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## DATA ANALYTICS -AN EMERGING SKILL GAP

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### Abstract

Successful companies use predictability, advanced analytics, and data-led insights to help them make informed decisions in order to differentiate themselves in the market place, to help them make informed decisions, to solve business problems, stay relevant in an increasingly evolving and competitive market to stay ahead. Further Covid-19 disrupted business and education across the world to survive the topsy-turvy transformative era, companies have become even more reliant, on analytics practitioners data savvy business leaders and consultants who know how to respond and lead the changes when it comes to solving data-driven business challenges. Industries are looking for more and more data analytics skilled youth. However the lagging skill gap is a limiting factor and a demand for not only Post graduate but also graduate students if trained can fill the emerging skill gap. Successful companies are using predictability and advanced analytics to differentiate themselves in the market place. The paper is a dip stick study on the gap & need for data analytics skills in Bangalore's job market, it provides a review of existing literature on analytics skills. The study addresses skill types, mode of learning, why it is needed in today's market, and future growth prospects of the data analytics skills. It threads upon a quick evaluation of the work done by Information & Technology Sector, the various curriculum offered by Higher Educational Institutions and what is needed. The work will be beneficial to educators considering improvement of the curriculum for Data Analytics skills and to students desiring a more contemporary program. It can be referred by Institutions to promote need-based curriculum through innovative pedagogy to disseminate the future skills at graduation level. Thus the collected information will enable its implementation under a common National Qualification framework guidelines for Educational Institutions.

**Index Terms:** Data Analytics, Curricula, job role, NOS, Pedagogy, Higher Education, Data Science, Future skills

### Introduction

Data is growing fast and is available via different sources. It is stored and analysed for further access, storage and processing in business via database systems. Data Analytics and related technologies have been developing rapidly in the last decade.

“ Without Data, you are just a person with an opinion”, Bhasker Rao, CEO, AIM. Organisation are clearly interested in optimising the outcomes of processes, products and services, they need data as a part of their market intelligence. Though firms may be storing increased data without increased insight (Minsker, 2014). Data science is considered as a profitable attribute, beyond the benefits of Business Intelligence and Operations Research, (King, 2014). The scope of the paper is more on Data Analytics which can be a super- sector in Data Sciences. Data Analytics skill sets includes learn key analytical skills (data cleaning, analysis, & visualization) and tools.

## Methodology

A dip stick study of Companies who regularly hire Data Analytics and Big Data Professionals were interviewed, 15 companies addressed the questionnaire and 15 Academic Institutions including colleges/ educational institutions were interviewed. The questions addressed where the intake of freshers and entry-level positions, qualifications, skill sets required, workforce requirements and prediction for data analysts. The colleges were asked the curriculum, duration, pedagogy and placement support.

Secondary literature review was on skill policy, Courses offered under NSQF, Data Sciences or Data Analytics courses across Colleges and Institutions in India. Collected and examined & mapped the curriculum and major topics covered under Data Analytics across various Educational Institutions as well as the Qualification packs(QP) & National Occupation Standards (NOS) under NSDC.

## Literature and secondary data

Data science is the domain of studies that combines modern tools and techniques to find unseen patterns, derive meaningful insights and make business decisions. Data science includes math and statistics, specialized programming, advanced analytics, artificial intelligence (AI), and machine learning with specific subject matter expertise to uncover actionable insights hidden in an organization's data. These insights can be used to guide decision making and strategic planning. (IBM definitions). Data science is an analytical method that can turn unstructured data into useful patterns and information. Storing, managing and analysing large data sets with different structures requires innovative technologies and techniques (Daniel, 2015). Manyika et al. (2011) defined big data as *data that is too big and moves too fast, thus exceeding the processing capacity of conventional database systems*.

**Data Analytics** is the process of analysing data in order to extract meaningful data from a given data set. These analytics techniques and methods are carried out on big data in most cases and can be applied to any data set. It is the collection, transformation, and organization of data in order to draw conclusions, make predictions, and drive informed decision making. (Siemens & Long, 2011).

In USA, there are some programs that use interesting new approaches which may be applied to new programs. Denison University approaches data analysis from a liberal arts standpoint, with a focus on critical thinking and problem solving. Participants are required to take interdisciplinary courses in a field of interest, which helps them assimilate applied problem solving. Valparaiso University has adopted a business analytics program that focuses less on technical aspects of data, and more on problem solving, visualization and communication. Ottawa University offers a fully online data science program designed for adult learners. Tenets of these programs may be added to the project program development.

In India, formal curricula and the number of people trained do not meet the industry requirements and the need for it is growing exponentially with separate departments in organisations not only it is needed at higher secondary level but also at graduation levels, and PG of computer science and information systems. The current situation shows no two Data Analytics degrees/ certification are the same. Mainly because all stakeholders concerned are not focused, defined, or agreed upon. In many cases, this problem persists with Information Technology (IT) discipline at large. NSDC and IT& ITESector has recently included two National Occupation Standards (NOS): AI-Data Science Consultant under the Occupation as Artificial Intelligence and Big Data Analytics with the job role and Qualification Pack (QP) certification for **AI-Data Sciences Consultant** under the QP no. SSC/Q8117 Level 8. (<https://nsdcindia.org/ai-data-quality-analyst-v2>). Meant for students who have completed their Post Graduate or undergoing Post Graduate. The other QP is **AI- Data Quality Analyst**, Artificial Intelligence & Big Data Analytics under NSQF level 6. Which is meant for students in their final year of Graduation or undergoing graduation. **Data Steward** with the QP SSC/Q8111 skewed towards Data Governance Analyst.

