International Journal of Humanities and Social Science Invention (IJHSSI)
ISSN (Online): 2319 – 7722, ISSN (Print): 2319 – 7714
www.ijhssi.org ||Volume 11 Issue 9 September. 2022 || PP. 64-67

Improving Data Analytics Talent Quality through University-Industry Cooperation

Lihua Wu
School of Information Management, Beijing Information Science & Technology University, China
Corresponding Author: Lihua Wu.

ABSTRACT: *To bridge gaps between the fast-growing industrial demand and the university education, a framework for university-industry cooperation is put forward to help improve the cultivation quality of data analytics talents. The framework integrates the academic education process in university and practical training process in industry via a set of tried and true pathways consisting of curriculum co-construction, industry certification and practical training programs. The framework provide a holistic approach to prepare talent pool for data analytics roles through the constant efforts to upgrade the knowledge, skills and competencies of student candidates.*

KEYWORDS: *Data analytics talent, university-industry cooperation, talent quality, curriculum co-construction, industry certification, practical training*

Date of Submission: 01-09-2022 Date of Acceptance: 13-09-2022

I. INTRODUCTION

The development of data-driven economy promotes the demand of data analytics talents. According to World Economic Forum (2020), big data remains the high priority in technologies likely to be adopted by companies by 2025 and data analysts and scientists top the list of job roles in growing demand across industries. Talent insights reported by LinkedIn (2022) also presented that occupations related to data analytics have become one of the fastest growing occupations in the global Internet technology labor market, such as data engineers and data scientists with a growth rate of 28% and 23% respectively in the past year.

The market of data analytics talent is hot, but fundamental disconnections exist between the supply-demand sides. First, companies are facing critical talent shortfall. A poll conducted by Gallup for the Business-Higher Education Forum (2017), revealed that by 2021, 69% of employers expect candidates with data science and analytics skills to get preference for jobs in their organizations, yet only 23% of college and university leaders say their graduates will have those skills. Second, industries and universities are struggling with the gap between curriculum and skill demand. The university education focuses on theoretical teaching and the skill training is insufficient. And the updating of curricula often lags behind the technological changes and the industrial development. As a result, the university education is out of step with the talent demand of industry to some extent.

To mitigate the gaps, universities must build a detailed understanding of industrial talent needs as well as adjust the mode and content of education. Industries also should take a concerted effort in the talent pipeline development. The university-industry cooperation is an ideal solution for both to achieve their aspirations. Effective cooperation between universities and companies from the industry synergistically increases the knowledge and the level of practical skills of the graduates and their rapid adaptation for the job (Martin Kendra et al., 2015). This study aims to provide an executable framework for the cooperation between universities and industries so that both sides can utilize shared resources and advantages to improve the cultivation quality of data analytics talents and make them more employable.

II. COOPERATION FRAMEWORK

Universities and industries have their resources and advantages respectively. For universities, mature education system, friendly academic environment, professional faculty, as well as advanced laboratory are all the favorable conditions that help talents growth. Certainly, the first and the most important one is students who are the potential force for data analytics talent pool. By contrast, industries possess abundant industrial experiences, acute market insights, up-to-date technologies and skilled staffs. The cooperation between university and industry is to form the complementary power by combining advantages to build a workforce ready for jobs of data analytics. University-industry cooperation integrates the academic education process in university and practical training process in industry through various pathways to support the improvement of

data analytics talent quality. The following framework outlines the working mechanism of university-industry cooperation.

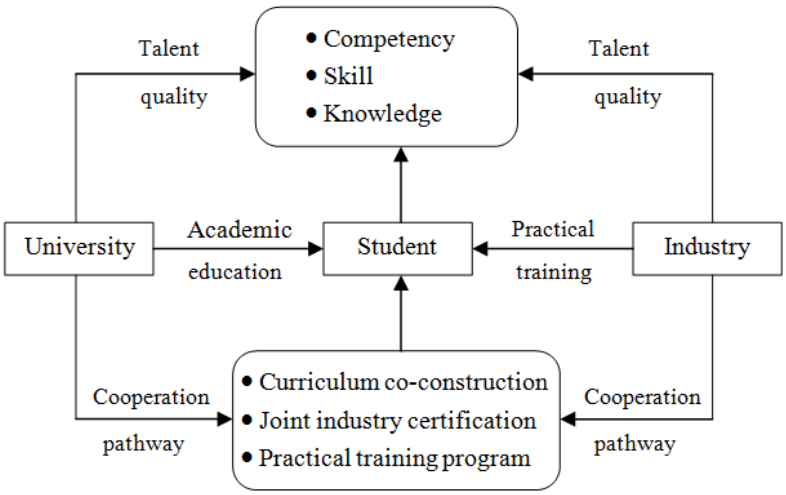

Figure 1: University-industry cooperation framework

The process of talent cultivation in university and industry is different. Basically university education is academic-oriented, setting curricula and organizing teaching based on the theoretical skeleton of some subject or major. Graduates from a university have systematic and integral theoretical knowledge which enables them the capabilities to adapt to occupations widely. But due to the limitations of classroom teaching, there are not many opportunities for university students to participate in practical training. Even application-oriented universities rarely provide career training. Therefore, most of university students are short of necessary work skills.

