The Analytics and AI Opportunity for Business Schools

A 5-Part Framework for Developing the Right Programs and Delivering the Right Curriculum

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The rising importance of analytics and artificial intelligence (AI) is undeniable. About 77 percent of the devices we use today have some sort of AI-enabled feature. And by 2025, the global market for AI is expected to be about $60 billion. That demand will only accelerate in a post-COVID world, as e-commerce continues to grow exponentially and we lean on analytics and AI to prepare and swiftly respond to any future global pandemics.

THE LINK BETWEEN ANALYTICS AND ARTIFICIAL INTELLIGENCE

Data analytics can be defined as the discipline of helping organizations get more out of their structured and unstructured data. Now, we have entered the next phase of advanced analytics-related demand—that is, artificial intelligence (AI). AI technologies complement the traditional field of data analytics by adding "sensing" and "learning" capabilities. As industries and businesses continue to rapidly migrate to—and increase their use of—digital technologies, the global demand for analytics and AI skills will rise for the foreseeable future.

Accordingly, and recognizing the burgeoning demand for analytics and AI (A/AI) skills, business schools have launched more than 400 business analytics programs worldwide. However, most of these efforts have been piecemeal and ad hoc rather than the result of a well-crafted strategy

A 5-Part Framework for Analytics and AI Education

Based on our experience working with CEOs and management teams to drive innovation and implement digital technologies, we have witnessed not only the rise, but also the mismatch in supply and demand, of A/AI analytics talent. As educators, we firmly believe that business schools have a paramount role to play in bridging this gap. We propose a strategic framework for business schools to consider when evaluating, developing, and growing their advanced analytics and AI programming. The approach includes five major components (**see Figure 1**):

1. *Programs:* What programs should business schools offer to align with the business needs of the future?
2. *Curriculum:* What is the right mix of classes to offer for students to succeed in industry?

3. *Delivery models:* What delivery models work best given the selected set of programs?
4. *Collaborations:* Who should the school collaborate with to bring in new thinking and deliver maximum value?
5. *Career services:* What type of career services are needed to best prepare students for analytics jobs?
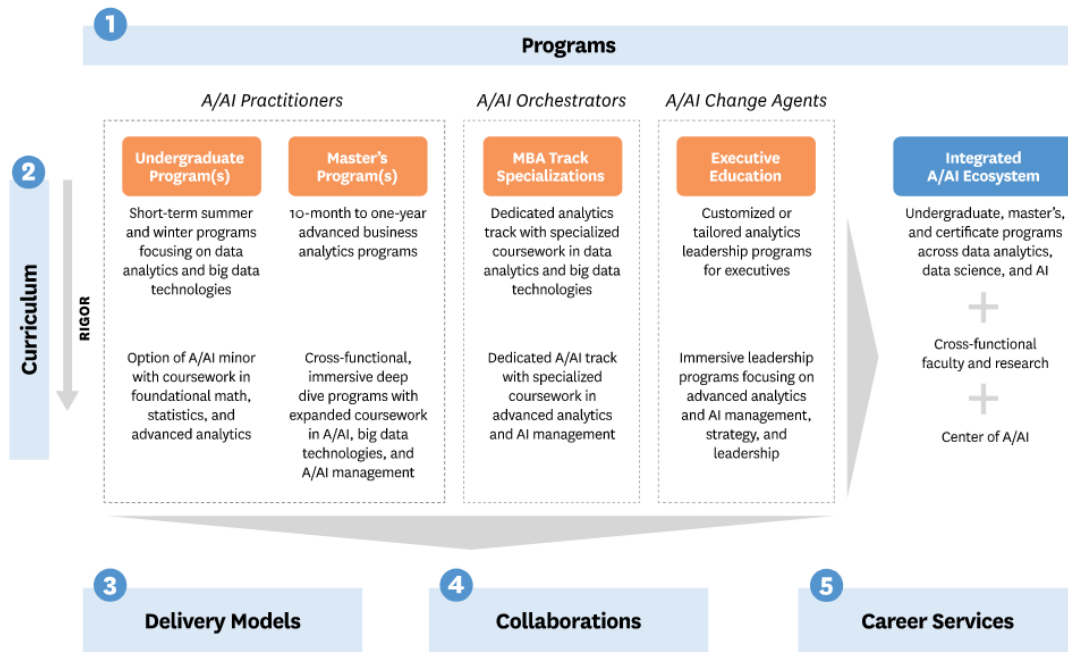
Source: Vijay Govindarajan, Nikhil Sikka, *Inspiring Minds* by Harvard Business Publishing Education.

Figure 1: A comprehensive framework for advanced analytics and AI education at business schools

In each of the five dimensions, business schools need to make strategic choices based on their overall competitive positioning. A prestigious, premium-priced, research-oriented business school, for example, might make different choices than a business school that relies on scale and volume to offer affordable programs.

1. Programs

Academic institutions would be well served to develop their analytics and AI programs keeping in mind not only how AI is improving, transforming, and disrupting current business models, but also how different audiences have distinct learning needs. We believe that the following three groups of students need to be trained; together, they will play different yet crucial roles in organizations.

