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HIGHER EDUCATION RESEARCH AND POLICY REFORM PROGRAM

Synergy of Non-Degree Data Upskilling Programs and Higher Education

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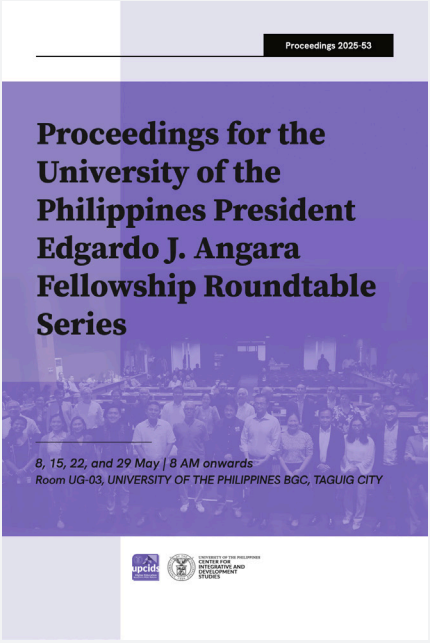

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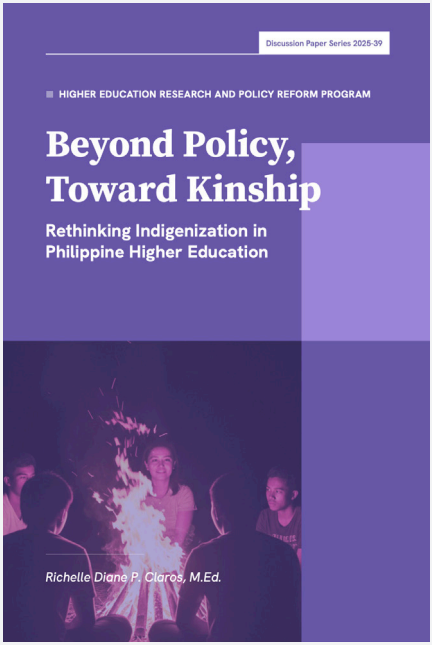

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SYNERGY OF NON-DEGREE DATA UPSKILLING PROGRAMS AND HIGHER EDUCATION

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ABSTRACT

Advancements in data, analytics, and artificial intelligence (AI) have necessitated the upskilling of the Philippine workforce with relevant data competencies. Responding to this need, Higher Education Institutions (HEIs) have developed data science and analytics programs both at the undergraduate and graduate levels, but access to these courses remain limited by geographic availability and cost. Non-degree data upskilling intensive programs, such as short courses, bootcamps, and certifications, provide an alternative means for Filipinos to learn data science and analytics in a relatively short time. These non-degree programs are offered both by HEIs and by other data education providers. This study explores how HEIs and data education providers can synergize to provide responsive and accessible data science education non-degree programs. Key informant interviews were conducted to understand the strengths of HEIs and education providers and identify points of synergy. Findings show that HEIs and data education providers can synergize in three areas: evaluating demand, designing responsive programs, and delivering at scale. Recommendations are discussed for each key area.

Keywords: non-degree programs, data upskilling, data science and analytics, data education

INTRODUCTION

The rapid advancements in data, analytics, and artificial intelligence (AI) continue to make these technologies invaluable resources for many organizations (Quismorio et al. 2020a). The Philippine government has considered data and AI to potentially uplift the Filipino people and enhance the competitiveness of the economy (DTI 2021). Subsequently, there is a need to upskill the Philippine workforce to be data literate and equipped with relevant competencies. New policy frameworks, such as the Philippine National AI Strategy (NAISR) and the Commission on Higher Education (CHED) Memorandum Order on Micro-credentials, have been launched to address learner and industry needs. Higher education institutions (HEIs) have also since developed formal data science and analytics degrees, launching both undergraduate and graduate degree offerings. However, access to these formal courses is limited by a range of barriers, including geographic availability and cost.

During and after the COVID-19 pandemic, there was an emergence of non-degree data upskilling intensive programs offered by data education providers not affiliated with traditional HEIs. Such programs emerged as data roles were perceived as pandemic-resilient (Ligot et al. 2022), leading to high demand for data practitioners in industry. With higher education degree offerings still limited, these programs have been an attractive mode for Filipinos eager to learn data science and analytics in a short period of time and leverage it to improve career outcomes.

Generally, non-degree data upskilling offerings include short courses, bootcamps, and their derivatives, usually designed as intensive programs to upskill a cohort in a relatively short time. These programs are characterized by 1) a short completion timeframe and work-friendly schedule, 2) project-based learning frameworks, and 3) wide learning communities and networks, with offerings primarily being instructor-led. Non-degree programs are commonly offered by HEIs or private non-HEI data education providers.

