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The Rise of Data Analytics: An Inductive Analysis of Disciplinary Migration in Higher Education

Lionel Mew
lmew@richmond.edu
University of Richmond
Richmond, VA, USA

Abstract

This inductive research paper examines the emerging phenomenon of data analytics as a discipline and its impact on traditional academic fields in higher education. Through analysis of literature reviews, enrollment trends, and market dynamics from 2020-2025, this study investigates three primary research questions: (1) Is data analytics increasing in popularity among university students? (2) Is data analytics displacing students from information systems programs? (3) Is data analytics competing with data science and mathematics/statistics for student enrollment? The findings reveal that data analytics has experienced explosive growth of over 700% in completions between 2012-2021, with significant implications for traditional disciplinary boundaries. This growth is found to result in decreased matriculation in similar and related fields such as information systems, mathematics and statistics. Based on the inductive analysis, we propose a theoretical framework for understanding disciplinary migration in the digital age: the Technology-Mediated Disciplinary Evolution Model (TMDEM). This paper contributes to understanding the evolving landscape of higher education and provides a theoretical framework for future research on disciplinary migration in the digital age.

Keywords: data analytics, data science, information systems, enrollment trends, higher education, disciplinary migration

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1. INTRODUCTION

The proliferation of data-driven decision-making across industries has catalyzed unprecedented changes in higher education, particularly in the emergence and rapid growth of data analytics as a distinct academic discipline. According to Encoura research, over a period when all completions grew by 9%, the overall data science/data analytics market proxy grew by over 700% revealing an explosion of student demand—growing from just under 6,000 completions in 2012 to over 46,000 completions in 2021 (Encoura, 2024). This dramatic expansion raises critical questions about the displacement effects on traditional disciplines and the reconfiguration of academic pathways in higher education.

The current landscape of higher education is characterized by what scholars term the "enrollment cliff." As noted by EdTech Magazine, the enrollment cliff is projected to occur around 2025 or 2026, referring to an anticipated significant decline in higher education enrollment across the U.S., brought on by myriad factors, including decreasing birth rates, high tuition costs and an evolving job market (Manfuso, 2024). Against this backdrop of declining overall enrollment, the meteoric rise of data analytics programs presents a compelling case study of how market forces and technological advancement can reshape academic disciplines.

This paper employs an inductive research approach to examine the growth of data analytics and its impact on related fields. Rather than testing predetermined hypotheses, this study allows patterns to emerge from the data, enabling a more nuanced understanding of the complex relationships between emerging and traditional academic disciplines. The research addresses three primary questions that have emerged from preliminary observations of enrollment patterns and market trends.

The significance of this research extends beyond academic curiosity. Understanding these disciplinary shifts has practical implications for university administrators making strategic decisions about program development, faculty hiring, and resource allocation. For students, these trends inform career pathway decisions in an increasingly competitive educational marketplace. For policymakers, insights into these changes can inform workforce development strategies and educational funding priorities.

2. LITERATURE REVIEW

Historical Context of Data Analytics as a Discipline

The discipline of data analytics has evolved considerably since its inception in the mid-20th century. Initially focused on data processing and statistical analysis, the field has transformed into a sophisticated domain encompassing predictive modeling, machine learning, and business intelligence. Chen, Mao, and Liu (2014) identified the introduction of big data concepts in the early 2000s as a significant turning point, integrating various technologies and methodologies for capturing, storing, and analyzing vast quantities of data.

The modernization of analytics techniques has been influenced by several factors, including advancements in statistical methodologies, the rise of big data, and the increasing need for data-driven decision-making across sectors including healthcare, finance, and marketing (Raghupathi & Raghupathi, 2021; Nyamba et al., 2021). This evolution has positioned data analytics as an integral component of organizational strategy, with applications evident in diverse fields such as healthcare analytics, marketing analytics, and operational analytics.

Recent developments have further accelerated the field's growth. According to the U.S. Bureau of Labor Statistics, employment of data scientists is projected to grow 36 percent from 2023 to 2033, much faster than the average for all occupations, with about 20,800 openings for data scientists projected each year (BLS, 2024a). Similarly, operations research analysts, a related analytical occupation, is projected to grow 23 percent from 2023 to 2033 (BLS, 2024b). This demand surge reflects the field's transition from a specialized technical domain to a mainstream business function.

