PUP Education Review
Volume XIV, Issue 1

Polytechnic University of the Philippines

The Influence of Data Analytics MOOCs in Making Career Decisions: The Case of Project SPARTA Completers

Nikko Visperas[1], Donna Pamella Gonzales[2], Alan Cajes[3], Mary Therese Fernandez[4], Ragella Phoebe Terrado[5], and Jerby Lopez[6]
[1]Far Eastern University
[2]Commission on Higher Education
[3]University of Science and Technology of Southern Philippines
[4,5,6]Development Academy of the Philippines
[1]nvisperas@feu.edu.ph

DOI: https://doi.org/10.70922/aexr9988

Submit to this journal
Other related articles
Announcements
Other PUP Journals

Other citation formats:
MLA Chicago

Article History:

Date Received: August 20, 2025
Date Revised: November 7, 2025
Date Accepted: December 10, 2025

How to Cite this paper:

Visperas, N., Gonzales, D. P., Cajes, A., Fernandez, M. T., Terrado, R. P., & Lopez, J. (2025). The influence of data analytics MOOCs in making career decisions: The case of Project SPARTA completers. *Education Review,* 14(1), 91–117. https://doi.org/10.70922/aexr9988

The Influence of Data Analytics MOOCs in Making Career Decisions: The Case of Project SPARTA Completers

Nikko Visperas[1], Donna Pamella Gonzales[2], Alan Cajes[3], Mary Therese Fernandez[4], Ragella Phoebe Terrado[5], and Jerby Lopez[6]
[1]Far Eastern University
[2]Commission on Higher Education
[3]University of Science and Technology of Southern Philippines
[4,5,6]Development Academy of the Philippines
[1]nvisperas@feu.edu.ph

Abstract

Massive Open Online Courses (MOOCs) are widely valued across sectors for their ability to build knowledge and skills. With the growing demand for data analytics professionals, MOOCs have become a key tool for teaching data analytics to meet this need. This demand also influences professionals' career decisions. Using the Social Cognitive Career Theory, this study explores the influence of completing data analytics courses under the national project, Smarter Philippines through Data Analytics Research and Development, Training, and Adoption (SPARTA). Project SPARTA offered six learning pathways and 12 micro specializations, comprising a total of 30 MOOCs to Filipino students and professionals from 2019-2024. Through qualitative research, specifically semi-structured interviews with Filipino professionals in the private sector who completed at least one main pathway, with at least 90% of their courses taken through MOOCs, this study revealed that MOOCs help professionals improve their self-efficacy through Modular Instructions. Participants also developed key data analytics skills such as Root Cause Identification, Dashboard Creation, and Data-driven Presentations. These skills stimulated interest in Data Analytics Specializations, enabling professionals to set career goals either a Cross-functional Transition or Work Promotion. As a result, they also engaged in Continuous Skill Expansion. The study identifies themes anchored on the Social Cognitive Career Theory and MOOCs, hence, theorizing and proposing a model on how data analytics learning influences Filipino professionals in their career goals. It also highlights the importance of skill-specific outcomes from MOOCs and suggests further research on the career impacts for professionals who transitioned roles or achieved promotions.

Keywords: Career Decision, Career Development, Data Analytics, Education, MOOCs,

INTRODUCTION

Data Analytics has placed its importance in various industries in the age of AI; however, it has been mentioned that specific competencies have not been identified yet to become a data scientist (Cao, 2019). Back in 2016, there was already a significant demand

 | ISSN 2546-0730 (Online) | ISSN 1908-8701 (Print)

for professionals who are proficient in analyzing data; this is why the study conducted by Kim (2016) mentioned the value of collaborating with professionals coming from different disciplines and industries. The significant demand has continued globally in the following years.

In the United States (U.S.), Le et al. (2025) expressed that the continuous economic growth in states leads to a higher demand for data analytics practitioners. The said demand in the U.S. has improved the operations in various fields: energy (Atadoga et al., 2024), business, particularly in customer management (Tiwari, 2024), and public health (Babarinde et al., 2023). It has also been mentioned that such demand is not being achieved due to the skills gap that is present in the United Kingdom (Fearns & Harriss, 2023); however, the curricula on data science in Switzerland match the needs of various industries, mentioning SQL (Structured Query Language) as a key skill (Mildenberger et al., 2023).

While in Asia, it was found that in India, data analytics was identified as one of the core competencies that employees should upskill themselves to adapt to the age of Artificial Intelligence (AI) (Jaiswal et al., 2021). Similarly, data analytics was also seen as a core competency among businesses in the United Arab Emirates in establishing their competitive edge in the market (Aljumah et al., 2022). The increased demand for data professionals has been present, as well, in Southeast Asia, as claimed in the study of Andrea et al. (2023). For example, the study of Shafiullah et al. (2022) suggests that utilizing data analytics and AI may help address challenges in developing smart cities in the region.

In the Philippines, efforts to create smart cities and address demand have been supported by government agencies and the private sector. One of which is the Development Academy of the Philippines (DAP) and the Department of Science and Technology's (DOST) Project Smarter Philippines through Data Analytics Research and Development, Training and Adoption or also known as Project SPARTA. It was established in 2019 to offer massive open online courses (MOOCs) on Data Analytics, aiming to increase the number and quality of data professionals in the Philippines (Development Academy of the Philippines, n.d.).

In 2019, Project SPARTA began offering six (6) learning pathways, and by 2022, it had expanded to include 11 microspecializations, comprising a total of 30 MOOCs. From 2019 to 2022, these MOOCs were accessible to learners through Coursebank (coursebank.ph). However, in 2023–2024, they migrated to DAP's own learning management system, Linang. These MOOCs were offered for free to Filipinos aged 18 and above who were residing in the Philippines, catering to both students and professionals during the period from 2019 to 2023 (Development Academy of the Philippines, n.d.).

Table 1

The Main Pathway Offerings of Project SPARTA

Pathway	No. of Required Courses	Pathway	No. of Required Courses
Data Associate	6	Analytics Manager	10
Data Steward	10	Data Engineer	15
Data Analyst	12	Data Scientist	17

These Main Pathway Offerings of Project SPARTA were developed by the Development Academy of the Philippines, Analytics and AI Association of the Philippines, and DOST-PCIEERD. These are based on analytics roles, as defined in the Development Academy of the Philippines (n.d.), specifically: (a) Data Associate – teaches learners to collect, manage, and interpret data to communicate insights. The Data Associate is the entry-level pathway that does not require any expertise. (b) Data Steward – enables learners to administer data processing and to comply with data governance policies. (c) Data Analyst – allows learners to employ further analytical approaches in solving functional problems in organizations. (d) Analytics Manager – teaches learners to lead analytical functions and report insights to higher-level decision makers in organizations. (e) Data Engineer – develops learners who can develop, manage, and maintain data workflows and systems. (f) Data Scientist – enables learners to develop advanced frameworks that can be utilized in generating more observations.