The trainings offered by industry however are occupation- oriented. They often aim at a particular job (e.g. data analyst) and put upskilling or reskilling in the first place. So such trainings give prominence to the pertinence and practicability of teaching and learning. What the job needs, what will be taught and learnt. With a short-term training, employees are fast equipped with on-the-job skills and talent gaps for the targeted job will be reduced and even closed.

Table 1: Education difference between university and industry

Party / Process	University	Industry
Education type	Academic-oriented	Occupation- oriented
Education focus	Research or knowledge application capabilities	Skills or techniques
Education mode	Classroom teaching	Real-world training
Educatee role	Student	Employee

University-industry cooperation is keen to combine the university-preferred knowledge education with industry-preferred skill trainings. On the one hand, students rely on sound knowledge base to win long-way potentials for their career development. On the other hand, students get easier access to their desired jobs with strengthened technical foundations and skills when they graduate. Obviously, the ensemble education process helps university students gain the dual competitiveness in the labor market.

III. COOPERATION ELEMENTS

Talent quality

The data analytics talent is a new type of workforce. To improve the talent quality to meet the industrial demand, requirements in talent quality should be identified clearly. Generally speaking, talents who have qualified with solid knowledge basis, outstanding skills and comprehensive developing competencies are popular in the labor market.

Knowledge: The knowledge of data analytics talent is categorized into the academic knowledge and domain knowledge. The academic knowledge is mainly acquired from the process of university education, including the general knowledge, disciplinary knowledge and specialized knowledge. The academic knowledge

may be applicable to a variety of industries and occupations. The domain knowledge is the specific cognition and insight into a industrial area. For example, knowledge in a business area may include business process, operation and management, decision-making, as well as communication and negotiation. Nowadays, data analytics runs through a variety of industrial domains like biology, medicine, economics, sociology, agriculture, transportation and so on. Only when data analytics is applied to solving the specific domain problems can analytics be meaningful. Through breaking the specialty-centered limits of traditional education, data analytics talents seek to knowledge integration across multi-disciplines and multi-domains to build a long-term strength for the evolution and development of career.

Skill: Data analytics talents engage in multiple job roles such as database administrator, data analyst, data engineer, data scientist and advanced analyst. So data analytics breeds a new set of professional skills in data, analytics, machine learning and programming. The typical skills include:

- Data curation skill: Sourcing, cleaning and manipulating on raw data, with the purpose of data preparation for further analysis.
- Data analytic skill: Codifying, manipulating, and analyzing data for use in functional or business units, usually using the statistics techniques.
- Machine learning skill: Extracting actionable knowledge directly from data through a process of pattern discovery, unusually involving in the methods and techniques in artificial intelligence field.
- Data governance skill: Including data ethics and data security to guarantee correct, safe and legal use of data.
- Data visualization skill: Displaying data in a visual and interactive manner by using graphics, image processing, computer vision and other user interface techniques and methods.
- Engineering skill: Grasping programming languages and data analytic software tools, i.e. JavaScript, HTML, Java, C/C++, Python, SAS, SPSS etc.

These skills create the core competitiveness of data analytics talents and can be a guide for universities and industries to develop their skill building, upgrading and retraining plans for the analytics workforce.

Competency: Quality requirements for data analytics talent go beyond pure knowledge and skills. Analytics roles need critical thinking and problem-solving competency, workplace competency and lifelong learning competency too. Data analytics talents should have the abilities of analytical thinking, logical reasoning, creative brainstorm, and complex problem-solving. The abilities enable talents comprehensively apply the knowledge and skills what they have mastered to cope with complex real-world problems. Workplace competence represents a set of general career-related attributes and abilities. For example, the ability to collaborate and innovate with colleagues, the way of interpersonal relationship processing and self-management, or the inclusive organization, management and leadership art are critical to individual success. And last, technologies change quickly. To keep up with the changes, continuous learning, upskilling and reskilling are necessary to prepare for new jobs to be coming at any time. Lifelong learning competency prioritizes data analytics talents to be appropriate successor for a long-term employment.

Cooperation pathway

University-industry program must have cooperation mechanism in place so that it can progress over time to strengthen the knowledge, skills and competencies of data analytics talents continuously. The workable mechanism includes such pathways as regular curriculum reviews and updates, renewed educational programs with industry badges and certifications, and additional expertise training programs with new focuses.