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Data Analytics Versus Data Science: Definitional Boundaries

Understanding the growth of data analytics requires clear differentiation from the closely related field of data science. Data analytics typically focuses on examining datasets to discover patterns, derive insights, and support decision-making, emphasizing descriptive and diagnostic analytics that address "what has happened" and "why it happened" within specific business contexts (Provost & Fawcett, 2013; Sun, 2023).

In contrast, data science encompasses a broader, interdisciplinary approach that combines scientific methods, algorithms, and systems to extract knowledge from both structured and unstructured data (Romero et al., 2020). Data scientists employ diverse techniques including machine learning, data mining, and predictive modeling, utilizing programming languages such as Python and R to develop complex models and algorithms.

According to UCLA research, data science programs are typically more mathematically rigorous, emphasizing programming, statistics and machine learning. Data analytics programs may focus more on business acumen, data visualization and communication skills (UCLA Samueli, 2024). This distinction has important implications for student choice and career pathways, as data analytics may be perceived as more accessible to students seeking immediate career applications without the extensive technical prerequisites required for data science.

Information Systems: Traditional Foundations Under Pressure

Information Systems has historically focused on integrating technology, people, and processes to manage organizational information. However, the emergence of data analytics and data science has created pressure on traditional IS programs. Chen & Upah (2018) found that predictive analytics can influence students' decision-making regarding major selection, effectively redirecting them from IS to more data-centric fields when equipped with insights from predictive models.

The evolution of data analytics in sectors like accounting has further illustrated this shift. The increasing reliance on big data analytics in accounting practices has created demand for professionals well-versed in data analysis tools rather than traditional IS skills, potentially attracting students interested in quantitative methodologies and applied analytics (Aziz, 2023).

Current Enrollment Trends and Market Dynamics

Recent enrollment data reveals significant patterns in higher education. According to the National Student Clearinghouse Research Center, total postsecondary enrollment is up 3.2 percent this spring (+562,000), compared to spring 2024. Undergraduate enrollment grew 3.5 percent, reaching 15.3 million but remains below pre-pandemic levels (-2.4%, -378,000) (NSCRC, 2025). This overall growth masks important underlying trends in specific disciplines.

The data analytics market shows particularly robust growth patterns. According to NCES data classification systems, program completions are tracked through the Integrated Postsecondary Education Data System (IPEDS) using Classification of Instructional Programs (CIP) codes, which provide detailed tracking of fields of study and program-completion activity (NCES, 2025). Encoura research indicates that about 96% of all completions are at three credential levels: master's (68%), bachelor's (23%), and postbaccalaureate certificate (5%). Compared to the entire market (across all fields of study and at all credential levels), the data science/data analytics market has a disproportionately higher concentration representation at the master's (68% vs. 16%) and postbaccalaureate certificate (5% vs. 1%) levels, and under-indexed at the bachelor's (23% vs. 40%) level (Encoura, 2024).

This distribution suggests that data analytics is attracting significant numbers of working professionals seeking to upgrade their skills, rather than primarily serving traditional undergraduate populations. The implications for traditional disciplines offering similar professional development opportunities are significant.

Furthermore, labor market data supports the enrollment trends. According to the U.S. Bureau of Labor Statistics, data scientists employment grew significantly over the last decade, with employment projected to grow 36% from 2023 to 2033, much faster than the 4% average for all occupations. Operations research analysts, another data-focused occupation, is projected to grow 23% over the same period (BLS, 2024a; BLS, 2024b). These growth rates position data-related careers among the fastest-growing occupations in the U.S. economy.

Student Preference Patterns

Research indicates that data analytics may be outpacing data science in popularity among students due to several factors. Jones et al. (2020) identified the marketing of analytics

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programs as a critical factor influencing student preferences, driving up enrollment in data analytics courses rather than data science ones. The perception of data analytics as more applicable and actionable resonates with students inclined toward career-oriented education (Daniel, 2017).

According to Rakow et al. (2023), the rise of online educational platforms offering data analytics certifications enhances accessibility, further elevating the discipline's appeal compared to the substantial commitment required for mastering data science methodologies. This accessibility factor is particularly important in the context of changing student demographics and educational delivery modalities.

3. RESEARCH QUESTIONS

Based on the literature review and emerging patterns in enrollment data, this study addresses three primary research questions:

RQ1: Is data analytics increasing in popularity as a discipline among university students?

RQ2: Is data analytics displacing students from information systems programs?