Table 2

The Micro Specialization Pathway Offerings of Project SPARTA

Pathway	No. of Required Courses	Pathway	No. of Required Courses
Analytics Project Management	5	Data Visualization	5
Finance and Risk	5	Research Methods	4
Human Resources	5	Statistical Techniques	5
Urban Planning	5	Computing	4
Data Governance	5	Methods and Algorithms	4
Operational Analytics	4	Public Policy and Governance	5

While these Micro Specialization Pathway Offerings were also described in the Development Academy of the Philippines (n.d.) as: (a) Analytics Project Management – allows learners to demonstrate knowledge on the processes and activities required in implementing projects and their process groups. (b) Finance and Risk – enables learners to utilize machine learning and use statistics in developing insights from financial records. (c) Human Resources – teaches learners to develop new or improve existing hiring processes and capability-building initiatives from human resource data. (d) Urban Planning – allows learners to acquire knowledge on the challenges and trends in urban planning and to utilize analytics in fostering smart governance. (e) Data Governance – enables learners to develop measures in securing compliance with data privacy, data ethics, and intellectual property rights. (f) Operational Analytics – teaches learners to analyze and visualize data in operations and roles, enabling them to understand and use it easily in the business. (g) Data Visualization – allows learners to utilize data visualization tools and languages in developing reports and presentations. (h) Research Methods – enables learners to explore various research methods in developing new frameworks and knowledge. (i) Statistical Techniques – teaches learners to use advanced statistical tools and methods in analyzing data. (j) Computing – allows learners to use programming languages in analyzing and visualizing data. (k) Methods and Algorithms – enables learners to utilize Python to check on algorithms and develop predictive models. (l) Public Policy and Governance – teaches learners to utilize data analytics as a basis for drafting policies and improving processes in the government.

Table 3

List of Project SPARTA Courses

No.	Course Code	Course Title
1	SP101	Getting Grounded with Analytics
2	SP102	Designing and Building Data Products
3	SP201	Essential Excel Skills for Data Preparation and Analysis
4	SP301	Data Management Fundamentals
5	SP302	Enterprise Data Governance
6	SP203	SQL for Business Users
7	SP401	Dashboards and Drill-Down Analytics
8	SP202	Computing in Python
9	SP501	Data Visualization Fundamentals
10	SP502	Data Visualization Using Tableau and Python

No.	Course Code	Course Title
11	SP503	Storytelling using Data
12	SP601	Data-Driven Research Fundamentals
13	SP602	Experimental Design and Analysis
14	SP701	SQL for Data Engineering
15	SP702	Python for Data Engineering
16	SP703	Advanced Data Engineering
17	SP801	Statistical Analysis and Modeling using Excel
18	SP802	Statistical Analysis and Modeling using SQL and Python
19	SP901	Data Science and Machine Learning using Python
20	SP902	Deep Learning Using Python
21	SP1001	Design Thinking for Analytics
22	SP1002	Analytics Applications in Operations
23	SP1003	Analytics Applications in Finance and Risk
24	SP1004	Data Science and Analytics Project Management
25	SP1005	Data-Driven Policy Analysis
26	SP1006	Applied Analytics in Public Human Resource Management
27	SP1007	Applied Analytics in Public Finance and Budgeting
28	SP1008	Data Engineering in e-Governance Systems
29	SP1009	Urban Planning in the Fourth Industrial Revolution
30	SP1010	Livable and Sustainable Cities in e-Governance

From 2019 to August 2023, Project SPARTA has already produced 614 graduates of its learning pathways, and 1189 for micro specialization. In 2024, it also produced 275 and 750 graduates for learning pathways and micro specialization, respectively. This number may contribute to the demand for data analytics professionals in the Philippines. It has been mentioned, as well, that this field offers various training focuses and roles; hence, it could provide an opportunity for career change or development. This study could also help other career shifters determine which training or roles they should focus on as they aspire to careers in data analytics. The offered pathways of SPARTA could support its learners through these career goals. Therefore, it is essential to determine the influence of Project SPARTA, through finishing a pathway, in making career decisions among professionals. Specifically, this study seeks to achieve the following objectives: (a) To know the self-efficacy and outcome expectations of completers after finishing their respective pathways; (b) To describe the interests, goals developed and actions being

© 2025 | ISSN 2546-0730 (Online) | ISSN 1908-8701 (Print)

taken by pathway completers after finishing their respective pathways; and (c) To develop a model that reflects how pathway completers make career decisions that can serve as a basis for future research studies.

Learning Data Analytics through MOOCs

Data Analytics MOOCs have been valued across the globe, particularly in Asia, Europe, and North America, due to their potential to help identify economic challenges (Nikolskiy et al., 2022). Similarly, data analytics has been recognized as vital for economic and financial planning; therefore, it should be integrated into the curricula of economics majors (Halyna & Volodymyr, 2024). The study also argued that aside from learning digital skills, it is important that they are well-equipped to address the economic challenges that they may face in the future. In regional areas that are also economically challenged, the findings of Ma and Lee (2023) suggest that MOOCs are effective among learners as they provide fulfillment of needs. They also added that these MOOCs may offer innovations in the education sector.

MOOCs have been vital in the education sector. For instance, the Data Analytics MOOCs offered by Johns Hopkins University are noted for their popularity, as evidenced by the enrollment figures highlighted in the study by Kross et al. (2019). One reason that can be assumed is the openness of Data Analytics MOOCs, which can be enrolled in by learners without a background in Information Technology, specifically in programming languages (Liu et al., 2022). This is why MOOCs are being utilized globally, considering their ease of use and accessibility; however, this study of Roy (2022) also recognizes the challenges of interaction and assessments, comparing them to traditional ways of learning. It has also been mentioned that MOOCs are beneficial as they also allow learners to demonstrate knowledge on data analysis, but data, particularly personal information, shall be handled responsibly (Inan & Ebner, 2020).

However, Hidalgo et al. (2020) suggested that further research could focus on creating MOOCs with more specialized subject matter. The study by Almgerbi et al. (2021) highlights the significance of Data Analytics MOOCs and the roles of both the education sector and industry in upskilling their respective stakeholders. Specifically, it found that Data Analytics MOOCs equip professionals with skills to analyze and monitor data, enabling them to develop data-driven predictions (Kew & Tasir, 2021). Regarding predictions, a similar finding was reported in the study by Hoi et al. (2018), which noted that Data Analytics MOOCs, particularly those focused on Machine Learning, support making predictions by monitoring data and work-related tasks.

Key Data Analytics Competencies in the Industry

The industry typically requires candidates to have an undergraduate degree and at least one year of relevant work experience before working as data analysts, according to a study by Zhang et al. (2023). Specifically, the study of Dong and Triche (2020) mentioned that data professionals should have a strong competency in data visualization and analysis, including the use of programming languages: Tableau, R, and Python. It was claimed in the same study that these are widely used by various industries; hence, their continuous demand among employers.

The employers value the technical skills, but aside from these, it was found in the study of Persaud (2020) that social skills are also vital. Additionally, in the mixed-method study of Strengell (2017), in businesses that usually deal with customers, employers find personal and professional skills more important. Schmidt (2020) found that data professionals in managerial positions emphasized the importance of not only having expertise in data analytics but also being adept at identifying the root causes of problems that arise in company operations.

However, it has been mentioned that the root cause of the mismatch in the industry is the alignment of the curricula. The literature points out that the education sector needs to align its curricula with the needs of the industries. For instance, the study of Han and Ren (2024) suggested that higher education institutions incorporate data analytics principles and applications in their curricula. This is why the study conducted by Cao (2019) suggested that companies should establish standard competencies in data analytics, enabling the education sector to align its courses accordingly. Furthermore, the study by Cheon et al. (2024) proposed a method for universities to align their students' skills with industry needs by analyzing curricula and the details of hiring notices. In effect, these key competencies on data analytics will help organizations in improving decision-making processes and enhancing efficiency (Ghasemaghaei et al. 2018).