NASSCOM offers under future Skills, **Data Analyst Associate** (DA-100). It's come up with a course certified by Jigsaw Manipal Academy. The pathways help the learner to prepare for the MS certified Data Analyst Associate (DA-100) Certification. The job roles are Business Intelligence Analyst & Data Scientist. However, this course is meant for Engineers, MCA, MCS or IT Professionals. There are many more courses offered by Tier 1 & 2 Universities which provides Data Sciences and Big Data Modelling courses at the higher level. Namely SJMR, IIT Chennai, Master's Degree in Data Sciences by IBM learning platform Simply Learn or Jigsaw Academy provides Data Science executive course under IIM Lucknow. IIIT Bangalore offers executive PG programme in association with Upgard (online Education Platform).

They are all aligned to higher levels of Post Graduate and Bachelor of Engineering in Computer Science and these courses may not cater to the entry level Data Analysts that are required in large numbers across all sectors. Adding Data

Analytics in various streams including computer sciences and allied fields which would be able to generate the output of data analytics professionals from the domain. Graduates can contribute to the field if they have analytical business skills (Janicki, Cummings, & Kline, 2013) and domain expertise skills (Poremba, 2013) to critically evaluate the business (Pratt, 2013) of Big Data. One of the purposes of the article is to enable the future workforce to acquire data analytics skills early in their educational phase mainly 11<sup>th</sup> & 12<sup>th</sup> (Plus 12 & Pre University studies) as well as graduation level (3/4 years) and build a solid foundation to be industry ready to mitigate the emerging skill gap.

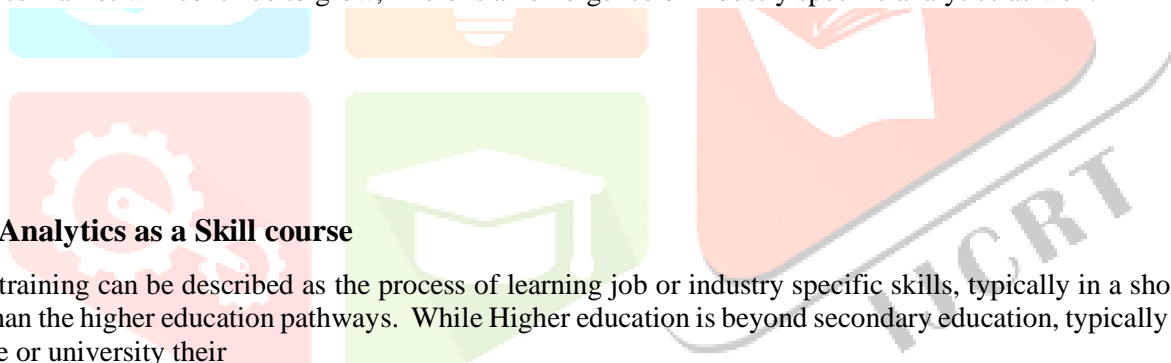
De Veaux et al. (2017), states technical domain has three subgroups with (1) applications like Excel, SAS, and Tableau; (2) programming languages like R, Python, SQL, and Java; and (3) infrastructure such as Hadoop, Cassandra, Oracle, Linux, MapReduce, Hive, and Pig. In the literature review not much curricula was available in Data Analytics as a domain course. Typically a Data Analyst should be able to develop the following Skill sets: Descriptive analytics, Predictive analytics, Prescriptive analytics and Data Visualisation.

## Gap in the industry for Data Analytics professionals

Research conducted by Research agencies like (AIM) also predicts that more and more professionals will be needed for Data Analytics, Data Science will provide niche solutions for predictive analytics but also fraud detection. Bangalore leads the jobs market with mature analytics eco-system accounting for 24% of analytics jobs in India. Followed by Delhi and Mumbai. Also Tier2 Cities demand has increased. (AIM, 2020).

Job openings in Data Science Sector in 2019: Total number of job openings in data analytics and & Data Science ecosystem has been 97,000. Out of which 97% has been full time and 3% has been contractual basis. 21% of jobs posted are for Analytics is for freshers. India needs 1,37,630 professionals by 2025 in Data Science as per NIIT, Talent is in short supply.

The cumulative analytics market in India stands at 30 Billion Dollars which will double by 2025. The hiring pattern is 38% for large corporation, 33% is for mid-sized corporation and 29% is start-ups. (AIM, 2020). While the data and analytics market will continue to grow, There is an emergence of industry specific analytics as well.



## Data Analytics as a Skill course

Skills training can be described as the process of learning job or industry specific skills, typically in a shorter period of time than the higher education pathways. While Higher education is beyond secondary education, typically done through college or university their

Curriculum is set by the Higher Education pathways of UGC/ AICTE or Universities.

Skills training offers learners practical skills, which makes it easier for employers to be job ready. Here both routes are ready for employment & can exist simultaneously.

Skills training or higher education, plays an important role in the development of students and to move into a career. Both education pathways can exist simultaneously. The most important aspect in all of this is, relevance and progression. Students can be taught skills that they need to get a job and progress in their roles. At the same time as per UN's SDP Goals lifelong learning options should be available to address the need of redundant technologies and job opportunities. Hence re-training, upskilling needs to be in place as well, to allow the workforce to grow, adapt and increase their career prospects; in that way, employers make the most of their workforce. For students who go down the higher education pathway, they must ensure they are confident in their skills and build a career with a space and opportunity to grow. As a result of the study, it is determined that there is a lack of standardization with regards to the textbooks, resources and core subjects of Data Analytics especially when looked with the lens of NSQF

## Designing the curriculum

The objective of a task-based training session is to ensure a person can apply the required knowledge and skills to perform a work task or activity and develop competencies in a specific field. Competency is the consistent application of knowledge and skills to the standard of performance required in the workplace. It embodies the ability to transfer & apply skills & knowledge to new situations and environments. (Standards for RTOs 2015, Glossary.) Thus the curriculum designed for data analytics should have the 3 aspects: Application of knowledge + Application of Skill = Performance of work task (A.Kluge, 2014)

## Job role of a Data Analyst

The job role of a data analyst will need knowledge domain, analytical domain & business domain, which includes communication skills, project management, client orientation, and time management. The analytical domain incorporates problem definition and problem-solving skills, predictive analysis, descriptive analysis which can be further described through visualisation tools. The job role will include the following:

**Data Capture:** This stage includes Data Acquisition/collection from raw structured & unstructured data like log files, video, audio, pictures, Internet of Things, social media, and more. These methods can include manual entry, web scraping, and real-time streaming data from systems and devices.