RQ3: Is data analytics competing with data science and mathematics/statistics programs for student enrollment?

Additionally, this study explores emergent research questions that arise from the inductive analysis:

RQ4: What factors drive student migration toward data analytics programs?

RQ5: How do market demands and employer preferences influence disciplinary choice?

4. DISCUSSION

Evidence for Increasing Popularity of Data Analytics (RQ1)

The evidence overwhelmingly supports the conclusion that data analytics is experiencing unprecedented growth in popularity among university students. According to Encoura's research, the 700% increase in completions between 2012-2021 represents one of the most dramatic disciplinary expansions in recent higher education history (Encoura, 2024). This growth trajectory continues into 2024-2025, with the U.S. Bureau of Labor Statistics projecting data scientist employment to grow 36% from 2023 to 2033, much faster than the average for all occupations (BLS, 2024a).

The institutional response to this demand has been swift and comprehensive. Universities have rapidly expanded their analytics programs to accommodate student interest, positioning data analytics as a more accessible and pragmatic option for students seeking immediate career opportunities (Gilbertson et al., 2022). The emergence of specialized data analytics schools and bootcamps further demonstrates the market's recognition of this trend.

Several factors contribute to this popularity surge:

1. **Accessibility:** Data analytics programs often require less mathematical rigor than data science, making them accessible to a broader range of students
2. **Career immediacy:** The focus on business applications provides clear pathways to employment
3. **Industry demand:** The explosive growth in data-related jobs creates strong incentives for students
4. **Flexibility:** Many programs offer online and part-time options suitable for working professionals

Displacement Effects on Information Systems (RQ2)

The evidence suggests that data analytics is indeed displacing students from traditional information systems programs, though the relationship is complex and multifaceted. The pressures on IS programs manifest in several ways:

Skill Set Evolution: The increasing reliance on big data analytics across business functions has created demand for professionals with data analysis capabilities rather than traditional IS skills focused on system integration and management. This shift reflects broader changes in organizational technology needs.

Student Perception: Data analytics programs are often perceived as more directly applicable to immediate career needs, whereas IS programs may be viewed as more traditional and less aligned with current market demands. The marketing advantage of analytics programs compounds this perception issue.

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Curricular Overlap: Many core competencies traditionally taught in IS programs—database management, business intelligence, systems analysis—are now central to data analytics curricula. This overlap creates direct competition for students interested in these technical skills.
However, the displacement is not complete. There are opportunities for integration between these disciplines, with data analytics complementing IS by incorporating data-driven methodologies into systems design and management. Some institutions are adapting by creating interdisciplinary approaches that combine elements of both fields.

Competition with Data Science and Mathematics/Statistics (RQ3)
The relationship between data analytics and related quantitative disciplines is characterized by both competition and complementarity. The evidence suggests several patterns:

Data Science Competition: Individual programs will vary in curriculum, admissions, and outcomes. Data science programs are typically more mathematically rigorous, emphasizing programming, statistics and machine learning. Data analytics programs may focus more on business acumen, data visualization and communication skills. This differentiation suggests that data analytics may be attracting students who might otherwise have pursued data science but prefer a more business-focused, less technically intensive approach.

Mathematics and Statistics: The traditional mathematics and statistics disciplines face particular challenges. According to the National Center for Education Statistics, mathematics scores for U.S. fourth- and eighth-graders in 2023 declined compared to 2019, before the onset of the global COVID-19 pandemic (NCES, 2024). This decline in mathematical preparation at the K-12 level may make data analytics more attractive than traditional mathematics/statistics programs for students seeking quantitative careers without extensive mathematical prerequisites.

Market Segmentation: Rather than simple displacement, the evidence suggests market segmentation is occurring. Data analytics attracts students interested in immediate business applications, while data science appeals to those seeking more technical, research-oriented careers. Mathematics and statistics programs increasingly serve pre-graduate school populations and specialized technical roles.

Emergent Factors Driving Student Migration (RQ4)
The inductive analysis reveals several factors not initially anticipated that influence student choices:

Technology Integration: According to EDUCAUSE research, universities are increasingly using AI to better target student support, establish if students are enrolling in the right program, etc. Our Center for Data Science is providing analytics to adjust/validate our processes (EDUCAUSE, 2024). Universities themselves are using data analytics to understand and guide student choices, creating feedback loops that may reinforce existing trends.

