

A Feasibility Study on Offering Bachelor of Science in Data Science and Analytics

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Abstract:- In this present era, data has become a powerful and vital component of emerging technologies, especially in the digital economy. Innovations and advancements in this digital economy and other sectors can be attributed and associated with data studies. Thus, the field of Data Science and Data Analytics has dramatically evolved over the last decade and continuously gaining popularity, particularly in Information Technology. In Philippine education, the Commission on Higher Education has formulated draft guidelines for B.S. Data Science and Analytics Program recognize the need to produce a future-ready generation that can answer the needs of the industry's economic trends and domains. In line with this, the College of Information and Communications Technology of the Nueva Ecija University of Science and Technology proposes opening a new program: Bachelor of Science in Data Science and Data Analytics. A feasibility study is an essential tool to assess the viability of the proposed program.

The objectives of this feasibility study are to identify if there is a significant demand of the program based on stakeholders' responses. Provide analysis of the feasibility in opening the proposed program under the College of Information and Communications Technology. And provide a comprehensive reference, including faculty line up, curriculum design, curriculum map, and course description.

The descriptive method was used for this study. A questionnaire and interviews were used as the primary instruments. The involvement of the stakeholders (students in public and private schools, parents, industry professionals and academicians) make this study possible. Using important files and papers from the College, a SWOT Analysis was conducted to investigate and determine the program's competitiveness and/or attractiveness.

The result reveals that many student respondents are interested in enrolling in the B.S. in Data Science and Analytics program. The demand for the course,

employability, low financial cost for enrollment, and the university's strong reputation are some of the iterated factors observed among the respondents. The SWOT analysis enumerates the strengths, weaknesses, opportunities, and threats findings in the program.

The offering of a Bachelor of Science in Data Science and Data Analytics is deemed necessary to produce a future-ready generation of data scientists that will fill the industry's need.

Keywords:- Data Science and Data Analytics, SWOT Analysis.

I. INTRODUCTION

Data has become a powerful and vital component in this new era of continuous emerging technologies. Breakthroughs in societal sectors can be attributed to careful studies of data gathered. Hence, the field of Data Science is slowly gaining popularity in the Information Technology world.

Data Science is a discipline that offers the discovery and utilization of methodologies, principles, and policies on data analysis, tools, knowledge, and insights (Yan and Davis, 2019). In this era, small and large companies have been dealing with large volumes of data to find insights to aid in better decision-making. The focus of data science is not solely limited to the economic arena but also caters to education, healthcare, government, among others.

In the study by Tan and Tan (2016), the need for B.S. Data Science degree programs in the Philippines have been proposed. The study has mentioned that such a degree aims to produce data scientists who can provide insights and new knowledge for the different societal sectors. The authors have also identified that such a degree can pave the way for local and foreign workforce opportunities.

In line with this, the Commission on Higher Education (2021) has formulated a draft of guidelines for BSDSA. The Data Science and Analytics Program acknowledges the need to produce a future-ready generation that can answer the needs

of the industry's economic trends and domains. The draft includes a curriculum outline comprised of mathematics, statistics, Information Technology, and data science and analytics.

To keep with the trend, the College of Information and Communications Technology of the Nueva Ecija University of Science and Technology proposes opening a new course: Bachelor of Science in Data Science and Analytics. The University aims to equip the students with the fundamentals of data science by applying mathematics, statistics, data mining, machine learning, and artificial intelligence concepts. By gaining exposure to these concepts, the students will be primed to provide relevant data-driven research and solutions.

As such, the offering the B.S. The Data Science and Analytics program is proof that the College and the University are committed to their mandate in continuously providing quality education and opportunities for its stakeholders. Thus, producing productive citizens equipped to respond to the call of Science and Technology in both local and international communities.

II. OBJECTIVE OF THE STUDY

In general, the objective of this study was to determine the feasibility of offering a four-year course. The proposed program is Bachelor of Science in Data Science and Analytics.

Specifically, this study aimed to describe the course's strengths, weaknesses, opportunities, and threats to justify its proposed offering

III. METHODOLOGY

This study took a descriptive method, with a questionnaire serving as the primary tool for the student respondents. It also conducted unstructured interviews with parties involved in Nueva Ecija. Because the purpose of this study is to characterize a current scenario in terms of current market trends to estimate future results, this technique was chosen.