**Data storage and data processing:** Since data can have different formats and structures, companies need to consider different storage systems based on the type of data that needs to be captured. This stage includes data cleaning, data processing, deduplicating, classification, data modelling, transforming and combining the data, extract, transform, load jobs or other data integration technologies. The data preparation is essential for promoting data quality before loading repositories for further use.

**Data analysis:** This stage is to analyse the data. Here an exploratory data analysis can be conducted to examine biases, patterns, ranges, and distributions of values within the data. The data analytics exploration drives hypothesis generation. It also allows analysts to determine the data's relevance for use within modelling efforts for predictive analytics, regression, qualitative analysis.

**Communicate:** This step is to prepare the analysis in easily readable forms such as charts, graphs, and reports to provide insights to the business and in-order to make decisions. These processes are called Data Reporting, Data Visualisation, Business Intelligence, Decision Making. A data science programming language such as R or Python includes components for generating visualizations; alternately, data scientists can use dedicated visualization tools.

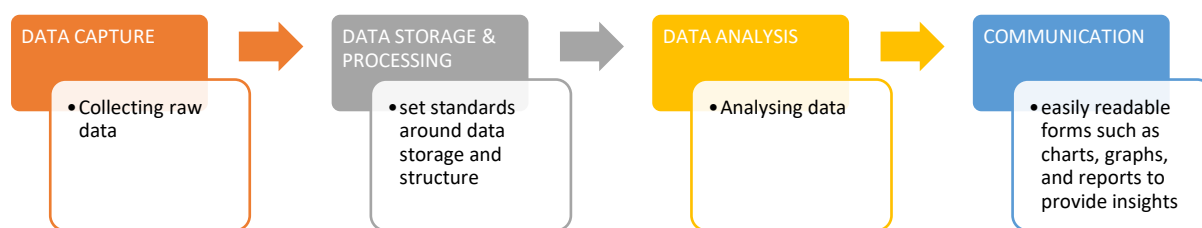


Fig 1: showing Data Analysts job role

To mitigate the lack of professionals it is essential to leverage the other streams apart from Computer Science and Mathematics to leverage Data Analytics skilling. The other option is to reskilling and upskilling the current workforce, because the traditional student output is nowhere near sufficient to meet the need. The solutions for this could be by introducing three pathways that can cater to the huge requirements in the market to non-IT/ Engineering background and tier 3/ 4 universities:

1. Integrated with BCom, BBA, BSc. Maths
2. BVoc. Data Analytics (level 6 & 7)
3. Certificate course of NSQF in Data Analytics that can be done through a training institute in Data Analytics.
4. Prodegree (professional Degree) in Data Science including Data Analytics

Secondary Schools and Colleges can start the pathway programs in Data Analytics for students in the stream of Maths, Commerce, Business Administration, Information Technology & Computer Science. It may be happening under some international curricula offered under Information Technology. CBSE is yet to initiate the Data Analytics especially extracting, preparing and visualising the data at the 11<sup>th</sup> & 12<sup>th</sup> Studies.

The integrated course on data analytics to compliment the various streams of Bachelor's courses could include specific pedagogies such as incorporating required mathematics competencies into Data Analytics courses, using specific pedagogies, tools and technologies need to be crafted into the data analytics course. This course can be offered as a subject in the 5<sup>th</sup> & 6<sup>th</sup> Semester as an elective (Jain University Model); the courses can be more domain specific like Business Analytics, Financial Analytics.

Bachelor of Vocational Course in Data Analytics can be offered to students with Data Analytics as the Key subject with the option of Certificate (level 4) , Diploma (level 5), Advanced Diploma(level 6) and Bachelor of Vocational Degree for completion of (level 7).

Prodegree in Data Sciences after 12<sup>th</sup> the subject can be for 4 to 5 years: Which includes 12+3+2 leading to a pro degree with PG in Data Sciences or 12+4 of Engineering BE in Data Sciences. Most of the degrees available are meant to be Prodegree- A professional degree meant to get employed example, BTech-Data Science offered by Hindustan University or IIM Lucknow in association with Jigsaw Academy. A degree of this nature will often include mandatory industry internships and work placements as part of the curriculum. The practical application of knowledge and theory is essential. Completion of the degree is for the most part mandatory to work in particular fields and be licensed to do so. Thus Professional degrees will equip with a clearly defined set of skills, while academic degrees will add a broad transferable set of skills.

This paper will not focus on the Prodegree (Professional Degree course) but more on integrated domain course or NSQF certificate course. The proposed curriculum presented in this paper based on the NSQF, can be implemented by some of the Training Institutions and at the same way integrated with colleges/Universities.

Further Data Analytics professionals can be hired from the above courses in all the sectors like IT, KPO, Health, E-Commerce, Media & Entertainment, BFSI, Retail, E-commerce, Travel, Transport, Public Sector, FMCG, Telecom, Energy, Automobiles, Food Industry etc.

## Data Analytics Tools

The Industry specific requirement as per the Analytics India Magazine (AIM), A survey was conducted with the result that the most popular demand in the industry were.