As discussed in the succeeding literature review, both HEIs and non-HEI data education providers have unique strengths and limitations in their design and delivery of non-degree data science and analytics programs. Therefore, there is a need to consider possible synergies between HEIs and data education providers. Such exploration can surface practical implementation models for HEIs as they design their own non-degree programs.

This study explores how higher education institutions can work with data education providers in designing and delivering non-degree data upskilling programs. More specifically, it aims to answer the question: "How can HEIs and data education providers synergize efforts to meet labor demands and provide accessible data education?"

This paper begins by outlining the context of data science and analytics in the country and discussing challenges and opportunities. Key informant interviews are then used to explore key themes in the design and implementation of non-degree programs. Finally, three areas of collaboration are discussed.

LITERATURE REVIEW

Data Science and Analytics in the Philippines

Given the rise of big data, the need for formal higher education programs for data science and analytics had been raised before the COVID-19 pandemic. As early as 2016, Tan and Tan (2016) already identified a need for a Bachelor of Science program in data science in the Philippines. Neighboring countries, such as Indonesia, had already taken similar steps to scope out the alignment of higher education programs in the big data era (Rozas et. al 2019). Across the Asia-Pacific Economic Cooperation (APEC), talent shortage constrain economic growth due to gaps and mismatches between labor market needs and the available supply of educated professionals In 2017, the APEC developed a set of 10 recommended data science and analytics competencies, grouped into three categories: 1) business and organizational skills, such as operational analytics and data visualization; 2) technical skills, such as data analytics methods and statistical techniques; and 3) workplace skills (APEC Human Resource Development Working Group 2017). Two years later, the Analytics Association of the Philippines (AAP) built on the recommended competencies to establish the AAP Professional Maturity Model and defined five specific analytics job families (Pelayo 2019). The success of the model paved the way for the establishment of the Philippine Skills Framework for Analytics & AI (PSF-AAI) in 2024, aligning the country's workforce development efforts.

At the same time, various data-related laws and initiatives have also been enacted in the public sector, increasing the need for trained data professionals. The Republic Act No. 10173, or otherwise known as the Data

Privacy Law, was passed in 2012, and its implementing rules and regulations (IRR) were established in 2016, providing mechanisms to protect personal data and improving digital systems. In 2019, the passing of the Republic Act No. 11315, or the Community-Based Monitoring System (CBMS) Act, required new municipal and city-level statistician positions to be filled.

More recently, the National AI Strategy was launched as one of the government's flagship initiatives to guide the country through this big data era. The NAISR recognizes the significant potential of emerging technologies, such as AI and big data, to improve the lives of Filipinos. One key dimension of the strategy is workforce development, again emphasizing the need to develop data and analytics competencies in the Filipino workforce.

Filipino students and professionals who seek data science education can do so in three ways: 1) formal degree programs via HEIs, 2) non-degree programs (e.g., certificates, diplomas, bootcamps), and 3) Massive Online Open Courses (MOOCs). The next section discusses the currently available degree programs and non-degree programs and their strengths and limitations.

HEIs offering Data Science and Analytics degrees

Traditional data science degrees in HEIs offer strong quantitative foundations for learners, usually requiring mathematics and programming courses in the first part of the degree. Some HEI embed their data science offerings as academic majors within Information Technology or Computer Science degrees, which will equip students with foundational skills of data architecture, data infrastructure, and data security (Quismorio et al., 2020a), competencies crucial in data engineering work. HEIs also allow students to also customize their learning experiences through electives (DLSU n.d.) to complement their core data science and analytics subjects as well. HEIs also offer the use of computing facilities for student projects. For example, AIM offers its MSDS students access to their Analytics, Computing, and Complex Systems (ACCeSs) Laboratory, a cutting-edge computing facility housing one of the region's fastest AI super computers (AIM 2025),

As of July 2023, 13 HEIs offer undergraduate data science and analytics degrees in the country. Of the 13, 10 are private universities and only three are public universities, the University of Southeastern Philippines in Davao, the University of Science and Technology of Southern Philippines in Northern

Mindanao, and the University of Makati in NCR. Nine HEIs offer postgraduate data science degrees (CHED Data, personal communication, 2023). The Asian Institute of Management (AIM), was the first to launch a graduate program in 2018 with its Master of Science in Data Science (MSDS) degree.

At the same time, closer examination of these existing data science degree programs reveals notable limitations. First, the smaller number of public universities offering undergraduate-level Data Science degrees means fewer options for students to pursue data science under Republic Act No. 10931, or the free higher education law. Second, 70 percent of HEIs offering data science programs are found in NCR or Central Luzon, highlighting a disparity in geographical accessibility.