A. Respondents

This survey included 20 senior high schools from Cabanatuan City and Nueva Ecija as respondents. This includes schools located near NEUST extension and satellite campuses. A total of 1072 graduating students were asked to participate in the survey. The distribution of respondents per school surveyed is shown in Table 1.

Name of School	No. of Respondents	Percentage
Aliaga National High School	43	4.0
Bartolome Sangalang National High School	21	2.0
Calaba National High School	127	11.8
Camp Tinio National High School	113	10.5
Cuyapo National High School	34	3.2
Jaen National High School	126	11.8
Jorge M. Padilla National High School	36	3.4
Liceo De Christ the King, Inc.	55	5.1
Malacanang High School	38	3.5
Mallorca National High School	59	5.5
Manuel V Gallego Foundation Colleges Inc.	54	5.0
NEUST Laboratory High School	14	1.3
Nueva Ecija High School	152	14.2
Pantabangan National High School	28	2.6
Peñaranda National High School	47	4.4
Rizal National High School	27	2.5
Saint Nicolas De Tolentino High School	27	2.5
Salagusog National High School	29	2.7
Sibul National High School	19	1.8
Talugtug National High School	23	2.1
Total	1072	100.0

Table 1 Distribution of the Respondents

The second set is 20 external stakeholders was surveyed using convenient sampling to corroborate the senior high school respondents' survey results and for validation purposes.

Concerned Stakeholders	No. of Respondents	Percentage
DSA Industry Professionals	10	50
Parents	6	30
Academicians	4	20
Total	20	100.00

Table 2 Concerned Stakeholders

B. Data Gathering Tools

With the help of other academic members from the College of Information and Communications Technology, the researchers gathered the essential data for this feasibility study using questionnaires. The researchers also conducted interviews with interested parties. Using important files and papers from the College, a SWOT Analysis was conducted to investigate the research's strengths, weaknesses, opportunities, and threats.

C. Preparation of the Questionnaire.

The researchers designed the questionnaire for this study after conducting substantial research and analyzing the items that should be included. It was created using an existing instrument at the College. It was changed to accommodate the needs of this research.

D. Validation of the Questionnaire.

MV Gallego Foundation Colleges Grade 12 students assessed the first copy of the questionnaire to check if the respondents could answer it and if it needed to be updated or modified.

E. Administration of the Questionnaire.

To collect data, the researchers used a Google form. The researchers obtained permission from Nueva Ecija's Schools Division to perform the study.

F. Interview.

The researchers also conducted unstructured interviews with stakeholders in the Data Science and Analytics business, academicians, and parents. A Zoom consultation was also organized to showcase the planned curriculum. The recommendations and criticisms were considered to improve the planned program.

G. Statistical Treatment of the Data

The frequency of responses and the accompanying mean were used in the statistical analysis of data collected from various public and private senior high schools in Nueva Ecija.

IV. RESULTS AND DISCUSSION

❖ Survey Results

The statistical analysis of data collected from chosen Grade 12 students from various public and private senior high schools in Nueva Ecija was shown in the tables below.

Are you willing to take BSDSA?	f	%
Yes	689	64.0
No	383	36.0
Total	1072	100.00

Table 3 Willingness to Take BS in Data Science and Analytics

According to a survey of senior high school students' desire to take the Bachelor of Science in Data Science and Analytics program shows that 689 out of 1072 students, or 64.0 percent of the total number of respondents, are inclined to take the BSDSA program.

In addition, the survey questionnaires filled out by the student respondents who answered positively were tallied for the next question.

What is the reason for wanting to take BSDSA?	f	%
Demand for the course	343	49.8
Employability	189	27.4
Influenced by family	46	6.7
Non-board course	46	6.7
Influenced by friends	35	5.1
Others	30	4.4
Total	689	100

Table 4 Reasons for Choosing BS in Data Science and Analytics

From the 689 questionnaires tallied, 343 or 49.8% of them answered that they want to enroll in BSDSA because of the demand for the course. This received the highest percentage score among the options for wanting to take BSDSA. This was followed by employability which received 189 or 27.4% of the respondents. The reason for wanting BSDSA as influenced by friends and that the program is a non-board course received 46 or 6.7 % of the respondents. Influenced by friends received 35 or 5.1% while 30 or 4.4% respondents answered they were influenced by a factor other than those listed above.