Practitioners seeking analytics and AI fluency

Practitioners should be able to frame a business problem within an A/AI context, then effectively work with tech teams to build the necessary models and AI-enabled products and services. Students who want to be A/AI practitioners—not necessarily data scientists— should be well served by **master's programs with specialized coursework**. A **minor in A/AI for undergraduate** business students that focuses on hard data and technical skills can also set up students for a lucrative career or provide a path for an advanced degree in AI.

Many US business schools have created specialized master's programs in data analytics, and a few European business schools have started investing in master's programs in more specialized and advanced AI technologies. For example, SKEMA Business School in France and the Schulich School of Business at York University in Canada recently launched master's degrees in AI and data science.

Short-duration business analytics programs geared toward undergraduate students, similar to the Business Bridge Program at Tuck, can help prepare them for job-oriented careers. These programs can provide liberal arts and STEM students with essential practitioners' skills needed to ease the transition into the field.

Orchestrators looking to bridge technical and business expertise

There is a huge demand for analytics talent that can connect the technical expertise of data scientists with the knowledge of business teams and orchestrate multi-million-dollar digital and AI investments. **MBA programs** provide the best learning environment for those who want to manage an A/AI team or function. They need to have foundational technical knowledge to know the right questions to ask, identify use cases, develop new business models using A/AI, help guide priorities, and execute projects. For any business school to stay relevant in this data age, it needs to have a dedicated track or specialization for its MBA students, with specialized coursework covering relevant A/AI topics.

Change agents committed to transforming the future

The focus of these programs—primarily in the **executive education** arena—should be on educating C-level executives, senior leaders, and managers in creating awareness and a general understanding of how to incorporate analytics and AI into the way their companies conduct business. For instance, asset-heavy, industrial companies such as Rolls Royce, Honeywell, John Deere, and General Motors are accelerating efforts to fuse physical products and digital technologies to create new pockets of value. Yet, inside these companies, there are hundreds of thousands of managers and executives who are still involved in the core business of hardware manufacturing. These managers have to become digitally literate; this represents a big executive education opportunity. Except for a handful of executive programs, such as Kellogg's executive program in AI, there aren't many business programs targeted at C-level executives and senior managers that focus on AI leadership and strategy.

Clearly, institutions have several choices to make here—a business school might choose to play in one or more of these spaces, depending on its mission. Eventually, we believe that schools need to take a long-term view and move toward building an integrated ecosystem of different programs and centers that cater to all three A/AI audiences—practitioners, orchestrators, and change agents—effectively.

2. Curriculum

No matter which program they enroll in, all students need to understand foundational technical skills. However, the rigor and pedagogical style (hands-on lectures vs. case teaching, for example) will vary depending on the type of audience and the length of the program.

Essential technical foundations (for all students)

Though the depth of knowledge will vary depending on the audience, foundational A/AI coursework should include skills in the following:

- Data mining and preparation (using SQL, Spark, Hadoop, etc.)
- Creating actionable data visualizations (using Tableau, Power BI, Orange, etc.)
- Training in statistical modeling and predictive machine learning and deep learning algorithms (using Python or R).

A/AI project management and storytelling (for practitioners and orchestrators)

Defining a business problem, then structuring it as a problem-solving process for an analytics team, requires strong consulting, storytelling, and project management skills. Learning to work in an agile team environment and accomplishing goals via "sprints" helps cross-functional teams work in shorter development cycles and iterate effectively.

Data management and governance (for practitioners and orchestrators)

An eye-opening 80 percent of organizations struggle with data quality issues due to inconsistent metadata and data lineage necessary for deploying A/AI enabled digital models. Coursework focusing on data strategy, governance, and managing data pipelines and related issues is a must.

Industry or functional specialization (for orchestrators)

To unlock the real value of analytics, it's important for students to see—and dig into—the right use cases for their particular industry or functional area. Take healthcare, for instance. Here, a very deep understanding of the healthcare industry, including healthcare administration, business models, and detailed operations, is a critical underpinning of students' ability to frame business problems as analytics projects. Similarly, a student needs a deep understanding of a functional area (such as marketing, operations, or HR) before being able to apply an analytics framework to end-to-end processes.

Execution and implementation (for orchestrators)

Despite the technological advances we've seen, the implementation of analytics and AI projects is still a major problem. A 2020 global study from BCG reports that as many as 90 percent of companies fail to reap any financial benefits from their AI initiatives. Institutions must offer curriculum that includes courses on the last-mile business integration, which importantly combines macro- and micro-interactions between humans and machines.

Leadership and ethics (for change agents)

Transforming legacy businesses into digital ones and leading change using A/AI is not an easy task—it requires incredibly strong leadership skills. Executives need to know how to put AI to work in their organizations, avoid management pitfalls, properly structure AI teams, and create and lead major change management initiatives. Plus, due to potential legal issues surrounding the privacy and transparency of AI algorithms, there is a growing need for AI ethics programs and policies tailored to specific industries and regulatory structures.