Table1: showing most popular language for Data Analytics AIM, 2020

<b>Most Popular language</b>	<b>Phyton</b>	68%
	R	19%
	SQL	4%
	SAS	2%
	others	5%
<b>Visualisation tool</b>	Tableau	56% %
	Others	21.00%
	MS Power BI	11%
	IBM Watson	9%
	SAP Cloud	3%

Python has become a staple in data science, allowing data analyst to use the language to conduct complex statistical calculations, manipulate and analyse data, and complete other data-related tasks. Python can build a wide range of different data visualizations, like line and bar graphs, pie charts, histograms, and 3D plots. Python also has a number of libraries such as NumPy, Pandas, Matplotlib, for analysing data quickly that enable coders to write programs for data analysis and machine learning more quickly and efficiently. Python emerged as the most popular language and core capability, across all sectors like BFSI, IT & ITES, Manufacturing, E-Commerce, Retail etc. R Studio an open source programming language and environment for developing statistical graphics is also popular amongst companies. Data Tableau (AIM, 2020 Survey) is a data visualization program that allows to generate basic oriented graph-like data representations by querying cloud databases, spreadsheets, machine learning algorithms, social databases, and other database

## Salaries for Data Analysts

25% of analytics jobs offer range of 6-10 lakhs followed by 22% for 3-6 lakhs for entry-level, AIM, 2020. Top industries hiring Data Analytics has been the BFSI sector followed by E-Commerce and telecom (AIM, 2020).

## Prerequisites

Data Science Weekly (2013) suggests several competencies including basic algebra, and descriptive statistics (regression, probability theory, numerical analysis)

## Dip Stick Study Results & Discussions

Questionnaire was subjected to Academicians and Industry Hiring needs in Bangalore 15 companies and 9 Academic Institutions were interviewed with Semi-structured questionnaires.

Colleges and universities students hired for Data Analytics role included tier 1 & 2 Engineering colleges, Tier 1 & 2 Graduates and Post Graduates, Tier 3 Engineering colleges and Tier 3 Graduates and post graduates, Training Institutions. Tier 1&2 Engineering Colleges from CS emerged as the 1<sup>st</sup> choice followed by Tier 2 & 3 Gradates & Post graduates from BCS/BCA. A substantial number of Companies looked for online certification or training certifications from training and skill development institutions like NIIT, Micro Soft's Data Analytics, Google Analytics, CDAC, NIIT, Jig Saw Academy, Besant Technologies.

The Engineering Colleges included VIT, New Horizon Engineering College, Amrita Viswa Vidyapeeth, MVJ Engineering College, VEC, IIT & NIT, IIIT B.

Thus, offering integrated courses at Graduation level with the help of training institutions can result in covering the demands for data analytics professionals.

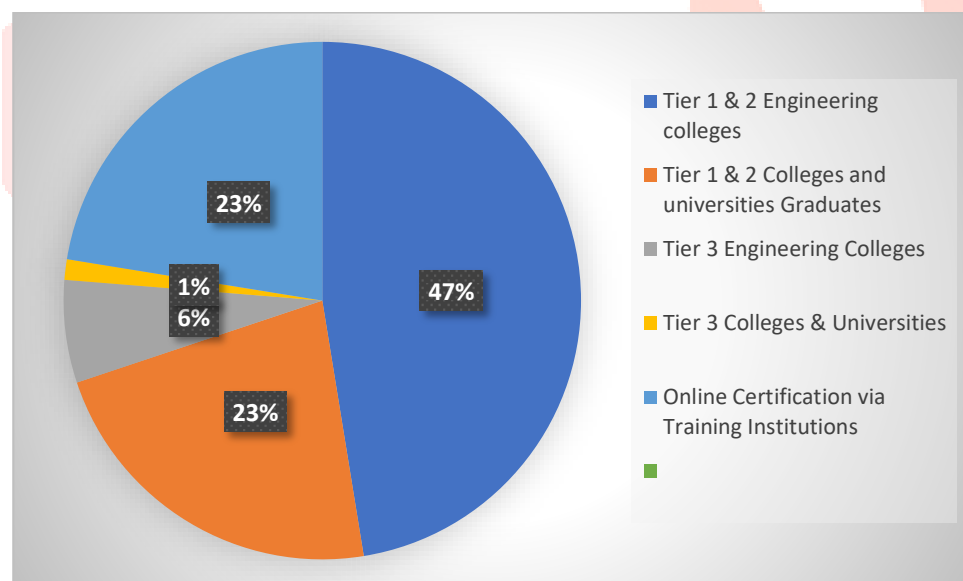


Fig 2 : Colleges/ Universities Training Institutions

Reasons for hiring from Educational Institutions showed an updated dynamic curriculum, collaboration with other companies & Brand name of the Institutions mattered in hiring. It could also be that the Brand name is associated with good dynamic curriculum & collaboration with other companies.