Factors Affecting Career Shifts

Professional skills and career development have been identified as factors influencing employees' plans to shift careers, as highlighted in the quantitative study by Lipayon (2021). Similarly, openness to change among employees was found to be a reason for career shifts in the study by Carless and Arnup (2011). However, many studies indicate that employees commonly shift careers due to work environment factors (Uy, 2020; Masdonati et al., 2022; Belida et al., 2024). In the field of data analytics, it was found that faculty researchers shifted careers from academia to the data analytics industry, with work stability being the primary reason (Castro et al., 2020). This aligns well with the study of Wang et al. (2019), recognizing that roles in the data analytics industry offer

© 2025 | ISSN 2546-0730 (Online) | ISSN 1908-8701 (Print)

stability. Additionally, the availability of various roles in the field and professional training opportunities are among the reasons for initiating a career change.

Some literature also mentions geographical and economic reasons as reasons for career change. Opportunities abroad that lead to a shift in career are an example, as stated in the study of Lyons et al. (2014). This is also similar among artists in the creative industries in that they consider finding a new life and career in a different location. The study found that this move provides artists with an opportunity to discover more skills that they can use to improve their careers.

Furthermore, employees who shifted careers were found to experience improved work fulfillment (Carless & Arnup, 2011). This claim is further supported by Longhi et al. (2023) regarding fulfillment. Additionally, the study highlighted improvements in mental health, particularly among women employees (Alacovska, 2020).

Theoretical Framework

This research study utilized the Social Cognitive Career Theory (SCCT) developed by Lent et al. (1994) with the goal of describing, through a model, how individuals develop their career interests, choose their career paths, and take steps in attaining their education and career goals. They added that the theory follows a "cognitive constructivist approach" (Lent et al., 1994, p. 87); hence, it connects to the qualitative research approach in which explores how individuals construct meanings through their interactions. This justifies the utilization of the said method for this qualitative study.

Looking at the concepts present in the framework, which were utilized in this study, Self-Efficacy refers to the individuals' belief in their capabilities, which were shaped by their interactions with people and the environment (Lent et al., 1994). Segal et al. (2022) also supported this claim and added that these individuals believe they will succeed in obtaining their career goals. Meanwhile, Outcome Expectations refer to the results of performing individuals' capabilities, whether in social or material outcomes (Lent et al., 1994), which also motivates individuals in their career goals, as claimed in the study of Gore and Leuwerke (2000) as cited in Segal et al. (2022).

Furthermore, the contextual influences were also identified in SCCT. First, it mentions Interests, which refer to the activities that individuals confidently engage in, shaped by the first two concepts mentioned above (Lent et al., 1994). Like Outcome Expectations, the study of Gupta et al. (2024) claimed that Interests also influence career goals, which were examined among Engineering students in Singapore. These interests also allow individuals to make plans and decisions in pursuing specific career paths; hence, identifying their Goals. Lastly, Actions refer to the steps being taken by individuals to achieve their goals anchored on their interests, as well (Lent et al., 1994). Specifically,

taking courses and finding other opportunities were identified as Actions based on the study of Zikic and Saks (2009).

METHODOLOGY

Research Design

This study on the influence of Data Analytics MOOCs utilized a qualitative research design, specifically through the conduct of semi-structured interviews. As demonstrated in the study by Abeer and Miri (2014), qualitative research can effectively capture learners' perspectives on enrolling in and learning through MOOCs. It also helps researchers and subject matter experts identify points for improvement and strategies to increase learners' online engagement. Moreover, Adams (2015) mentioned that semi-structured interviews allow researchers to establish conversations with their informants, which could reveal their motivations or influences, for example, in making choices in various aspects of life. This claim supports the goal of the study, especially in obtaining rich information from the informants.

Selection Criteria

To gather relevant data, the researchers conducted semi-structured interviews with six (6) informants who met the following criteria: (a) a pathway completer of Project SPARTA; (b) has completed 90% of the courses in their enrolled pathway through MOOCs (excluding live course sessions via Zoom); and (c) is a professional currently employed in the private sector. Furthermore, the completers were selected through random purposive sampling, a combination of random sampling and purposive, criteria-based selection. Fifteen completers were randomly selected from each pathway, and based on the order of sampling, each was checked to ensure they satisfied the criteria set by the researchers. Email invitations were sent to the informants through the application data they provided to SPARTA. Consent was given as the learners were informed that they might be contacted by the project team for research studies as part of their return service to the government.

Instrumentation

The researchers developed an interview guide based on the concepts outlined in the Social Cognitive Career Theory. The researchers then ensured that they had questions that were relevant to each of the concepts identified and anchored to the objectives indicated. No pilot testing was conducted, but the questions were reviewed by an expert in qualitative research. This is in consideration that the study is small-scale in nature. Additionally, before conducting the interviews, the researchers ensured that the ethical considerations stated below were mentioned to the informants; hence, seeking their

consent to proceed with the recorded interviews. Lastly, the interviews were conducted via Zoom, and the researchers, considering their prior involvement in the project, ensured they remained objective and avoided providing subjective reactions during the interviews, as reflexivity in research is concerned.

Ethical Considerations

Before the actual questioning, permission to record the interview was obtained. They were assured that their participation in the interview was purely voluntary and that they could withdraw at any time if they had doubts or if they were uncomfortable. Additionally, they were informed that none of their personal or sensitive information, as defined under the Philippines' Data Privacy Act of 2012, would be disclosed in this study. Lastly, the researchers emphasized that all information would be kept confidential, and the interview recordings would be deleted from the Zoom cloud three (3) months after the completion of the research study.

RESULTS

Anchored on the concepts present in SCCT, the researchers conducted interviews with completers of the Data Analytics MOOCs under Project SPARTA. The interview transcripts were analyzed to identify themes that address the first and second objectives of this study. The latter part of this chapter presents a model based on the themes identified in the study, thereby addressing the third and final objective.

Self-Efficacy Expectations

Modular Instructions

The informants were asked about their confidence after completing the Data Analytics MOOCs in their chosen pathways, particularly in handling the tasks assigned to them at their current companies. They affirmed that completing their respective pathways significantly boosted their confidence at work. They attributed this to the skills they acquired through the modular, step-by-step instructions provided in each MOOC. In their words:

> *It definitely boosted my confidence because I was the only one who was under the program within our team...The pathway-structured modules enhanced my expertise in data analysis, which also equipped me with the advanced tools, as well as the techniques on how to tackle complex data and challenges.*

Through Excel and SQL lessons, I had a background on what to do first, or the scripts that I can use. I forgot the term. So, it helped me in presenting the data that I have gathered and the analysis that I see.

I'm very confident, because the methodology was very thought well [well thought out, and the speakers are brilliant, and all of them can provide a lot of learning, and the course material was very organized.

Outcome Expectations

The informants were asked about the expected outcomes they gained and observed after completing the Data Analytics MOOCs in their enrolled pathways. Specifically, these outcomes were explored by identifying situations at work where the pathway completers applied their learnings and how these influenced their performance. The researchers observed that the informants provided detailed examples of their learning application, which contributed to the outcomes they developed and achieved after completing the Data Analytics MOOCs.