3. Delivery Models

The COVID-19 pandemic has resulted in a massive worldwide experiment in delivering learning content online, jumpstarting the long-overdue digital overhaul of higher education. The analytics curriculum lends itself very effectively to a hybrid teaching model; technical concepts can actually be taught more effectively through asynchronous, prerecorded lectures, with which students can learn at their own pace and skill levels. High-value synchronous, virtual or face-to-face time should be used wisely to encourage critical thinking, case discussions, network building, and hands-on labs.

Figure 2 shows the possible delivery models for different types of programs. As an example, the Harvard Business Analytics Program (HBAP) offers a hybrid, fully online program in which asynchronous technical sessions are supplemented with synchronous classes. Another successful example of hybrid teaching is the post-graduate business analytics program offered by Great Lakes Institute of Management in India.

A fully immersive delivery model makes sense for high-touch residential MBA programs. On the other hand, fully online A/AI programs can be developed by leveraging the technology and cloud-based platforms offered by the growing number of EdTech companies like 2U. Business schools can also partner with platform companies such as Coursera to offer short-term certificate programs and massive open online courses (MOOCs).

	Single Mode	Hybrid
On Campus	• All classes and content delivered in person SUITABLE FOR: • Immersive residential MBA and master's programs • C-suite executive education programs • Small, cohort-differentiated residential programs	• Asynchronous material delivered through an online learning management system (LMS) • Synchronous and discussion-based lectures delivered in person SUITABLE FOR: • Master's programs
Remote	• All classes and content delivered through an online learning management system (LMS) SUITABLE FOR: • Affordable, large-scale analytics programs • MOOCs • Upskilling large numbers of employees	• Asynchronous material delivered through an online learning management system (LMS) • Synchronous and discussion-based "live" lectures delivered at designated times through platforms like Zoom • In-person immersions SUITABLE FOR: • Part-time master's programs • Executive education programs

Source: Vijay Govindarajan, Nikhil Sikka, *Inspiring Minds* by Harvard Business Publishing Education.

Figure 2: Possible delivery models for different analytics programs

4. Collaborations

Different schools and departments within academic institutions often operate in silos, offering competing programs in A/AI within the same school. This is undesirable. Institutions should instead pursue the following collaborations to build integrated, impactful programs.

Collaboration among academic departments

Creating partnerships across an institution's business school, engineering school, and computer science department is critical, especially due to the technical nature of the AI curriculum and the need to apply AI to solve business problems. Rather than competing, different departments should work together and play to each other's strengths. Columbia's newly minted MS in Business Analytics program provides a good example of this cross-functional collaboration, leveraging faculty and resources from Columbia Engineering and Columbia Business School.

Industry partnerships

Established A/AI-heavy tech companies and top global services firms that deal with large amounts of corporate data provide industry applications and lessons that are unmatched in academic settings. Schools can benefit a tremendous amount both by cowriting A/AI-specific business case studies that bring in new thinking and by hiring adjunct faculty from industry to provide highly integrated courses tied to companies. Microsoft, for example, recently launched the first Microsoft AI Business School in China in conjunction with Cheung Kong Graduate School of Business and Tsinghua University. Elite business schools should explore opportunities to offer either joint degrees or executive education programs with digital giants such as Amazon, Apple, Facebook, and Google.

Industry partnerships are also critical for experiential learning. When students can apply fundamental modeling and data skills on actual client projects, they can better understand the issues that arise during real-world engagements. One successful example of this is Imperial College Business School, which partnered with KPMG to create the Data Observatory and Data Spark initiatives to bring business-focused academics together with industry specialists in data science.

The implications of ignoring industry partnerships are massive—and will likely result in an explosion of competing alternatives to business school degrees. The rise of industry-sponsored bootcamps and in-house skill-building certificate programs from the likes of Google will only exacerbate competition.

5. Career Services

Personalized career services in the analytics realm are usually not well developed, primarily due to a shortage of career coaches who have significant experience in the industry. Students typically struggle to cultivate their A/AI path due to lack of proper tools, resources, and career support.

Business schools' career teams should have dedicated resources for analytics-related career planning, as recruiting for these roles is quite different from typical MBA and business roles. Beyond the required technical skills needed for analytics roles, employers are looking for skills in problem solving, leadership, and business communication. To give students opportunities to develop and demonstrate these skills, institutions might support the following:

- A forum for students to present their A/AI work or research via poster sessions, an idea borrowed from science-heavy academic programs
- A co-op learning model, with periods of full-time work with industry partners, which gives students an opportunity to gain hands-on analytics experience to be competitive in the job market
- Career-focused student clubs that bring in industry speakers; provide additional programming around technical topics; and organize corporate treks, hands-on data analytics workshops, and hackathons

Creating the Future

Business schools are at an inflection point, particularly when it comes to their analytics and AI offerings. They must explore additional revenue sources to future-proof their institutions for long-run financial stability. With schools expecting [revenue plunges in the order of tens of millions](#) due to the pandemic, a well-crafted and comprehensive advanced analytics curriculum provides a perfect opportunity to not only drive new revenue growth, but to also address a large gap in the marketplace for developing A/AI-savvy business leaders.

Link: https://hbsp.harvard.edu/inspiring-minds/the-analytics-and-ai-opportunity-for-business-schools