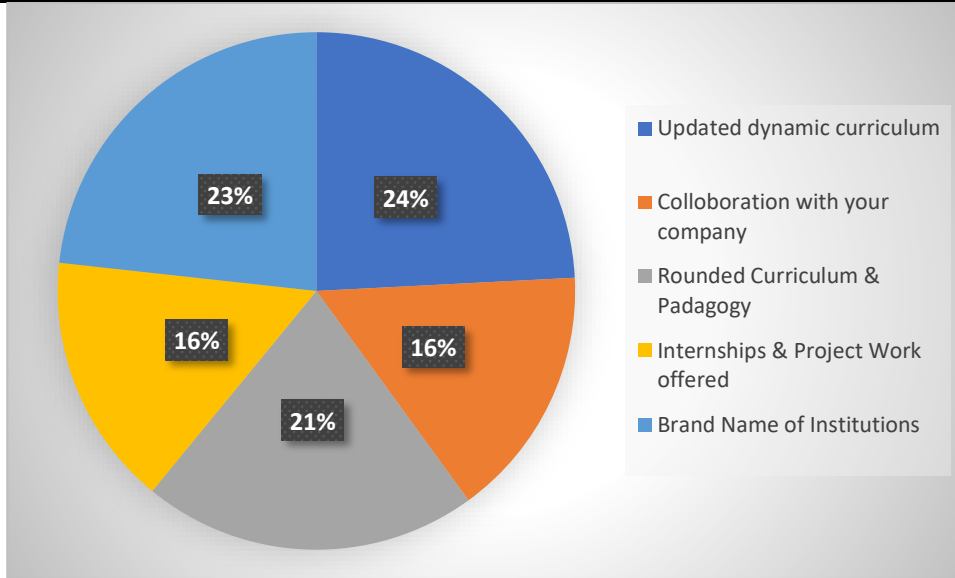


Fig 3: Reasons for hiring

Which are the streams that can include Data Analytics basics in Graduation  
 Computer Science, Maths, Commerce, Business Studies in the order given as the streams to integrate Data Analytics in 11<sup>th</sup> & 12<sup>th</sup>.

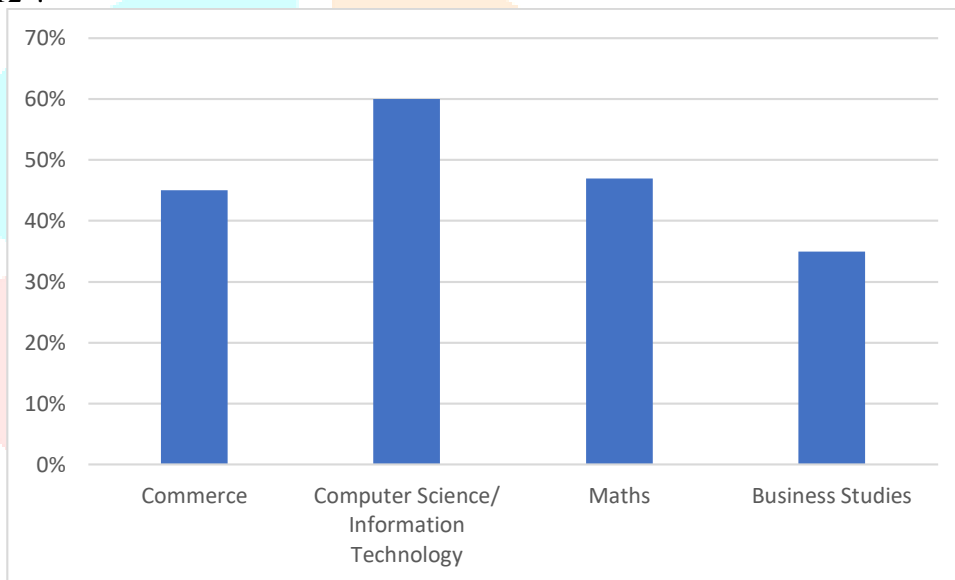


Chart Title 4: Streams in Graduation

Streams which can include Data Analytics at Engineering Level majority expressed Computer Science to be a part of the Stream of Engineering as Data Sciences, Others included Industrial Design, Mechanical & electronics as the next choice. However some of the companies also suggested a new stream of Data Analytics as a new stream. All respondents all wanted Data Analytics as a part of every stream of Engineering studies. This shows the need for Domain Analytics as a specialised field too.

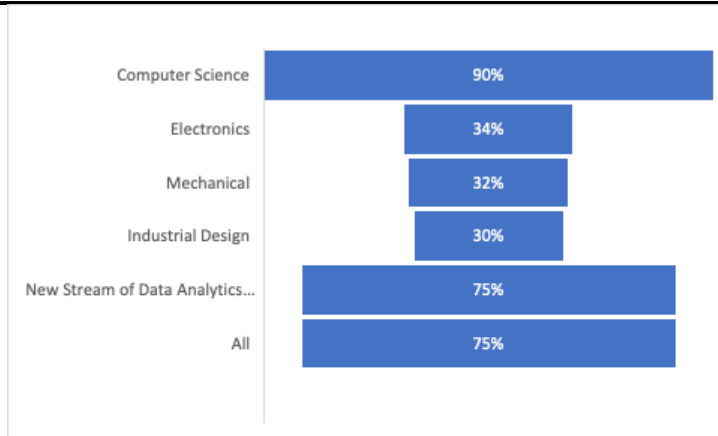


Chart: 5 Streams in Engineering

The skill sets & tools trainees would like to possess at the entry-level for 3 years graduate program showed learning of Data Analysis tools and its applications like data visualisation was most needed, data analysis and data collection were given the next most important skill sets to acquire followed by data capture. Tools to learn includes Excel, Python & Tableau were rated the top most. Followed by SQL, R. 26% said Power Bi and 12% WebGL, 10% said DBMA & ER Modelling. Also in Table 2. It is mentioned that the most popular language tools are Python & Tableau.