Competency mismatches have also been found between industry demands and competencies taught by HEIs. Quismorio et al. (2020a) found that data science practitioners who are college graduates from HEIs tend to have skills better fit for data engineers and not data scientists. During their study, HEIs were just beginning to roll out formal data science degrees meaning data science professionals were sourced from related degree programs, such as computer science, business administration, and engineering. The lack of specialized offerings then, may have contributed to the competency gaps identified by industry.

Filipino students interested in learning data science without access to HEI degree programs can refer to online resources such as MOOCs. However, many of these courses are self-directed and are often from foreign universities.

Project SPARTA as a response to access and competency needs

Encouragingly, the Philippine government has made efforts to address these needs. In 2020, the Development Academy of the Philippines (DAP) and the Department of Science and Technology (DOST) launched the Project Smarter Philippines through Data Analytics, R&D, Training, and Adoption (SPARTA), seeking to address the growing demand for data science professionals. Project SPARTA was initiated to put in place the necessary online education, research, and development mechanisms and infrastructure enabling data science and analytics education and advancing smart governance practices. It was developed with the Analytics Association of the Philippines, incorporating

AAP's Analytics Maturity Model in designing the courses, which aligned the program with industry needs. The project aimed to train and graduate 30,000 learners in data science, analytics, and related fields through online learning (DOST 2020). For three years up to 2023, Filipinos could avail of a scholarship covering the costs of accessing Project SPARTA courses.

During launch, Project SPARTA shared some characteristics with MOOCs, such as primarily being self-directed and relying on learners to uphold the honor code in completing their courses. This modality enabled wide access to learners, especially during the COVID-19 pandemic, to rapidly upskill their data science competencies. By 2023, the DAP reported over 2,300 new graduates of Project SPARTA, with over 700 main pathway graduates and nearly 1,600 microspecialization pathway graduates (DAP 2023).

Project SPARTA demonstrates that Filipinos have an appetite for and benefit from accessible non-degree data upskilling programs. This shows that non-degree data upskilling programs could help address the access and competency gaps in the Philippines' data landscape. In addition, Balazon et al. (2025), in an assessment of training needs in the Philippines, found that most Filipino data science learners have only modest knowledge of key data science concepts— indicating a prevalence of learners that will benefit from introductory courses to firm up fundamental skills, which is an area non-degree programs can efficiently serve. Gains from programs like Project SPARTA indicate the need for further exploration of how non-degree data upskilling programs can be implemented and expanded in the Philippines.

Opportunities presented by non-degree data upskilling programs in the Philippines

Non-degree data upskilling programs are usually characterized by 1) a short completion timeframe and work-friendly schedule, 2) project-based learning frameworks, and 3) wide learning communities and networks, with offerings primarily being instructor-led. While MOOCs fall under the umbrella of non-degree data upskilling programs, their context and learning modes are different, such as being purely self-directed and individual, among other design differences. The scope of this study focuses on cohort-based, instructor-driven, non-degree programs delivered by HEIs and data education providers.

Non-degree data education providers (Non-HEI)

Data education providers vary from private institutions, non-profits, and government. Table 1 summarizes non-HEI providers and their programs currently available in the Philippines, with information taken from their respective websites as of November 2025. Most providers with synchronous courses offer programs from seven to fourteen weeks, which is comparatively shorter than formal higher education semesters, which run from four to five months. Self-paced offerings allow for greater flexibility for students, given their extended durations. Providers differ as well in how they package and market their programs. The foremost attraction is the short completion timeframe — being able to cover data science and data analytics foundations within eight to twelve weeks. Some providers also emphasize the prospective earnings from taking on a data science role. Costs can range from PHP 30,000.00 to 60,000.00 (Analytiks, Inc. 2023; Eskwelabs 2025. Some data education providers also offer job and interview guarantees to students as part of their courses or bootcamps, making their programs more attractive.

Table 1. Scan of Data Upskilling Providers and Programs in the Philippines

PROVIDER	LENGTH	MARKETING AND BENEFITS	COST AND PAYMENT
Eskwelabs (Data Science and Data Analytics)	12 weeks	Eskwelabs is an online upskilling school that gives you access to affordable and high quality data skills education. Includes interview and job guarantee	~PHP 62,000 Upfront or via installment
SPARTA (6 Data-Related Tracks)	Self-paced within 6 months	Gain new skills, expand your knowledge, and earn DSA certificates at your own pace and time.	Scholarship offered in 2020–2023 via DOST
For the Women Foundation (Data Science)	14 weeks	FTW is a nonprofit organization providing free data science and technology training for women.	Free Scholarship offered; funded by partner organizations
Analytiks, Inc. (Data Science)	8 weeks	Get to call yourself a Data Scientist after 8 weeks of instruction, focused on teaching individuals and teams.	PHP 30,000

Some programs have cultivated high trust with prospective employers, as evidenced by being able to partner with companies to sponsor bootcamp cohorts. Companies provide funding, venues, and mentors for entire cohorts of the bootcamps or short courses. For example, top Philippine companies such as fintech GCash and e-commerce company Lazada sponsored a 14-week Data Science bootcamp cohort for the For the Women (FTW) Foundation. In these programs, FTW Data Science scholars are taught programming, data storytelling, and presentation and communication skills, at no cost. Employability support is also present after the course (FTW Foundation n.d.).