Root Cause Identification

One informant mentioned that the knowledge he acquired from the Data Analytics MOOCs enabled him to gather and analyze data to identify the malfunctioning issue in their production machine at work. He added that he utilized SQL scripts and Microsoft Excel to accomplish this task. On the other hand, another informant, who works for a non-governmental organization, emphasized the importance of unifying data gathered from the grassroots to identify the problems of malnutrition and the immediate needs of lactating mothers in the provinces of Mindanao. They shared:

We have this issue that happened in the production line. So, they need to investigate what happened, what was the root cause of that issue, and one of the ways that they connect is through the data that we have gathered from the machine. When I got the data from the database, I was able to use SQL scripts, like the select statements. So, the basic SQL scripts. So, more on Excel formulas that I used.

But the immediate needs of mothers are the ones that are not seen. So, through the data that they provided, we also saw that there is really a need to unify the data from the grassroots. Like the DOH [Department of Health] *report is different from the NNC* [National Nutrition Council] *report.*

Dashboard Creation

Most of the informants also mentioned that after completing their respective pathways, they were able to apply their knowledge and skills at work, particularly in creating dashboards for monitoring and generating insights. For instance, one informant shared that their ability to develop insights improved significantly through the use of a dashboard he created to oversee the functionality of the equipment they use. The informants stated:

> *It's a PostgreSQL that was taught in Project SPARTA, and then from that PostgreSQL, we've created a dashboard for data analytics for the equipment that we use. So, it's helpful for us operators because instead of just looking at the log sheets, we can see the dashboard, so the insights are improved.*
>
> *I've used some, but not the full-blown dashboards, since I was in a hurry to do it. But at least I've started to use the Pareto charts that were taught.*
>
> *I was tasked to create dashboards, and these are the projects that I have been working on so far within the company.*

Data-Driven Presentations

Most of the informants also stated that they were able to develop data-driven and visualized presentations, which they used for reporting to both internal and external stakeholders. These presentations benefited not only their company but also, as one informant mentioned, the government. It can be inferred that data-driven presentations contribute to a better understanding of various problems and aid in monitoring employee performance. The informants shared:

> *The clients that we are working with, and saying that the data that I have been presenting to them is really valuable. As far as I know, or how may I describe it, it is really complex, and it is helpful within the company.*
>
> *Before we entered Malaybalay City to conduct an activity and to talk to the mayor, we asked for the available data related to infants and children prior to the event. So during the event, I presented it to him. The presentation was better and easier to understand by the officers and mayors. It was also easier for the City Nutrition Council to understand their needs.*
>
> *I was able to present my data visualization skills using graphs like column bars, pie charts, something like that. Then my boss was happy because I was able to… they trusted my presentation, and they applied [adopted] it immediately in our company. They're [The presentation shows how to determine the number of] people online for this week, something like that, then I was able to present [it to] him.*

Interests

Data Analytics Specializations

Most of the informants stated that, after completing the Data Analytics MOOCs, they not only applied the knowledge and skills they acquired but also continued to upskill themselves in specialized areas of Data Analytics. One informant mentioned multiple times during the interview that she is particularly interested in further developing her skills in machine learning. While machine learning was covered as part of the SPARTA courses, she expressed a desire to delve deeper into the subject and its practical applications. Additionally, an informant who is an engineer shared that he takes on part-time jobs in Analytics, which motivated him to study Python and its frameworks in greater depth. Lastly, a Computer Science graduate intends to focus on further enhancing his expertise in Data Visualization.

> *I want to apply this more to my work now. I want to learn more. Currently, I'm still researching what training I can get. I want to delve more into the machine learning side of data analytics.*

> *I'm really developing my interest about data analytics compared to my engineering course. So, I'm doing side work, or it's [I'm making it like a hobby. I'm still learning more about Python now and its frameworks.*

> *It's fun and parang nakakahiligan ko na mag [I'm making it as a hobby to] generate ng mga visualization charts. Saka align din po siya sa course ko kasi graduate po ako ng Computer Science [And it is also aligned to the degree I finished, Computer Science]. It's my personal choice. Then it's also my hobby. I love exploring technology.*

Goals

Cross-Functional Transition

The informants were also asked about their career goals, particularly their professional plans. Most of them revealed plans to transition from their current roles into data-related positions aligned with what they learned from the Data Analytics MOOCs. One informant expressed an intention to pursue a more advanced role, Data Scientist, which is considered the most advanced position in the field of data analytics. Another informant emphasized the relevance of the field and, as a result, plans to shift his career from the contact center industry to data analytics. In their words:

> *I'm planning to apply for a machine learning engineer role or data scientist role. I'm just looking for one. I haven't applied, but I'm researching what are the available job opportunities outside my company are.*

> *Opo, kasi ano parang ang tagal ko na sa call center, stagnant po tsaka lagi may movement, lagi may sunset, yung mga business hindi po nagtatagal. Tapos ito, medyo positive ako sa data analytics career kasi kahit more than 50 years, nandyan pa rin yan eh, kasi we have the data – and it is multiplying, exponentially.* [Yes, because, well, I've been in the call center industry for a long time, and it feels stagnant. There's always movement, always sunset; businesses don't last long. But with this, I feel more positive about a career in data analytics because even after more than 50 years, it will still be there, since we have the data—and it's multiplying exponentially.]

> *I have not applied for any roles in our plant, but I'm trying to find more opportunities online.*

Work Promotion

On the other hand, two informants intend to stay in their current roles, considering that, aside from being able to apply their data analytics skills, there are also opportunities for promotion within their respective companies. Another informant specified that his learning from SPARTA's Data Analytics MOOCs have significantly contributed to his professional growth, leading to a promotion in his company. In their words:

> *There were times that I even tried to apply, but in the end, I decided to stay within the same company for me to get the business intelligence supervisor role as of the moment.*

> *This is also one of the goals that I have during the time that I was studying Project SPARTA under the data analyst pathway, which is to use this for my growth as well as for promotion internally.*

Actions

Continuous Skill Expansion

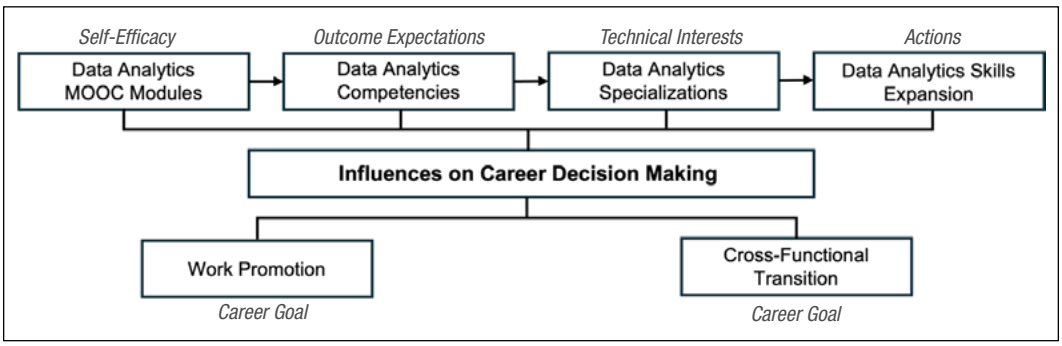
Most of the informants stated that after completing and while completing the Data Analytics MOOCs of SPARTA, they continue to enroll in other MOOCs to further enhance their knowledge and skills, which can contribute to their work and their communities in general. Two informants mentioned enrolling in MOOCs offered by Google and the University of the Philippines Open University (UPOU), while another informant generally

stated that he continues to seek opportunities for upskilling to contribute to his team and company. They said:

> *For me, Project SPARTA helped me a lot. And currently, I am also enrolled in Google Certification Data Analytics.*
>
> *Project SPARTA pushed me on what data I want to get so that we can achieve our goal in Modern Nanays of Mindanao in addressing the gaps and providing support to mothers, especially during the first 1,000 days [after giving birth]. I just have a pending thesis part. So, while doing Project SPARTA, I also went online to the Open University [to study more courses]. Because of SPARTA it gave me motivation to continue my professional development through UPOU.*
>
> *As a business intelligence supervisor, I am constantly looking for ways to deepen my skills and make meaningful data contributions to my team.*

Figure 1

The Researchers' Developed Model on the Influences of Data Analytics MOOCs in Making Career Decisions



The results of the study confirm the assumptions outlined in the Social Cognitive Career Theory (SCCT) and demonstrate its applicability to professionals in the Philippines who have completed Data Analytics MOOCs. The themes revealed from the study's analysis were further examined by the researchers to develop a model and identify the factors influencing career decision-making among data analytics professionals.

The development of Data Analytics MOOCs in the Philippines is relatively new this decade, supporting the claim of Brown and Lent (2017) that SCCT is not limited to psychology but can also be applied to the field of data analytics and MOOCs. The model illustrates that Modular Instructions help with the Self-Efficacy of the informants. In addition, Outcome Expectations, based on the findings of this study, may also refer to the Data Analytics Competencies (Root Case Identification, Dashboard Creation, and Data-

Driven Presentations) that data professionals may acquire, and these may also deepen their interests and skills through Data Analytics Specializations and Skills Expansion, respectively. This is why they continue setting goals, either Cross-Functional Transition or Work Promotion.

Lastly, the model presented in this study demonstrates that, despite workplace uncertainties, highlighted in Brown and Lent's (2019) research, data professionals recognize the opportunities MOOCs provide in achieving their career goals.

DISCUSSION

The results revealed that the informants' confidence in utilizing their skills was enhanced due to the modular instruction approach of the Data Analytics MOOCs. This is consistent with the findings of Nardo (2017), which, although conducted in a classroom setting, showed that modular instruction helped learners gain confidence in demonstrating skills acquired in their language classes. Similarly, Carabot (2022) observed that modular instruction increased students' confidence. Regarding MOOCs, the findings of this study align with those of Smith-Lickess et al. (2019), which revealed that in the United Kingdom, MOOCs not only improved learners' knowledge but also boosted their confidence, particularly in healthcare-related quality improvement projects. The same finding was also like the study of Rodriguez and Armellini (2017) that adults who completed MOOCs improved their confidence, particularly in acquiring skills.

One of the skill outcomes revealed is Root Cause Identification. This result aligns with the study by Schmidt et al. (2023), which highlights it as a key skill for data professionals in managerial roles. However, among facilitators of MOOCs with a background in analytics, it was found that root cause analysis on MOOC platforms has been challenging due to restrictions in acquiring data (Topal et al., 2020). A similar challenge among analytics learners was observed in the study by Nicolay et al. (2021), which highlighted difficulties in applying their learning to identify root causes in complex educational scenarios. Lastly, the study of Kobi (2024) that utilizes analytical skills at work, through data visualization, helps in identifying processes that do not work effectively. The literature emphasizes challenges in developing root cause identification skills among learners, which align with the findings of the study.

Additionally, Dashboard Creation was also identified as a skill outcome. One of the informants mentioned that developing dashboards helps in identifying insights for effectively monitoring work operations and production. This aligns with the literature study conducted by Kobi (2024), which states that dashboards containing analytical data and visualizations aid in developing insights that guide employees in tracking and monitoring their key performance indicators. In an academic setting, the study findings also align with

those of Charleer et al. (2018), where faculty members and students utilize dashboards to gain analytical and factual insights. One informant also mentioned PostgreSQL in creating dashboards, while the study by Khatuwal and Puri (2022) suggested using Power BI and Tableau for data visualization to present valuable insights effectively.

In medicine, data-driven presentations, particularly those containing visualizations, are more effective and comprehensible for readers. This finding was revealed in the study by In and Lee (2017), which added that data-driven presentations enable medical practitioners to present complex data more effectively. Similarly, the study by Chen et al. (2020) recognized that the practice of developing visualizations, especially for intricate and complex data, leads to more effective presentations. Mathisen et al. (2019) even suggested a system that can be utilized by organizations where data-driven presentations, particularly the data analysis, can be modified by collaborators to generate more useful reports.

The informants also expressed their interests in different data analytics specializations. One informant's interest in machine learning may be connected to its growing demand and suitability across various industries, aligning with the study of Kumar et al. (2020). On the other hand, another informant expressed a continuous interest in learning Python. This finding aligns with the quantitative study by Sharov et al. (2023), which found that more data professionals are interested in learning Python, as reflected in Udemy's offerings, a platform that provides MOOCs. Lastly, there is also increased interest in Data Visualization among the informants, like the findings of Schmidt (2020). However, the study also emphasized the need for data analysts to further understand and practice advanced data visualization techniques.

The informants in this study practice data analytics in their current roles. However, they also mentioned that completing the Data Analytics MOOCs has encouraged them to consider transitioning to other analytics roles by exploring new opportunities. This validates that interests allow individuals to search for new career paths (Gupta et al., 2024). This also aligns with the findings of Shirani (2019), which highlight that professionals upskill in Data Analytics to facilitate career shifts. Similarly, these non-formal education programs being taken by professionals help them in transitioning from one field to a career in data analytics, as mentioned in the study of Castro et al. (2020). On the other hand, Manivel (2023) emphasized that career shifters should have a solid foundation in data analysis and statistical techniques, particularly for those aiming to specialize in big data practices.

Similar findings on continuous learning through MOOCs were observed among learners in the technical-vocational education sector, as highlighted by Zhao and Hu (2022). They identified perceived value and ease of use as key factors driving learners' sustained interest in MOOCs. Likewise, Ahmad et al. (2022) found that accessibility

and adaptability were primary reasons for continued enrollment and engagement with MOOCs. These results closely align with the study of Gonçalves et al. (2016), particularly in the education sector, where MOOCs are recognized as valuable for fostering continuous learning, including the development of MOOCs themselves. Additionally, it was found that acquiring skills through education helps professionals with their career goals, considering the rapid advancements in the tech industry (Ali, 2025).

DIRECTIONS FOR FUTURE RESEARCH

This study shows how Filipino professionals, particularly those in the field of Data Analytics, who continuously upskill themselves, recognize how the industry and the demand are rapidly changing. Given these findings, the use of Social Cognitive Career Theory remains applicable for future research, particularly in fields that are new and innovative. The proposed model above may also be utilized for MOOC completers in other subject areas to identify factors that influence their career decisions. Additionally, the said model may also be proven through other platforms that offer MOOCs on data analytics, both in international and local settings. Therefore, this may also help organizations in developing training programs and career pathways for their employees.