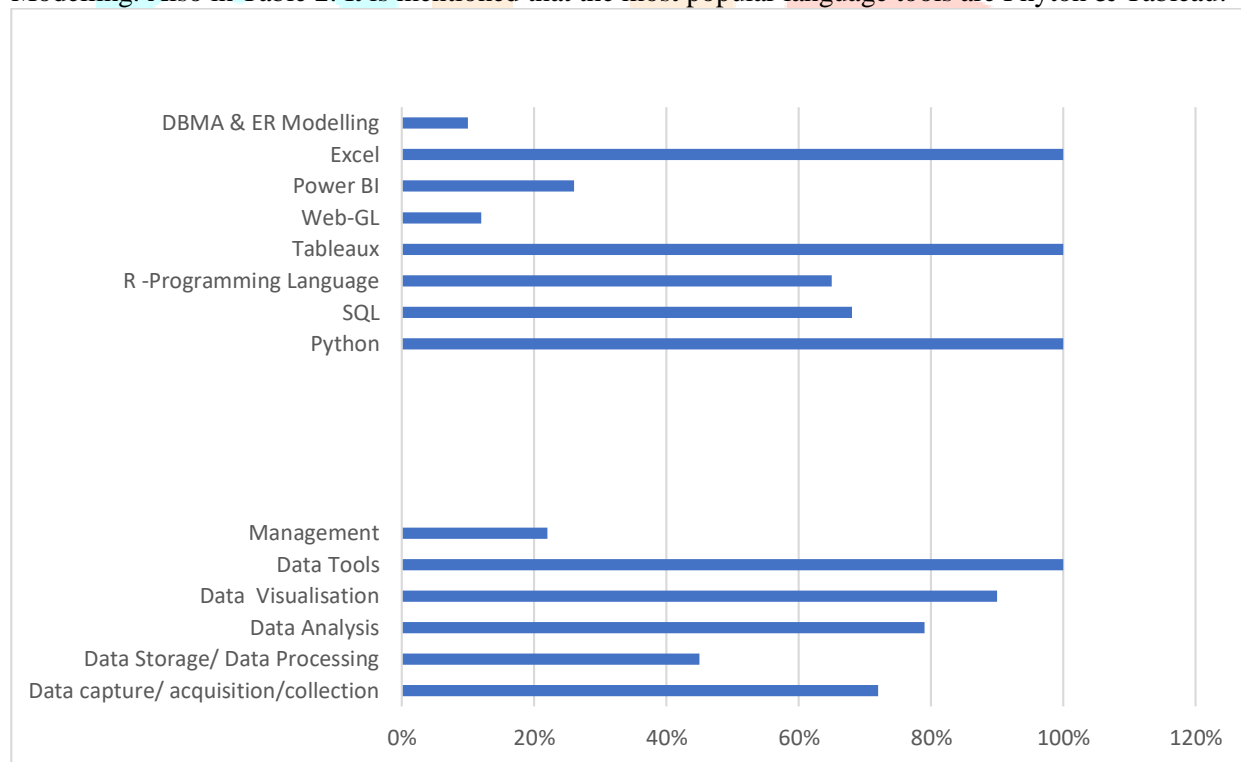


Chart 6: Skill sets and tools preferred for Data Analytics

**Sectors that need data analytics freshers include**

BFSI, Health, E-Commerce, Manufacturing, Food Industries, Media & Entertainment, Retail, IT & ITES, Automobile and Telecom in the order mentioned.



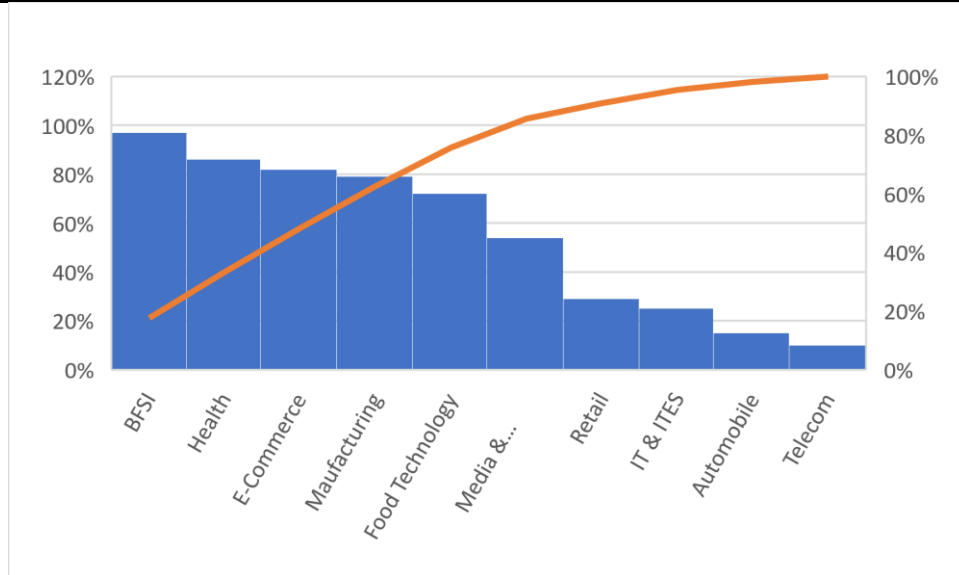


Chart 7: Data Analytics freshers

The annual remuneration for a Data Analytics Associate : 78% of the company's hiring said 3-4 lakhs 22% said 5-6 lakhs.

The Academic & Training Institutions feedback were as follows:

Data Analytics can be integrated with Graduation streams BCA, BBA, BCom, Media & Entertainment and new stream like Data Analytics were the top contenders.