Other forms of support include sending corporate executives to serve as mentors and to serve on judging panels during project presentations. At Eskwelabs, startups also offer a specific business problem as a potential capstone project for interested bootcamp students.

In return, corporate sponsors enjoy a continuous pipeline of trained data professionals. In effect, the company can augment part of its screening and training to the bootcamp. Every eight weeks, a new cohort of data analysts becomes available for the company to hire. For smaller companies and start-ups, having this pipeline allows them to leverage on the data science expertise (with ample compensation as needed) of both mentors and students to address their own business challenges.

Non-degree data upskilling programs within HEIs

HEIs have also offered non-degree data upskilling programs in differing models. The first model involves mathematical or statistical units offering short public data upskilling seminars on specific skills. For example, the UP Diliman School of Statistics offered face-to-face training seminars, such as one-day sessions on Basic Statistics with Exploratory Data Analysis and Applied Statistical Forecasting. The second model involves delivering a longer course, usually over multiple weeks. The De La Salle University Data Science Institute offered a six-week Data Analytics Fundamentals course, which provided an overview of data science, job roles, and skills. A third model involves a non-mathematical or statistical unit offering a data science certification in the context of their field. In 2024, the UP Diliman College of Education secured approval for the Certification in Data Science for Educators, a 19-unit program with six courses in data and computing in the education context. The program includes course titles such as “Research

Designs and Techniques Applied to Education" and "Computer Software in Education," underscoring the highly contextualized nature of the course (University of the Philippines College of Education n.d.).

Leveraging on opportunities

Current initiatives to address access and competency gaps of data education in the Philippines reveal strengths of various stakeholders and groups. On one hand, HEIs develop students' quantitative foundations and provide established infrastructure to support data science learning. On the other hand, non-HEI providers are likely to have more agile ties with industry and are more flexible in responding to industry needs. Therefore, there is a unique opportunity to leverage strengths through closer collaboration and synergy between HEIs and non-HEI providers.

The importance of such synergy is supported and recognized by the Philippine Commission on Higher Education as evidenced by the recent CHED Memorandum Order (CMO) No. 1, series of 2025. This new CMO recognizes that micro-credentials offer a flexible, industry- and needs-based approach to learning. Furthermore, the CMO acknowledges that "micro-credentials are often designed in collaboration with industry partners providing learners with knowledge and skills relevant to current and emerging job roles." This recognition of the value of partnering with learning encourages HEIs to find industry-driven partners, an approach that has emerged in the data science and analytics field.

Given the need to rapidly increase data science competencies in the Filipino workforce, the limitations of currently available degree programs, and the emergence of non-degree programs, there is an opportunity to leverage on the unique strengths of both HEIs and data education providers through collaborations and partnerships. This study aims to explore how stakeholders can synergize efforts to better meet the access needs of individuals and competency needs of industry.

METHODOLOGY

To understand the strengths of both HEIs and data education providers and how they can synergize, three key informant interviews were conducted with two HEIs, the University of Nueva Caceres (UNC) and De La Salle University

(DLSU), and one data education provider, Eskwelabs, who have non-degree data upskilling offerings. In particular, this study looks at two HEI implementation examples:

1. Where the HEI partners with a data education provider; and
2. Where the HEI delivered its own non-degree upskilling program

Exploring both perspectives enriches the understanding of the strengths and capabilities of HEIs, and which areas partnerships can complement each other.

First, the partnership model of the University of Nueva Caceres, a private HEI based in Naga City and Eskwelabs, a data science education organization was explored to find out about the motivations, outcomes, and implementation challenges of such partnerships.

The University of Nueva Caceres is a private non-sectarian university based in Naga City, Philippines, where it has the highest number of Philippine Association of Colleges and Universities Commission on Accreditation (PACUCOA) accredited programs in Region V (University of Nueva Caceres n.d.). UNC is part of iPeople, inc, the surviving entity of a merger between the education units of Ayala Corporation and Yuchengco Group of Companies.

Eskwelabs' mission is to "upskill the world" and believes that "the future of work is data," and that they are determined to equip everyone with the data skills they need to thrive (Eskwelabs n.d.-a). Eskwelabs' flagship public courses include Data Science and Data Analytics bootcamps. It has expanded in the data education space by providing other offerings such as bespoke courses for private organizations, hackathons, and internships, among others.