Industry Partnerships: The proliferation of industry-sponsored data analytics programs and competitions creates clear pathways from education to employment. For example, the Purdue case competition Data 4 Good challenges undergraduate and graduate students across the country to compete for $40,000 in prize money (Purdue University, 2024). These partnerships provide visibility and legitimacy that traditional academic disciplines may lack.

Certification Ecosystems: The availability of industry certifications and alternative credentials in data analytics provides additional validation and career advancement opportunities that traditional academic programs may not offer.

Market Demands and Employer Preferences (RQ5)
Employer demand patterns significantly influence student disciplinary choices. The data reveals that organizations increasingly seek professionals who can bridge technical capabilities with business understanding—a profile that data analytics programs explicitly target.

According to Encoura research, given the over-indexed activity at the graduate level in these fields, a significant proportion of this prospect pool are workers seeking to fine-tune these increasingly critical skills (Encoura, 2024). This suggests that much of the growth in data analytics represents professionals updating their skills rather than traditional student populations, indicating that employer demand is driving workforce development rather than academic interest per se.

The emergence of alternative providers further illustrates market dynamics: according to industry analysis, alternative education providers offer thousands of data-related courses, with many offered by major technology companies like

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IBM, Google, and Meta (Encoura, 2024). This proliferation of industry-provided training creates competitive pressure on traditional academic programs.

5. PROPOSED THEORETICAL FRAMEWORK FOR FUTURE RESEARCH

Based on the inductive analysis, this study proposes a theoretical framework for understanding disciplinary migration in the digital age: the **Technology-Mediated Disciplinary Evolution Model (TMDEM).**

Nature of the Model

TMDEM is a qualitative theoretical framework rather than a quantitative predictive model. It does not generate mathematical predictions but instead provides a structured lens for understanding the mechanisms and dynamics of disciplinary change. The framework identifies key variables and their relationships conceptually, offering a basis for future empirical testing and potential quantitative operationalization.

Core Components of TMDEM

1. **Technology Disruption Pressure:** Rapid technological change creates pressure on existing academic disciplines to adapt or risk obsolescence. The speed of change often exceeds the ability of traditional academic institutions to respond through normal curricular revision processes.

2. **Market Signal Amplification:** Industry demand signals are amplified through multiple channels—job postings, salary data, industry partnerships—creating powerful incentives for students to migrate toward emerging fields.

3. **Accessibility Gradient:** Students migrate toward disciplines that offer the optimal combination of career prospects and accessibility. Data analytics succeeds partly because it provides strong career outcomes without the intensive mathematical prerequisites of related fields.

4. **Institutional Response Lag**: Traditional academic disciplines experience response lag due to faculty expertise constraints, curriculum approval processes, and institutional inertia. This lag creates opportunities for emerging disciplines to capture market share.

5. **Feedback Loop Acceleration:** Success breeds success as successful programs attract resources, students, and industry partnerships, creating positive feedback loops that accelerate growth.

Predictive Elements

The TMDEM framework suggests several predictions for future disciplinary evolution:

1. **Continued Fragmentation:** Traditional broad disciplines will continue to fragment into specialized sub-disciplines that better match industry needs

2. **Industry-Academic Convergence:** The boundary between industry training and academic education will continue to blur
3. **Competency-Based Evolution:** Programs will increasingly organize around demonstrable competencies rather than traditional academic boundaries

4. **Adaptive Capacity as Competitive Advantage:** Academic programs that can rapidly adapt to technological and market changes will have sustainable competitive advantages

Framework Application

This framework can be applied to analyze other emerging disciplines (cybersecurity, artificial intelligence, digital marketing) and predict which traditional disciplines may face similar pressures. It also provides guidance for institutional strategic planning and program development.

Theoretical Foundations and Research Lines

The Technology-Mediated Disciplinary Evolution Model (TMDEM) emerges from the convergence of institutional theory, innovation diffusion research, and organizational ecology. Drawing on DiMaggio and Powell's (1983) institutional isomorphism and Slaughter and Rhoades' (2004) academic capitalism theory, TMDEM explains how market forces create new pressures that fracture traditional academic fields. The model incorporates Rogers' (2003) diffusion of innovations theory and technology acceptance models (Davis, 1989) to understand how perceived usefulness and accessibility influence student migration toward emerging disciplines.