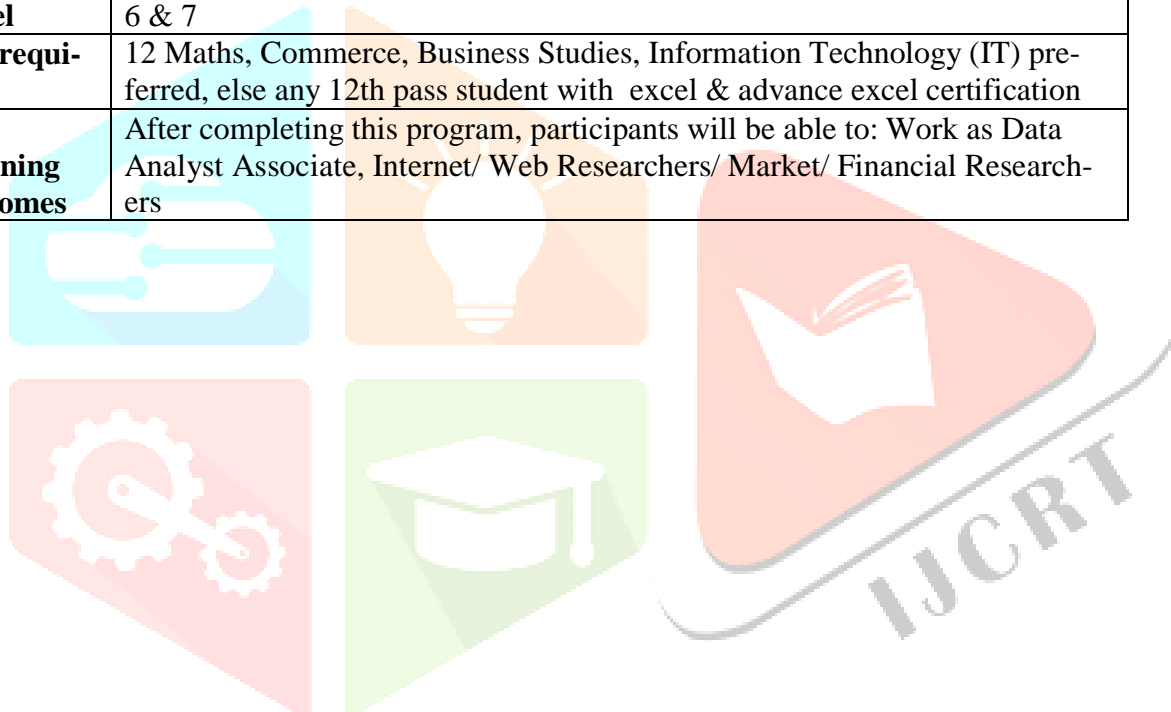
Data Analytics to be integrated in Engineering streams : 45 % said computer science, 30 % said any BE stream, 25 % said Data Sciences as a new stream could be a new engineering subject. **Entry-level Job Role for Data Analysts include** Junior Data Analyst, Business Analyst, Data Researchers, Web Internet Researchers.

## Conclusions

The study concludes with a few observations and recommendations. Data Analytics education needs to be integrated at the graduation and Higher Secondary Level in order to ensure sufficient human resources and the gapping emerging skill gaps. Domain expertise are very essential hence inclusion of data analytics in Commerce, Business Studies, Health, Retail & Commerce and many other sectors. Standard curriculum based on the National Skills Framework (NSQF) needed to treat it more as a Skill Based course to Acquire knowledge + Application of Skills = Performance of work task. The outcome of the study is a Curriculum designed under NSQF model for Data Analytics Associate. (Appendix-1) The Curriculum can be used for integrated Graduation course under level -6 & level -7 for Under Graduate studies, the course can be learned offline, blended or phygital model by Skill development training organisations/ IT training organisations.

With the help of Secondary and Primary Data collected a Model Curriculum for Data Analytics is framed here on the lines of NSQF

<b>Program name</b>	<b>Data Analytics</b>
<b>Job Role</b>	Data Analytics Associate
<b>Sector</b>	IT & ITES & Cross Cutting with other Sectors Commerce/ Business Management
<b>Occupation</b>	Data Analytics, Web Researcher, Big Data Analytics, Data Steward
<b>Brief Job Role Description</b>	knowledge domain, analytical skills, business skills, which includes communication skills, project management, client orientation, and time management.
<b>NSQF Level</b>	6 & 7
<b>Pre-requisites</b>	12 Maths, Commerce, Business Studies, Information Technology (IT) preferred, else any 12th pass student with excel & advance excel certification
<b>Training outcomes</b>	After completing this program, participants will be able to: Work as Data Analyst Associate, Internet/ Web Researchers/ Market/ Financial Researchers



Sr. no.	Topics	Hrs	Modules	Lesson Plans	Learning outcomes	Technology and software packages
1	Introduction & Principals to Big Data, Data Science and Data Analytics	6	Principals and Introduction to Data Science, Data Analytics, relevance, ethics and applications	Explain the relevance of Big Data, Data Science, Data Analytics for the market and environment	Understand the relevance of Data Analytics. Make appropriate recommendations & follow ethical decision making.	Lap top/ PC
2	Basic statistical concepts	20	Statistics - Basic Principals. Familiarise with Statistical concepts & models:	Define basic statistical concepts used for analysis : measures of central tendency, statistical anomalies. Classification, Prediction, Clustering Analysis, Similarity Measures to analyse data. Probability theory and hypothesis testing	Analytical abilities: Foundations to interpret data in an effective manner., Practice	Excel, Advanced Excel
	Statistical Tools	20	Statistical tool packages: Excel	Practice Different techniques for regression analysis, linear, logistic, different methods to import data from various file formats. Apply different methods to pre-process data such as removing missing values or transforming incorrect data types.	Ability to use statistical packages, Practice	
3	Advanced Excel	24	Excel functions with data interpretation, Analysis with Excel, advanced tools in excel and data visualisations	The different types of Regression Models and Time Series forecasting. The course emphasizes statistical computing	Learn the advanced concepts in Excel and start to perform data analysis with Excel & Advanced Excel. Practice	
4	Import of Data Capture, processing, Analysis,	26	Data type & sources, Acquire data, process data, store data	Techniques and methods of data, Data Acquisition methods and validation process. different storage systems. Data cleaning, deduplicating, classification, data modelling, transforming and combining the data, load	Perform Data processing, Analysis with case studies : exploratory data examine biases, patterns, ranges, and distributions of values within the data. Explain and conduct predictive analytics, regression, qualitative analysis. Practice	