To provide contrast to the HEI-provider partnership, an interview was also conducted with the De La Salle University's Dr. Andrew L. Tan Data Science Institute (DLSU-DSI), a unit within DLSU, that offers its own data science short courses to the public.

The interviews were conducted online and guided by three overarching themes:

1. The goals of the HEI and providers and how the programs started

2. Outcomes for students, HEIs, and providers
3. Administrative and implementation challenges

Information from these interviews was then compared and integrated with existing literature. Policy recommendations are then offered at the end of this paper.

RESULTS

Goals of the HEI and providers

Focusing on employability and responding to data upskilling demand

Improving employability and addressing the increased demand for data upskilling before, during, and after the post-pandemic era were key reasons for the launch of the non-degree offerings. DLSU-DSI recognized a high demand for data science upskilling and, at the same time, identified this as an opportunity to conduct a pilot to explore the viability of a full data science program. Given that short courses did not require approval, they could be launched relatively faster. At the time of launch, target learners were the general public, career-shifters, and persons in occupations who wanted to upskill.

For UNC, the rise of online classrooms and learning management systems during the COVID-19 pandemic also raised expectations that teachers would become more data-driven and use data to improve their students' experience, leading UNC to explore data analytics as an offering in the Professional Employment Program (PEP) for graduating Bachelor of Education students. The new data skills from the program are designed to complement the existing teachers' degree program and help boost graduate employability (Eskwelabs 2022). For Eskwelabs, the education students who are also data-literate can be great teachers and can serve as data champions within their organizations. By the end of the data analytics PEP, the graduating Bachelor of Education students would have earned data analytics skills, including data visualization, data storytelling, statistics, analytical frameworks which they could showcase when applying for work. Since the program is project-based, the students also have a portfolio of data projects that they can draw from for their professional careers. (Eskwelabs 2022).

On the provider side, Eskwelabs had already been offering part-time data science programs since May 2019. Eskwelabs' bootcamps were already offered through blended learning (Eskwelabs 2021), which provided an advantage when COVID-19 necessitated a shift to full remote learning. The partnership with UNC was initiated from a connection with the National Teachers College, which is also part of the Ayala Education Group.

Program Implementation and Outcomes

Non-degree programs were implemented either as part of an embedded program or as a separate offering. For example, UNC already had an established employability program, called the Professional Employment Program (University of Nueva Caceres n.d.). The PEP is embedded in the curriculum, requiring senior students to be placed in a simulated professional work environment where they undergo training and develop skills. The program is managed by the UNC Career Center, a unit dedicated to the university's employability initiatives. The PEP housed programs such as Service Culture and Systems Training, which build employability skills in students before they graduate. Data analytics was seen as a timely integration in the PEP framework during the COVID pandemic, and through a partnership with Eskwelabs, a data science education provider.

As a result of non-degree data upskilling programs, students gain skills that may help them stand out in a competitive job market within their industry. For UNC, the data upskilling program helps them achieve their goal of having 90 percent of their education graduates achieve gainful employment within 90 days despite the limited permanent positions in both public and private schools. The program was delivered online, with students taught by external experts (from Eskwelabs) and given the opportunity to engage with real-life datasets. In addition, the UNC Career Center viewed the program as laying the groundwork for prospective alternative careers, if students choose to pursue careers outside education. Having additional data competencies can help students transition to other fields.

Non-degree program offerings can also lead to formal education qualifications. DLSU-DSI utilized their non-degree data courses to offer a 12-unit Minor in Data Science, accessible to students from non-computing degrees. This enabled a substantial number of non-computing students to pursue it as an academic minor. The Minor in Data Science has since remained a popular and

attractive choice for students in other fields. Courses do not even have to be bundled; they can be designed as individual electives for interested students who are not pursuing the Minor.

Administrative requirements and implementation challenges

Cost and planning cycles

Engaging in partnerships necessitates both time and resources. For an HEI such as the University of Nueva Caceres, the cost of engaging an external provider, such as Eskwelabs, is a top consideration. As a private institution, UNC is constrained by budget considerations and is mindful of additional costs that may be passed on to its students. UNC did subsidize the cost of the initial run of the data provider, but cost was a factor in deciding to continue the program.

The same consideration applies to HEIs running their own courses. At the height of demand for non-degree courses, enrollments in DLSU's data science offerings could cover the cost of running them, but when demand stabilized, the DLSU-DSI also had to consider how to make the program sustainable. While financial costs were a major consideration, the time involved in the design and delivery also had to be worthwhile. Repurposing the courses into an academic minor proved to be an effective pivot.