Curriculum co-construction: Curriculum is the core carrier of university education. The best practice is a university and its industry partner work together to construct curricula to meet the knowledge and skill needs of data analytics talent. Although courses developed by industry may be introduced directly to the university, a more reliable solution is to update the current curricula or design new curricula by mapping to the university's and industrial needs concurrently. The contents and syllabuses, teaching methods, learning activities and assessment patterns of curricula can be jointly evaluated and developed by both sides. The resources shared by industrial partners, e.g. staff expertise, industrial practices, online learning opportunities, forum and salon activities, will help construct more efficient and adaptive curricula. To keep up with the changes of talent needs, the cooperative curricula should be reviewed and renewed regularly.

Joint industry certification: Beyond the cooperation on curricula, considerations should be paid to the opportunities for industry-recognized credentials. Some businesses, together with universities, are initiating a path forward on this front by designing and deploying digital credential or badge programs. For example, SAS integrates its academic specialization program into the postgraduate data science program of University of Queensland to enable students meet the demand for qualified data scientists, including SAS certified data curation professional and advanced analytics professional. Joint industry certification recognizes a new and innovative way for university students to do work-based learning or on-the-job trainings. Universities may tie industry credentials to credits via curriculum co-construction mentioned above, or implement extracurricular

certification separately. Increasing flexibility in when and how students earn credentials offers more opportunities for students to prepare for their data analytics careers.

Practical training program: A practical training pathway is needed to help students integrate knowledge and skills learned in universities into actual working scenarios. Programs, e.g. boot camps, internship projects, skill contests, scenario-based exercise games, can be created by both partners jointly. All programs are dedicated to applying knowledge and skills to solve real-world problems and tailored to job functions. Therefore, the trainings not only play emphases on upskilling and mastery, but also equip students with the professional experiences related to upcoming employments, including industrial insights, job expertise, hires guidance and so on. The programs reduce the gaps between a university student and a candidate for data analytics roles, accelerating the growth of in-demand talent tool. Industrial partners, if they want, can include the training programs into their talent recruitment system, with the results of student engagement as the touchstone of recruiting.

IV. CONCLUSIONS

Universities and industries have shared economic and social responsibilities to help close the data analytics talent gaps and build a workforce with in-demand skills and long-term development potentials for digital economy. Curricula, certification and practical training programs developed jointly by universities and industries provide new pathways for improving the data analytics talent quality from perspectives of knowledge, skill, and competency. However, due to the differences of institutional culture and structure, the university-industry cooperation may encounter unexpected barriers, such as incompatible behaviors and working styles, inconsistent understandings of educational programs as well as dismatch of responsible departments. The sustainable progress and gain from the university-industry cooperation should depend on the harmonious and efficient engagement of both sides. It advocates that the cooperation is better carried out in a top-down way so that it can go unimpeded and get support from all facets of human resources, finance and facilities.

At the same time, students, as the key subject to be data analytics talents, are critical to the success of university-industry cooperation. Universities should develop a set of measures to motivate students. First, universities may set up prizes or honors to encourage students to actively participate in practical activities offered by the cooperation so that they can truly experience joys of success and a good competitive atmosphere may be formed gradually. Second, both universities and industries should build cultural brands adapting to the digital economy, attracting more students' attention and constantly expanding student groups. And third, universities can cooperate with industries to create targeted recruitment tests for students, guiding students to actively explore the current situation of the labor market and understand what they are short of, with the purpose of strengthening their awareness of crisis and employment stress.

ACKNOWLEDGEMENT

This research was supported by Education Reform Project of Beijing Information Science & Technology University (No. 2019JGYB25).

REFERENCES

[1]. Business-Higher Education Forum (2017). Investing in America's Data Science and Analytics Talent. Retrieve on 6 July 2022 from https://www.bhef.com/sites/default/files/bhef_2017_investing_in_dsa.pdf.

[2]. LinkedIn (2022). 2022 Global Internet technology talent frontier insight. Retrieve on 6 July 2022 from https://business.linkedin.com/ zh-cn/talent-solutions/webinars/2022/april/Internet_Tech_Insights_hr.

[3]. Martin Kendra et al (2015). Increasing efficiency of the learning process by an active cooperation between universities and industry. Procedia-Social and Behavioral Sciences, 176: 14 – 19.

[4]. World Economic Forum (2020).The Future of Jobs Report 2020. Retrieve on 6 July 2022 from https://www3.weforum.org/docs/ WEF_Future_of_Jobs_2020.pdf.

Lihua Wu. "Improving Data Analytics Talent Quality through University-Industry Cooperation." *International Journal of Humanities and Social Science Invention (IJHSSI),* vol. 11(09), 2022, pp 64-67. Journal DOI- 10.35629/7722