				jobs or other data integration technologies.		
5	Data Visualisation concepts	12	Introduction to Data storytelling, Visualisations concepts, organise data, design charts & dashboards in Excel, Python & Tableau	Understand and build visualisations, organise data, design charts & dashboards to empower more meaningful business decisions.	Ability to use different Data Visualisation tools for presenting data to a targeted audience to visually present data to the best effect.. Critique Existing charts & Identifying methods of Improvement, Interpreting charts & graphs, Developing questions, storytelling. Case study practice	
6	Python	12	Python Environment Set up	Python environment set up & essentials, data Analytics overview, Statistical computing, , data manipulation, data visualisation with Python	Technical abilities & practice	Python
		12	Python Analytical problem solving	Analysis of data in Python using multi-dimensional arrays in NumPy, manipulate DataFrames in Pandas, use the SciPy library	To understand the use of programming language in Python and types of data. Learn how to prepare data for analysis, perform simple statistical analyses. Practice	
		10	Python -Data visualisation	Python for Data Analytics: Data visualisation in python, Introduction to NUMPY, Introduction to Matplotlib, Introduction to PANDAS, getting and cleaning data. PANDAS is a powerful library for data preparation and analysis. The Crisp DM framework-Data preparation, modelling, evaluation and deployment	To learn dataset manipulation using PANDAS, in Python which is the most powerful library for data preparation and analysis. Create meaningful data visualizations, predict, future trends from data, and more via NUMPY, Matplotlib & Practice	

7		12	Tableau	Data Exploration in Tableau. Tableau for visualisation: work with filter, parameters and sets, build charts, interactive dashboards, story interfaces, data blending, create extracts and organise and format data.	Craft a Business narrative using visualisation and become a data driven story teller. Competency to explain complex concepts in simple terms. Learn basic visualisation techniques using the most in-demand visualisation tool in the industry & Practice	Tableau
8		60	Capstone Project	Frame the problem and choose and execute an appropriate analytics methodology. Execute the program with real time data. Bring in the practice of all the modules learnt	The Capstone project will apply and refine the data analytic techniques to manage and complete a real world analytics project.	
9		6	Career preparation	Develop an effective Resume highlighting the Capstone project and Skill sets acquired. Interview Preparation, carer mentoring session, application for jobs, effective communications	Preparation for a career in data analytics and securing a job	

Table 2: Model Curriculum: Data Analyst Associate

## References

1. Aytac, Z., & Bilge. H. S (2020), *Big Data Analytics in Higher Education: Systematic Review* pg- 87
2. Gupta.B (2020), *Analytics India Magazine* (2020), pg- 5,14, 18, [www.analyticsindiamag.com](http://www.analyticsindiamag.com),
3. Gokul, K., Sundararajan, M., & Paul, P. (2019). Big Data Management, Data Science and Data Analytics: What is it and Where— An Educational in Indian Perspective. *International Journal of Innovative Technology and Exploring Engineering* (IJITEE), 8(12).
4. Guidelines for providing Skill Based Education under NSQF (UGC) <https://nsqf.ugc.ac.in/asset/Support/NSQF%20New%20Guidelines.pdf>
5. Luo. X, Justice, C., & Sorge, B. H. (2019). *Integrated Education of Data Analytics and Information Security through Cross-Curricular*, pg-2
6. Lionel.M, (2020) *Designing and Implementing an Undergraduate Data Analytics Program for Non-Traditional Students. Information Systems Education Journal* (ISEDJ) 18 (3) ISSN: 1545-679X, pg- 23
7. Musa J.J, Babb. J & Amjda. A. (2017), *Emergence of Data Analytics in the Information Systems Curriculum*, ISCAP, ISSN: 1545-679X, pg-25-27
8. Shah, B., & Choksi, D. (2019). Big Data Analytics Model for the Education Sector. *International Journal of Innovative Technology and Exploring Engineering* (IJITEE), 8(12)
9. MC\_SSCQ8117\_V1.0\_AI-Data Sciences Consultant\_26.10.18
10. SSCQ8101\_AI\_Data\_Quality\_Analyst\_V1\_21\_01\_2019, [https://www.nqr.gov.in/sites/default/files/QP\\_SSC\\_Q8101\\_v4.0\\_AI%20Data%20Quality%20Analyst.pdf](https://www.nqr.gov.in/sites/default/files/QP_SSC_Q8101_v4.0_AI%20Data%20Quality%20Analyst.pdf)
11. MC\_SSCQ8101\_AI - Data Quality Analyst\_QP-V2.0\_22092020 (1), [https://www.nqr.gov.in/sites/default/files/MC\\_SSCQ8101\\_AI%20-%20Data%20Quality%20Analyst\\_QP-V2.0\\_22092020.pdf](https://www.nqr.gov.in/sites/default/files/MC_SSCQ8101_AI%20-%20Data%20Quality%20Analyst_QP-V2.0_22092020.pdf)
12. SSC\_Q8101\_AI\_Data\_Quality\_Analyst\_V2\_16\_04\_2020, [https://www.nqr.gov.in/sites/default/files/QP\\_SSC\\_Q8101\\_v4.0\\_AI%20Data%20Quality%20Analyst.pdf](https://www.nqr.gov.in/sites/default/files/QP_SSC_Q8101_v4.0_AI%20Data%20Quality%20Analyst.pdf)
13. [https://nsdcindia.org/sites/default/files/SSCQ0401\\_Junior\\_Data\\_Associate\\_v2.0\\_13\\_07\\_2020.pdf](https://nsdcindia.org/sites/default/files/SSCQ0401_Junior_Data_Associate_v2.0_13_07_2020.pdf)