Considering that this is limited to the influences alone, this study recommends further research, such as a textual analysis of dashboards developed and used by Data Analytics MOOC completers, to theorize and create a framework that presents best practices, software, and techniques. This framework could promote efficiency not only for the private sector but also for the government and communities at large. Lastly, to further support the continuity of this study, this study also recommends further research to also conduct semi-structured interviews who have been promoted and transitioned to work on data analytics, and the informants are considering their learning on MOOCs as influences in such actions.

In the study by Holle (2020), career goals, such as aiming for a promotion, were identified as a key reason why data professionals continue to upskill themselves through online platforms like MOOCs, particularly those aspiring to advance to higher roles in data analytics, such as data scientists. Furthermore, the mixed-method study by Lestari et al. (2023) revealed that participating in capability development activities significantly contributes to exploring promotion opportunities at work. This is like the study of Gupta et al. (2025) that MOOCs, to be specific, have influenced professionals in their career advancement. This was realized considering that MOOCs were claimed in their study to be as flexible and affordable means of education. This finding also aligns with the research of Egloffstein and Ifenthaler (2016), which highlights how employees value MOOCs. However, it was noted that companies have a lower acceptance rate of these credentials as valid qualifications.

STATEMENTS AND DECLARATIONS

1. **Funding details.** This is one of the output requirements of the team members of SPARTA, a project funded by the Department of Science and Technology – Philippine Council for Industry, Energy, and Emerging Technology Research and Development. However, no amount was allotted to this research study, except for the salary of the team members working for the project, which was coursed through the Development Academy of the Philippines.

2. **Disclosure statement.** The authors declare that they have no conflicts of interest to disclose.

3. **Ethical approval.** The anonymity and data privacy of the informants were observed during the data-gathering stage of this study.

4. **Declaration of Generative Artificial Intelligence (AI) in Scientific Writing.** The authors used ChatGPT to check the grammar and structure of some parts of the paper, but all content was initially drafted by them. Hence, the authors of this study have full responsibility for its accuracy.

5. **Acknowledgment.** The authors acknowledge the rest of the project team, who worked hard to achieve the major objectives and targets of SPARTA.

REFERENCES

Abeer, W., & Miri, B. (2014). Students' preferences and views about learning in a MOOC. *Procedia – Social and Behavioral Sciences, 152*, 318–323. https://doi.org/10.1016/j.sbspro.2014.09.203

Adams, W. C. (2015). Conducting semi-structured interviews. In K. E. Newcomer, H. P. Hatry, & J. S. Wholey (Eds.), *Handbook of practical program evaluation* (4th ed., pp. 492–505). John Wiley & Sons. https://doi.org/10.1002/9781119171386.ch19

Ahmad, I., Sharma, S., Singh, R., Gehlot, A., Priyadarshi, N., & Twala, B. (2022). MOOC 5.0: A roadmap to the future of learning. *Sustainability, 14*(18), Article 11199. https://doi.org/10.3390/su141811199

Alacovska, A., Fieseler, C., & Wong, S. (2020). 'Thriving instead of surviving': A capability approach to geographical career transitions in the creative industries. *Human Relations, 74*(5), 751–780. https://doi.org/10.1177/0018726720956689

Ali, P. (2025). Skill-based education and its impact on lifelong learning and career advancement. *International Journal of Innovative Science and Research Technology, 10*(4), 1383–1388. https://doi.org/10.38124/ijisrt/25apr935

Aljumah, A., Nuseir, M., & Refae, G. (2022). Business analytics and competitive advantage for SMEs in UAE: A mediating role of technology assets. *2022 International Arab Conference on Information Technology (ACIT)*, 1–9. https://doi.org/10.1109/acit57182.2022.9994149

Almgerbi, M., De Mauro, A., Kahlawi, A., & Poggioni, V. (2021). A systematic review of data analytics job requirements and online-courses. *Journal of Computer Information Systems, 62*(4), 422–434. https://doi.org/10.1080/08874417.2021.1971579

Andrea, M., Lee, C., & Noh, M. (2023). Analysis of job ads to understand the IT trend in Southeast Asia. *The Academic Society of Global Business Administration, 20*(6), 152–165. https://doi.org/10.38115/asgba.2023.20.6.152

Atadoga, A., Awonuga, K., Ibeh, C., Ike, C., Olu-Lawal, K., & Usman, F. (2024). Harnessing data analytics for sustainable business growth in the U.S. renewable energy sector. *Engineering Science & Technology Journal, 5*(2), 1–9. https://doi.org/10.51594/estj.v5i2.806

Babarinde, A., Ayo-Farai, O., Maduka, C., Okongwu, C., & Sodamade, O. (2023). Data analytics in public health: A USA perspective – A review. *World Journal of Advanced Research and Reviews, 20*(3), 2462–2475. https://doi.org/10.30574/wjarr.2023.20.3.2462

Belida, P., Ong, A., Young, M., & German, J. (2024). Determining the factors influencing the behavioral intention of job-seeking Filipinos to career shift and greener pasture. *Societies, 14*(8), Article 145. https://doi.org/10.3390/soc14080145

Brown, S. D., & Lent, R. W. (2019). Social cognitive career theory at 25: Progress in studying the domain satisfaction and career self-management models. *Journal of Career Assessment, 27*(4), 563–578. https://doi.org/10.1177/1069072719852736

Brown, S. D., & Lent, R. W. (2017). Social cognitive career theory in a diverse world. *Journal of Career Assessment, 25*(2), 173–180. https://doi.org/10.1177/1069072716660061

Cao, L. (2019). Data science: Profession and education. *IEEE Intelligent Systems, 34*(1), 35–44. https://doi.org/10.1109/MIS.2019.2936705

Carabot, G. (2022). Parents' competencies and involvement in facilitating modular instructions: Its relation to students' personality development. *International Review of Social Sciences Research, 12*(2), 45–58. https://doi.org/10.53378/352904

Carless, S., & Arnup, J. (2011). A longitudinal study of the determinants and outcomes of career change. *Journal of Vocational Behavior, 78*(1), 80–91. https://doi.org/10.1016/j.jvb.2010.09.002

Castro, M., Van Der Heijden, B., & Henderson, E. (2020). Catalysts in career transitions: Academic researchers transitioning into sustainable careers in data science. *Journal of Vocational Behavior, 120*, Article 103479. https://doi.org/10.1016/j.jvb.2020.103479

Charleer, S., Moere, A., Klerkx, J., Verbert, K., & De Laet, T. (2018). Learning analytics dashboards to support adviser-student dialogue. *IEEE Transactions on Learning Technologies, 11*(4), 389–399. https://doi.org/10.1109/TLT.2017.2720670

Chen, S., Li, J., Andrienko, G., Andrienko, N., Wang, Y., Nguyen, P., & Turkay, C. (2020). Supporting story synthesis: Bridging the gap between visual analytics and storytelling. *IEEE Transactions on Visualization and Computer Graphics, 26*(7), 2499–2516. https://doi.org/10.1109/TVCG.2018.2889054

Cheon, B., Chang, J., & Sim, J. (2024). Matching skill demand with curricular competencies using text analytics: Focusing on data science majors and IT jobs. *The Korean Career, Entrepreneurship & Business Association, 8*(1), 195–212. https://doi.org/10.48206/kceba.2024.8.1.195

Development Academy of the Philippines. (n.d.). SPARTA. Retrieved January 14, 2025, from https://sparta.dap.edu.ph/

Dong, T., & Triche, J. (2020). A longitudinal analysis of job skills for entry-level data analysts. *Journal of Information Systems Education, 31*(4), 312–326. https://jise.org/volume31/n4/JISEv31n4p312.html