Planning and budget cycles are also related to costs. One identified implementation challenge by Eskwelabs was working with the set timeframes of HEIs. Most HEIs planning cycles would be on an annual basis, with clear processes for changes in curricular offerings; hence, any new programs should be planned well in advance to secure budget and implementation approvals.

Managing administrative functions

Coordinating adjacent roles and functions associated with the launch of the short course is a resource-intensive undertaking, especially for academics. What worked for both HEIs was that they ultimately had a separate entity dedicated to managing the delivery of these programs. For UNC, the partnership was owned and administratively managed by the UNC Career Center. While the academic unit was still heavily involved in the program, the administrative matters were led by the UNC Career Center.

The primary academic unit can also develop non-degree courses and endorse them to a unit that specializes in lifelong learning. For DLSU, the data science and analytics short courses were initially housed within the academic unit. Academics not only had to design and deliver the course, but also handle associated administrative tasks, such as marketing, which added to the workload. DLSU-DSI then collaborated with the School of Lifelong Learning (SoLL), another unit of the university dedicated to providing continuing education consulting and non-degree offerings, often in collaboration with industry. A distinctive feature of SoLL is that it spans across different disciplines, covering courses in management, leadership, computer graphics, arts, and data, among others.

This setup works not only because it unloads additional work from the academic units, but also because the dedicated staff in SoLL are more likely to be specialized and experienced to meet the demands of the adjacent responsibilities in launching a course. For example, in DLSU's experience, it was the academics who had to market the short courses, which was not in their usual line of work. However, an entity like SoLL would be more likely to have that expertise and resources among its professional staff. Similarly, the Eskwelabs team also has dedicated staff to handle partnerships, liaising with HEIs and industry, underscoring the importance of these roles in the success of non-degree programs.

Delivery and design of the courses themselves can also be augmented by industry partners and experts. DLSU-DSI is open to considering co-branded courses with reputable and well-known industry practitioners. Given that SoLL took over the administrative work, the academic unit is now able to allocate resources to coordinate with potential industry partners in designing and delivering courses. The opposite can be true as well— SoLL can source industry partners and enlist the help of DLSU-DSI to ensure that any collaboration is of top quality and maintains academic rigor. While there is an inherent risk in partnering with other entities, taking on that risk means being able to provide access to quality education with a much wider reach. Additionally, DLSU-DSI notes that HEI-provider partnerships can help support and prop up reliable organizations which can deliver good quality data education, further expanding access for students.

Other Perspectives

Beyond the three main themes, other perspectives were also discussed on the direction of data upskilling and AI use in the country. Interviews revealed that prospective learners are no longer just individuals interested in data science; they can be anyone who wants to improve their workplace skills and employability. Moreover, data upskilling program learners can also be employed in other industries and public-sector organizations that can benefit greatly from data-literate personnel. For example, in government offices, manual processes would benefit from digitization, centralization of databases, and doing analyses on available data. In settings like these, numerous organization workflows can change entirely from the application of newer technologies in data science and AI. Providing data science and analytics education and upskilling to personnel in other sectors, therefore, is an emerging space for HEIs and providers.

DISCUSSION AND RECOMMENDATIONS

Results from the interviews revealed distinct strengths between HEIs and data education providers. HEIs can design responsive programs to industry demands and use them for in-curriculum offerings, such as employability programs or an academic minor. However, HEIs are bound to longer planning cycles, cost considerations, and personnel constraints.

On the other hand, data education providers are likely to have strong industry ties, which they can leverage to provide students opportunities to engage with industry leaders, experts, and real-world data assets. Providers are also more likely to have specialized personnel to handle the administrative requirements of program management. However, providers may be less known and be relatively newer players in the space. In addition, enlisting providers will also entail additional costs for HEIs.

Drawing on the results above, HEIs and data education providers can synergize efforts in providing accessible data science education and meeting labor demands in three key areas: 1) evaluating skills and industry demand; 2) designing sustainable and flexible education programs; and 3) delivering at scale.

Demand, Design, and Delivery

Area 1: Evaluating skills and industry demand

Both HEIs and education providers have strengths in evaluating skills and industry demand. As demonstrated by UNC and DLSU, HEIs can take a proactive stance in evaluating industry demands and adapt their design offerings flexibly. Academic units and employability units in student services can propose offerings to meet such demands. What data science providers can contribute to this end is a much closer view on the hiring and recruitment, given their close ties with industry. Evaluating skills and industry demand can be a task enriched by joint perspectives from both HEIs and data education providers.

Offering short courses also can be a first step to evaluate demand without overcommitting resources. Furthermore, the short courses can be designed so that material can be repurposed, such as for electives or bridging courses for graduate data science courses, similar to how DLSU transformed its non-degree offering into a Minor in Data Science.