From organizational ecology (Hannan & Freeman, 1989), TMDEM adopts evolutionary frameworks emphasizing environmental selection pressures and resource competition, while resource dependence theory (Pfeffer & Salancik, 1978) explains how successful programs create self-reinforcing resource acquisition cycles.

Field theory (Bourdieu, 1975) provides the foundation for understanding academic disciplines as distinct institutional fields, while institutional entrepreneurship literature (DiMaggio, 1988) informs the model's treatment of legitimacy acquisition by emerging disciplines.

Contemporary digital transformation research (Vial, 2019) and Social Construction of Technology theory (Bijker et al., 1987) contribute insights about technology-society co-evolution. Unlike existing frameworks that address change retrospectively, TMDEM synthesizes these traditions to create a predictive model specifically focused on technology-mediated disruption in accelerated timeframes, integrating individual-level choice mechanisms with institutional and field-level adaptation processes.

6. SUMMARY

This inductive research reveals that data analytics represents more than simply another academic program—it exemplifies a new model of market-responsive higher education that challenges traditional disciplinary boundaries. The explosive growth in data analytics programs reflects broader changes in how students, employers, and institutions approach higher education in the digital age.

The evidence clearly supports all three primary research questions. Data analytics is experiencing unprecedented growth, it is displacing students from information systems programs, and it is competing effectively with data science and mathematics/statistics for student enrollment. However, the relationships are more complex than simple displacement, involving market segmentation, institutional adaptation, and the emergence of new educational models.

The emergent factors identified—technology integration in student guidance, industry partnerships, alternative credentialing—suggest that the growth of data analytics is part of a broader transformation in higher education toward more market-responsive, competency-based programming.

7. CONCLUSIONS

The rise of data analytics as an academic discipline provides a window into the future of higher education in a rapidly evolving technological landscape. This inductive analysis reveals that successful academic programs in the digital age require not only strong curricular content but also clear industry pathways, accessible entry requirements, and rapid adaptation to market signals.

For university administrators, the implications are clear: traditional disciplines must adapt or risk declining enrollment, while emerging disciplines must balance rapid growth with quality maintenance. The data analytics phenomenon suggests that successful programs combine academic rigor with practical applicability, theoretical foundations with industry relevance.

For students, these trends indicate the importance of choosing programs that balance personal interests with market demands. The success of data analytics demonstrates that students increasingly value programs that provide clear career pathways and immediate applicable skills.

For policymakers and workforce development professionals, the rapid growth of data analytics illustrates how higher education can serve as a responsive workforce development mechanism when properly aligned with industry needs. However, it also raises questions about ensuring adequate preparation in foundational skills—mathematics, statistics, critical thinking—that may be deemphasized in applied programs.

Looking forward, the Technology-Mediated Disciplinary Evolution Model provides a framework for understanding and predicting similar disruptions in other academic areas. As artificial intelligence, biotechnology, renewable energy, and other technological domains continue to evolve rapidly, higher education institutions must develop greater adaptive capacity to serve both student needs and societal workforce requirements.

However, the rapid market-driven growth of data analytics programs raises critical questions about quality assurance and the preservation of foundational competencies. While accreditation bodies such as ABET and AACSB provide curricular oversight in established fields, emerging disciplines like data analytics often lack equivalent regulatory mechanisms. Professional associations—including ACM, IEEE, and nascent data science organizations—have begun developing competency frameworks, but enforcement remains inconsistent. University governance structures must balance market responsiveness with academic rigor, ensuring that programs maintain adequate depth in mathematics, statistics, and critical thinking even when market pressures favor breadth and immediate applicability. The TMDEM framework's feedback loops could accelerate either quality improvement or quality erosion, depending on institutional commitment to foundational standards

The transformation represented by data analytics' rise is likely only the beginning of a broader reconfiguration of higher education in response to technological change and evolving economic needs. Understanding these patterns will be crucial for all stakeholders navigating the future of higher education.

Future research should examine the long-term outcomes for graduates of these emerging programs, the sustainability of rapid program growth, and the development of quality assurance mechanisms for market-responsive programming. Additionally, comparative analysis across different institutional types and geographic regions could provide insights into which models of disciplinary evolution prove most effective.

The story of data analytics' rise ultimately reflects the dynamic nature of knowledge itself in the digital age—where the boundaries between disciplines, the relationship between theory and practice, and the pathways from education to career are all being rewritten by technological possibility and market demand.

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