Egloffstein, M., & Ifenthaler, D. (2016). Employee perspectives on MOOCs for workplace learning. *TechTrends, 61*(1), 65–70. https://doi.org/10.1007/s11528-016-0127-3

Fearns, J., & Harriss, L. (2023). Data science skills in the UK workforce. *UK Parliament Post*. https://doi.org/10.58248/pn697

Ghasemaghaei, M., Ebrahimi, S., & Hassanein, K. (2018). Data analytics competency for improving firm decision-making performance. *Journal of Strategic Information Systems, 27*(2), 101–113. https://doi.org/10.1016/j.jsis.2017.10.001

© 2025 | ISSN 2546-0730 (Online) | ISSN 1908-8701 (Print)

Gonçalves, V., Chumbo, I., Torres, E., & Gonçalves, B. (2016). Teacher education through MOOC: A case study. In *ICERI2016 Proceedings* (pp. 8350–8358). https://doi.org/10.21125/ICERI.2016.0907

Gore, P. A., & Leuwerke, W. C. (2000). Predicting occupational considerations: A comparison of self-efficacy beliefs, outcome expectations, and person-environment congruence. *Journal of Career Assessment, 8*(3), 237–250. https://doi.org/10.1177/106907270000800303

Gupta, S., And, I., Kumar, S., & India, U. (2025). Impact of MOOC participation on career advancement and skills development. *Journal of Informatics Education and Research, 5*(2), 24–35. https://doi.org/10.52783/jier.v5i2.2524

Gupta, T., Yeter, I., & Khoo, M. (2024). Linking undergraduate engineering students' outcome expectations, interests, career goals, self-efficacy, social support, and barriers in Singapore: A social cognitive career theory study. In *2023 ASEE Annual Conference & Exposition Proceedings*. https://doi.org/10.18260/1-2--43486

Halyna, M., & Volodymyr, M. (2024). Enhancing economic education: The critical role of discipline data analytics and data science in curriculum development. *Економіка та суспільство, 63*, 10–24. https://doi.org/10.32782/2524-0072/2024-63-10

Han, F., & Ren, J. (2024). Analyzing big data professionals: Cultivating holistic skills through university education and market demands. *IEEE Access, 12*, 23,568–23,577. https://doi.org/10.1109/ACCESS.2024.3363876

Hidalgo, F., Abril, C., & Parra, M. (2020). MOOCs: Origins, concept and didactic applications: A systematic review of the literature (2012–2019). *Technology, Knowledge and Learning, 25*(4), 853–879. https://doi.org/10.1007/s10758-019-09433-6

Hoi, S., Sahoo, D., Lu, J., & Zhao, P. (2018). Online learning: A comprehensive survey. *Neurocomputing, 459*, 249–289. https://doi.org/10.1016/j.neucom.2021.04.112

Holle, D. (2020). Certification or advanced degrees. *Big Data, 8*(1), 2–4. https://doi.org/10.1089/big.2019.0172

In, J., & Lee, S. (2017). Statistical data presentation. *Korean Journal of Anesthesiology, 70*(3), 267–276. https://doi.org/10.4097/kjae.2017.70.3.267

Inan, E., & Ebner, M. (2020). Learning analytics and MOOCs. In P. Zaphiris & A. Ioannou (Eds.), *Learning and collaboration technologies: Designing, developing, and deploying learning experiences. HCII 2020. Lecture Notes in Computer Science* (Vol. 12205, pp. 241–253). Springer, Cham. https://doi.org/10.1007/978-3-030-50513-4_18

Jaiswal, A., Arun, C., & Varma, A. (2021). Rebooting employees: Upskilling for artificial intelligence in multinational corporations. *The International Journal of Human Resource Management, 33*(6), 1179–1208. https://doi.org/10.1080/09585192.2021.1891114

Kew, S., & Tasir, Z. (2021). Learning analytics in online learning environment: A systematic review on the focuses and the types of student-related analytics data. *Technology, Knowledge and Learning, 27*(2), 405–427. https://doi.org/10.1007/s10758-021-09541-2

Khatuwal, V., & Puri, D. (2022). Business intelligence tools for dashboard development. In *2022 3rd International Conference on Intelligent Engineering and Management (ICIEM)* (pp. 128–131). https://doi.org/10.1109/ICIEM54221.2022.9853086

Kim, J. (2016). Who is teaching data: Meeting the demand for data professionals. *Journal of Education for Library and Information Science, 57*(2), 161–173. https://doi.org/10.3138/jelis.57.2.161

Kobi, J. (2024). Developing dashboard analytics and visualization tools for effective performance management and continuous process improvement. *International Journal of Innovative Science and Research Technology (IJISRT)*. https://doi.org/10.38124/ijisrt/ijisrt24may1147

Kross, S., Peng, R., Caffo, B., Gooding, I., & Leek, J. (2019). The democratization of data science education. *The American Statistician, 74*(1), 1–7. https://doi.org/10.1080/00031305.2019.1668849

Kumar, Y., Kaur, K., & Singh, G. (2020). Machine learning aspects and its applications towards different research areas. In *2020 International Conference on Computation, Automation and Knowledge Management (ICCAKM)* (pp. 150–156). https://doi.org/10.1109/ICCAKM46823.2020.9051502

Le, T., Zhang, J., Chen, J., & Ortega, X. (2025). Data-analyst job demands and their relationship with economic strength in the United States. *Journal of Global Information Management*. https://doi.org/10.4018/jgim.377525

Lent, R., Brown, S., & Hackett, G. (1994). Toward a unifying social cognitive theory of career and academic interest, choice, and performance. *Journal of Vocational Behavior, 45*(1), 79–122. https://doi.org/10.1006/jvbe.1994.1027

© 2025 | ISSN 2546-0730 (Online) | ISSN 1908-8701 (Print)

Lestari, A., Rijal, S., Prameswari, Y., & Tjahyanto, T. (2023). The effect of position promotion, training, leadership style on employee career development in one of the start-up companies. *West Science Business and Management, 1*(3), 86–98. https://doi.org/10.58812/wsbm.v1i03.86

Lipayon, I. (2021). Factors affecting career shift: Towards a focused vocation development. *International Journal of Arts, Humanities and Social Studies, 3*(4), 107–115. https://doi.org/10.5281/zenodo.5236118

Liu, X., Golen, E., & Raj, R. (2022). Developing a hands-on data science curriculum for non-computing majors. In *2022 ASEE Annual Conference & Exposition Proceedings*. https://doi.org/10.18260/1-2--41966

Longhi, S., Nandi, A., Bryan, M., Connolly, S., & Gedikli, C. (2023). Do all job changes increase wellbeing? *Industrial Relations: A Journal of Economy and Society*. https://doi.org/10.1111/irel.12354

Lyons, S., Ng, E., & Schweitzer, L. (2014). Changing demographics and the shifting nature of careers. *Human Resource Development Review, 13*(2), 181–206. https://doi.org/10.1177/1534484314524201

Ma, L., & Lee, C. (2023). Leveraging MOOCs for learners in economically disadvantaged regions. *Education and Information Technologies*, 28, 1–26.

https://doi.org/10.1007/s10639-022-11461-2

Manivel, R. (2023). A creative journey into big data analysts. *International Journal of Computer and Communication Technology*. https://doi.org/10.47893/ijcct.2023.1435