Supply - Internal demand

HEIs can assess demand from two sources: within their student pool (internal demand) and from learners in the broader market (external demand). Internally, HEIs can revisit their existing courses related to data science and analytics, as well as those whose graduates are likely to take on data science roles. Quismorio et al. (2020b) surveyed the undergraduate degrees of data science and analytics practitioners in the Philippines, revealing that the top 10 degrees among practitioners were in computer science, business administration, statistics, mathematics, information technology, library and information science, economics, physics, industrial engineering, and civil engineering. Revisiting these courses can be a good first step for HEIs looking into assessing data education demand.

Beyond courses traditionally related to data science and analytics, HEIs and their statistical units can also collaborate with other disciplines to explore integrating and embedding context-relevant data analytics courses into traditionally non-data fields and developing niche offerings for specific courses. For example, linguistics programs may have interest in exploring natural language processing in their offerings. Units offering

courses related to data science can examine how data science subjects could be credited as electives in other units. This can cater to students and individuals who need specialized data science education but do not necessarily require a full degree.

One key insight from the interviews is the greater market for non-degree programs beyond disciplines traditionally associated with data and career-shifters. During the COVID-19 pandemic, data roles were perceived as pandemic-resilient and attractive to career shifters (Ligot et al. 2022). In addition, the rise of remote work during the pandemic may have provided greater flexibility in accessing learning materials for those wanting to shift into data science.

In today's context of hybrid work and the rise of AI, it would be advantageous to look beyond data science adjacent fields to disciplines which would benefit significantly from having a data literate workforce, and find students who would be well-positioned to be a "data champion" in their own fields, similar to how UNC and Eskwelabs rolled-out the program to Education majors.

Supply - External demand

A segment that is likely to be underserved currently is individuals who want to remain in their own fields but further use data in their own jobs. Short courses and bootcamps are likely to be very attractive to these individuals, as they want to advance in their chosen field but have no intention of making a complete pivot into data science or data analytics. HEIs can capitalize on their existing subject offerings by repurposing them for specific groups or industries to respond to untapped demand. Eskwelabs' AI Academy for HR provides a good example, partnering with the Philippine Society for Talent Development to develop courses harnessing AI technologies for human resources and learning and development (Eskwelabs n.d.-b).

Another likely underserved segment are small and medium-sized businesses and employers. These businesses are likely not to have sufficient capacity to recruit data professionals but are already experiencing increasing data requirements due to the digitalization of their operations (Ligot et al. 2022). Upskilling professionals in small and medium-sized businesses can yield significant benefits not only for companies but also for the economy as a whole.

Finally, data upskilling for government will be crucial. The obvious requirements are those made by law, such as the creation of additional statistical, technical, and financial and administrative positions at the Philippine Statistics Authority to support the implementation of the CBMS Law. HEIs and providers can align specific offerings to match the competency requirements of city or municipal level statisticians, which include database management, mapping and geotagging, and data collection and processing as recommended by the IRR of the CBMS Law.

Less visible but equally important is the general data upskilling of government personnel. With the government's increasing digitization efforts, more personnel will be needed to organize and make sense of the generated data, as well as to explore the use and integration of AI in work. Dedicated learning and development units within government agencies will serve as key contacts. For example, UP Diliman delivered specialized training in data analysis using Stata for DSWD personnel through liaison with the DSWD Academy (DSWD Academy 2025).

Area 2: Designing responsive and sustainable programs

It is crucial to stay up to date with the rapid pace of technological change in the data space. A challenge of HEIs is the relatively process-heavy nature of revising curriculum and course offerings. Due to lengthy protocols such as going through curriculum committees and complying with the CHED's mandates, updates in curriculum are likely to take time and require significant resources.

However, HEIs can utilize non-degree programs to increase the flexibility of their offerings. The PEP model of UNC responds to this challenge well by providing a flexible avenue to integrate emergent and trending skills in the curriculum in a relatively short amount of time. Given that the PEP is already a fixture in the curriculum, educators can focus on revising the content on one subject rather than introducing new changes in the entire curriculum. As with embedded internship subjects, it may be worthwhile for HEIs to explore how to institutionalize flexible employability-related subjects like PEP which can partner with education providers to rapidly respond to changing needs.

In addition to increasing the flexibility of offerings, synergies between HEIs and data education providers can result in more responsive data science programs. Leveraging their close industry ties, data education providers

can complement the academic rigor of HEI curriculum development and assessment by bringing in practitioners who can vouch for current industry needs.

Finally, to ensure the sustainability and relevance of courses, it is crucial to align non-degree programs with wider government and industry frameworks. HEIs would likely be more experienced in working with government education bodies such as CHED, which would benefit data education providers. In the CHED guidelines for micro-credentials (CMO No. 1, s. 2025), the CMO explicitly articulates that collaborating with industry partners, professional organizations, or employers in the design of micro-credentials is essential in ensuring quality and relevance. Working with reputable data science education providers aligns HEIs with the CMO's vision while helping providers onboard to the formal CHED micro-credential frameworks for non-HEIs.

