interest in online learning, limited DDDM skills, insufficient knowledge of data collection and analysis, and a limited curriculum structure. Ferrer et al. (2022) investigated how students' attitudes towards online learning influence their motivation to learn in Australia. Other studies suggested improving data and technology literacy skills and DDDM knowledge of lecturers and course administrators in order to implement DDDM approaches in HE (Hora et al. 2017; Kaspi and Venkatraman 2023). Additionally, the literature discussed barriers beyond the limited structure of the curriculum, including challenges in faculty

training, resource allocation, and the need for interdisciplinary collaboration to update curricula (Akanmu and Jamaludin 2015).

Data challenges encompass issues that were mainly recognized in the literature, including data collection (Gade 2021), exploitation (Thummala and Saxena 2024), integration (Sarioguz and Miser 2024), preparation (Mandinach et al. 2011), privacy (Thummala and Saxena 2024), processing, and quality of data (Rovolis and Habibipour 2024).

Management challenges include a mismatch between the needs in DDDM and the capabilities of the existing systems. In this context, Komljenovic et al. (2024) emphasized the discrepancy between the perceived significance of learning analytics tools and the lack of expertise in acting on the information effectively in the United Kingdom.

Other management challenges include low students survey response rates and system-imposed time constraints. Systemic challenges include limited data systems and bureaucratic implications of change (Stojanov and Daniel 2024).

The interviewees also discussed the significance of international accreditation in fostering DDDM in HE. It emphasizes the need to meet academic quality standards and systematic data collection to ensure accountability. This was previously brought up by Musendekwa (2025). They also suggested several opportunities to foster the utilization of DDDM, including capacity management, data integration, and the development of interconnected systems at the university level.

CONCLUSION

This research contributes to deepening the understanding of DDDM in Hungarian universities. We explored DDDM practices at a Hungarian business school, identified the tools used in this framework, and recognized the main challenges faced by faculty staff. We conducted 14 interviews using a semi-structured interview guide with the academic staff of the selected business school.

This study highlights that the practice of DDDM requires reliable data as a basis for firm decisions. DDDM practices play an important role in the development of the management system at the faculty, help maintain its competitiveness, and ensure a better quality of education for students. DDDM can be integrated both into the faculty's management and into the classroom. Through this research, we identified different DDDM tools. The development of these tools was primarily stimulated by the development of accreditation partnerships. Various challenges were also identified, including challenges related to COVID-19, culture, teaching, data, management, and systems.

Although DDDM in education is thriving, this topic remains understudied in Hungary. This research enabled us to develop a theoretical basis for generating concrete recommendations for decision-makers at the selected business school. This investigation includes a set of recommendations to help decision-makers enhance their DDDM practices:

- Sort existing surveys by category and priority to understand what surveys need to be added or deleted.
- Develop a rewards-based system to increase the response rate in surveys.
- Employ data analysis tools that support and understand individual data.
- Identify relevant sources for data.
- Collect data about students' performance on online educational platforms to facilitate students evaluation.
- Diversify assessment methods of students to ensure a fair evaluation for all.
- Maintain accreditations.

Despite our efforts to complete this research following a solid methodology, several criticisms can be addressed in our study. First, dealing with an understudied subject, we faced difficulties when writing the literature review. This research focuses on a specific aspect of DDDM for education, generating findings that are possibly only valid for Hungarian universities. To generalize these findings, a quantitative study must be conducted across multiple Hungarian business schools, enabling us to test and generalize our findings on a more representative sample. Additionally, a comparative analysis can reveal the cultural differences and contextual factors between different institutions from different countries.

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APPENDIX.
SUMMARY TABLE OF RESULTS

Sub-chapter	Primary Categories
DDDM Practices	Management
	Marketing strategy
	Strategic decision-making
	Classroom-related practices
DDDM Tools	Classroom-related tools
	Financial accounting tools
	Management tools
	Marketing tools
	Recording systems
	Security management tool
DDDM Challenges	COVID-19 related challenges
	Cultural challenges
	Educational challenges
	Data challenges
	Management challenges
	System-imposed time constraints
	Systemic challenges

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