Masdonati, J., Frésard, C., & Parmentier, M. (2022). Involuntary career changes: A lonesome social experience. *Frontiers in Psychology, 13*, Article 899051. https://doi.org/10.3389/fpsyg.2022.899051

Mathisen, A., Horak, T., Klokmose, C., Grønbæk, K., & Elmqvist, N. (2019). InsideInsights: Integrating data-driven reporting in collaborative visual analytics. *Computer Graphics Forum, 38*(3), 253–265. https://doi.org/10.1111/cgf.13717

Mildenberger, T., Braschler, M., Ruckstuhl, A., Vorburger, R., & Stockinger, K. (2023). The role of data scientists in modern enterprises: Experience from data science education. *ACM SIGMOD Record, 52*(1), 48–52. https://doi.org/10.1145/3615952.3615966

Nardo, M. (2017). Modular instruction enhances learner autonomy. *American Journal of Educational Research, 5*(10), 1024–1034. https://doi.org/10.12691/education-5-10-3

Nicolay, B., Krieger, F., Stadler, M., Gobert, J., & Greiff, S. (2021). Lost in transition: Learning analytics on the transfer from knowledge acquisition to knowledge application in complex problem solving. *Computers in Human Behavior, 115*, 106594. https://doi.org/10.1016/j.chb.2020.106594

Nikolskiy, V., Lukashenko, M., & Sharova, E. (2022). The modern world landscape of data science online education. *Vysshee Obrazovanie v Rossii = Higher Education in Russia, 31*(4), 129–147. https://doi.org/10.31992/0869-3617-2022-31-4-129-147

Persaud, A. (2020). Key competencies for big data analytics professions: A multimethod study. *Information Technology & People, 34*(1), 178–203. https://doi.org/10.1108/ITP-06-2019-0290

Rodríguez, B., & Armellini, A. (2017). Developing self-efficacy through a massive open online course on study skills. *Open Praxis, 9*(3), 335–343. https://doi.org/10.5944/openpraxis.9.3.659

Roy, A. (2022). MOOCs: A new means of higher learning. *International Journal for Research in Applied Science and Engineering Technology*. https://doi.org/10.22214/ijraset.2022.40172

Schmidt, J. (2020). Usage of visualization techniques in data science workflows. In *Proceedings of the 12th International Conference on Agents and Artificial Intelligence* (pp. 309–316). https://doi.org/10.5220/0009181903090316

Schmidt, D., Van Dierendonck, D., & Weber, U. (2023). The data-driven leader: Developing a big data analytics leadership competency framework. *Journal of Management Development*. https://doi.org/10.1108/JMD-12-2022-0306

Segal, G., Borgia, D., & Schoenfeld, J. (2002). Using social cognitive career theory to predict self-employment goals. *New England Journal of Entrepreneurship, 5*(2), 47–56. https://doi.org/10.1108/neje-05-02-2002-b007

Sharov, S., Tereshchuk, S., Tereshchuk, A., Kolmakova, V., & Yankova, N. (2023). Using MOOC to learn the Python programming language. *International Journal of Emerging Technologies in Learning, 18*(2), 17–32. https://doi.org/10.3991/ijet.v18i02.36431

Shirani, A. (2019). Upskilling and retraining in data analytics: A skills-adjacency analysis for career paths. *Issues in Information Systems, 20*(4), 65–74. https://doi.org/10.48009/4_iis_2019_65-74

Smith-Lickess, S., Woodhead, T., Burhouse, A., & Vasilakis, C. (2019). Study design and protocol for a comprehensive evaluation of a UK massive open online course (MOOC) on quality improvement in healthcare. *BMJ Open, 9*(e031973), 1–11. https://doi.org/10.1136/bmjopen-2019-031973

Strengell, T. (2017). Competitiveness from data and analytics: Required competency in organizations. *[Journal/Publisher information missing]*

Tiwari, V. (2024). Role of data analytics in business decision making. *Knowledgeable Research: A Multidisciplinary Journal*. https://doi.org/10.57067/0zr57x43

Topali, P., Ortega-Arranz, A., Martínez-Monés, A., & Villagrá-Sobrino, S. (2020). "Houston, we have a problem": Revealing MOOC practitioners' experiences regarding feedback provision to learners facing difficulties. *Computer Applications in Engineering Education, 29*(4), 769–785. https://doi.org/10.1002/cae.22360

Uy, J. (2020). Determinants of career change: A literature review. *JPAIR Multidisciplinary Research, 42*(1), 1–15. https://doi.org/10.7719/JPAIR.V42I1.804

Wang, D., Weisz, J., Muller, M., Ram, P., Geyer, W., Dugan, C., Tausczik, Y., Samulowitz, H., & Gray, A. (2019). Human-AI collaboration in data science. *Proceedings of the ACM on Human-Computer Interaction, 3*(CSCW), 1–24. https://doi.org/10.1145/3359313

Zhang, J., Le, T., & Chen, J. (2023). Investigation of essential skills for data analysts: An analysis based on LinkedIn. *Journal of Global Information Management, 31*(1), 1–21. https://doi.org/10.4018/jgim.326548

Zhao, F., & Hu, Y. (2022). Analysis of MOOCs continuous learning intention and its influencing factors of higher vocational students. In *Proceedings of the 8th International Conference on Communication and Information Processing* (pp. 1–8). ACM. https://doi.org/10.1145/3571662.3571681

Zikic, J., & Saks, A. M. (2009). Job search and social cognitive theory: The role of career-relevant activities. *Journal of Vocational Behavior, 74*(1), 117–127. https://doi.org/10.1016/j.jvb.2008.11.001

ABOUT THE AUTHORS

Nikko Visperas is the Manager of the Media Center of Far Eastern University. He completed his Doctor of Philosophy in Communication at the Polytechnic University of the Philippines. Mr. Visperas also worked for the Department of Information and Communications Technology and the Development Academy of the Philippines.

Donna Pamella Gonzales works for the Commission on Higher Education and is a former Project Officer at the Development Academy of the Philippines. She completed her Bachelor of Science in Medical Technology at the University of Santo Tomas and is currently pursuing her Master of Arts in Educational Management at the Polytechnic University of the Philippines. Ms. Gonzales also worked for the University of the Philippines Diliman and the Department of Education.

Alan Cajes is an Adjunct Lecturer at the University of Science and Technology of Southern Philippines. He finished Doctor of Philosophy in Applied Anthropology. Dr. Cajes is also a retired Senior Executive Fellow of the Development Academy of the Philippines.

Ragella Phoebe Terrado is a Project Assistant at the Development Academy of the Philippines. She finished her Bachelor of Science in Community Development at the University of the Philippines Diliman. Ms. Terrado also worked for the Quezon City Local Government and the Social Housing Finance Corporation.

Mary Therese Fernandez is an Associate Project Officer at the Development Academy of the Philippines. She finished her Bachelor of Arts in Broadcast Communication at the University of the Philippines Diliman. Ms. Fernandez also worked for CNN Philippines.

Jerby Lopez is an Associate Project Officer at the Development Academy of the Philippines. He finished his Bachelor of Science in Statistics at the University of the Philippines Diliman. Mr. Lopez also worked for Globe Telecom as a Data Analyst.

 | ISSN 2546-0730 (Online) | ISSN 1908-8701 (Print)