Area 3: Delivering at scale

Finally, while designing relevant programs is a top priority, the work continues in the actual delivery of the course.

Managing workload and resources

Designing and delivering a short course adds load to the current teaching, research, and extension work of HEIs and their academics. As mentioned by the HEIs, the design and delivery of non-degree programs also entail essential non-academic work such as marketing the course and completing administrative tasks. Not only does this work add to their existing load, but it also falls outside the academic unit's typical responsibilities and expertise, likely requiring academic staff to dedicate more time to orient themselves to this new type of work. The additional work reduces the attractiveness of creating and delivering these courses for HEIs and their personnel.

Data education providers can complement HEI resources by serving as force multipliers for HEIs, both in session delivery and in adjacent administrative work. Providers would likely have dedicated units for marketing and partnerships, given their strong alignment to creating and maintaining industry partnerships. They could take on the bulk of administrative work, leaving HEIs to focus on the rigor and design of the course. In terms of delivery, data education providers can help

source industry practitioners who can deliver courses to scale access and improve scheduling availability.

However, the likely primary challenge in this scenario is cost. Onboarding expert lecturers and enlisting external providers will incur costs. For their initial data analytics PEP run, UNC was able to subsidize costs for its students, but also noted that this might not always be feasible. While HEIs do have the option of passing costs to their students as part of fees, it would be worthwhile for HEIs to explore existing institutional grants available with the government, such as CHED, and other funding organizations that can support such programs, under the broader outcome of improving employability.

Enriching the experience

Collaborations between HEIs and data education providers may lead to more enriching non-degree programs. For example, HEIs may already have access to larger-scale datasets and statistical tools which students of data education providers can access for a time-bound period. Learning environments such as the Learner Management System (LMS) can be shared by both HEI and data science provider students who are collaborating on a project with an industry provider. For education providers, purchasing subscriptions to datasets and statistical tools may add additional costs and increase enrollment fees. Leveraging partnerships with HEIs can help education providers provide short-term access to such learning resources to their students without incurring further costs. On the other hand, by partnering with providers, HEIs can offer a more enriching experience and greater access to prospective learners without overstretching their personnel.

HEIs and providers can also pool and mutually expand their networks of experts to deliver relevant and high-quality sessions to students. In their data science courses, HEIs already engage corporate executives as lecturers on special topics or invite data science professionals to serve as readers/panelists for capstone presentations. HEIs also enlist adjunct faculty with extensive industry experience. Similarly, data education providers can bring in experts for their own courses and bootcamps. Having a wider network of industry experts, lecturers, panelists, and speakers would further enrich the learning experiences of students.

Expanding access to diverse cohorts

Finally, partnerships between HEIs and data education providers can also expand access to other wide cohorts. Data education providers can channel specific groups to employers (e.g. women). For example, FTW (For the Women) Foundation, utilizing a corporate sponsor model, has provided free Data Science and Technology training for women for upward career mobility, with over 600 women beneficiaries, 77 percent new job placement rate, and an average earnings boost of 218 percent (FTW Foundation 2025).

These models can serve as a reference for HEIs seeking to achieve gender parity in their student cohorts, especially in Science, Technology, Engineering, and Mathematics (STEM). Moreover, improving the employability of other cohorts such as students with disabilities and students from regional and remote areas, can be considered by both HEIs and education providers and supported by government bodies and other organizations.

CONCLUSION

This study explored potential synergies between HEIs and data education providers to address data upskilling needs and expand access to data education in the Philippines. Results show that HEIs and data education providers can synergize in three areas: demand, design, and delivery, which enable organizations to leverage on their strengths in providing quality non-degree programs that are responsive to learner needs and industry demands.

HEIs and data education providers with existing programs can examine these three areas to review their own strengths and weaknesses, and subsequently seek out partners who can complement their capabilities to enrich their offerings. For HEIs and organizations seeking to develop their own programs, this study offers practical insights into the key considerations when designing and implementing new data courses. Government and industry can also use these areas to assess how they can help further data education in the Philippines.

Furthermore, this study recommends continued periodic assessments of skills demand relative to education accessibility to keep pace with technological and data advances, and highlight the evolving capacities of HEIs and data

education providers. Evaluating the impact of new government policies, such as the CHED Micro-credential CMO and the National AI Strategy Roadmap will also be crucial in arriving at a complete picture of the data education space. Future studies could also expand the pool of HEIs and data education providers interviewed to reflect the diversity across student populations and offerings.

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