Are you willing to study at NEUST?	f	%
Yes	940	87.7
No	132	12.3
Total	1072	100.00

Table 5 Willingness to Study at NEUST

Out of 1072 senior high school student-respondents, 940 or 87.7% answered that they are willing to study at the Nueva Ecija University of Science and Technology, while 132 or 12.3% opted to other schools.

What is the reason for wanting to study at NEUST?	f	%
Free Tuition Fee	466	49.6
Good Reputation	221	23.5
Distance from home	139	14.8
Known to the Industry	74	7.9
Others	40	4.3
Total	940	100

Table 6 Reasons for Studying at NEUST

As for why the student-respondents are inclined to enroll at NEUST, the number 1 answer is because of the free tuition fee, which is 49.8% or 343 respondents. Second, on the list is the excellent reputation of the university which garnered 23.5% or 221 student-respondents. Distance from home was also considered with 139 respondents or 14.8%. 74 respondents which convert to 7.9% answered that NEUST is known to the industry while 40 or 4.3% respondents answered they were influenced by factor other than those listed above.

❖ *Swot Analysis*

A SWOT analysis assesses an organization's internal strengths and weaknesses, as well as external opportunities and threats (Bonnici and Galea, 2015). Internal analysis is used to discover the organization's resources, skills, core competencies, and competitive advantages. By looking at rivals' resources, the industry environment, and the overall environment, the external analysis finds market opportunities and dangers. The goal of a SWOT analysis is for an organization to use the knowledge it has about its internal and external surroundings to determine its strategy.

➤ *Strengths*

A. *Institutional Mandate & Philosophy and Goals of Proposed Program*

Republic Act No. 8612 converted the Central Luzon Polytechnic College into the Nueva Ecija University of Science and Technology. As provided in the charter, the mission of the university is stated as follows:

- To primarily provide advanced instruction, professional training in arts, science and technology, education, and other related fields, undertake research and extension services, and provide progressive leadership in these areas; and,
- To offer graduate, undergraduate and short-term technical courses within areas of specialization and according to its capabilities, considering the needs of the province, the region and the country.

B. *Goals of the Proposed Program*

The proposed program aims to equip graduates with the knowledge and skills to process, manage, and analyze data in various forms. They are competent, innovative, creative, and responsible problem-solvers committed to nation-building (CHED, 2021).

C. *Management Viability*

The Nueva Ecija University of Science and Technology is a leading State University in the region and one of the few SUCs in the country that the Commission has recognized on Higher Education for its internationalization efforts. The institution can educate students with the requisite information, abilities, and competencies for the Data Science and Analytics field in terms of managerial viability.

The Accrediting Agency of Chartered Colleges and Universities in the Philippines has granted the College of Information and Communications Technology it's Level 3 Phase 2 status for the Information Technology program, ensuring that the proposed BSDSA program will become relevant for the stakeholders for the community.

D. *Market Viability*

According to the findings, many students are considering taking the BSDSA and enrolling at NEUST. The results highlight the necessity for a BSDSA program to give students new options and opportunities to enhance their lives and contribute to developing a better community in today's modern-day.

E. *Instruction and Faculty*

In terms of instruction, the College of Information and Communications Technology has faculty members with relevant and related Bachelor, Masters, and Doctorate degrees in Computer Science and Information Technology. According to the proposed rules, standards, and guidelines for the BSDSA program, Computer Science and Information Technology are two related fields/disciplines of the proposed program, allowing the institution to deliver the requisite skills, knowledge, and competencies for a DSA graduate.

Table 7 shows the distribution of faculty members' educational attainment to be handling DSA courses.

Discipline/Field	Bachelor's Degree	Master's Degree	Doctorate Degree
Data Science and Analytics Allied Field (i.e., Information Technology)	100%	100%	30%

Table 7 Percentage Distribution of Faculty Members' Degree

The DSA faculty members are BS in Information Technology graduates with specializations in Web Application Technology, Network Administration, and Database Application Programming. Furthermore, they all hold a Master's degree in Information Technology with a specialization in Computer Education. Finally, 30% of the instructors have relevant Ph.D. degrees, essential for the DSA program.

➤ *Weaknesses*

The College only offers one program, Bachelor of Science in Information Technology, which focuses mainly on creating applications and systems. There is a need to provide a course that will focus primarily on data science and analytics. Studies show that many of the different industries within the vicinity of Nueva Ecija University of Science and Technology need data analysts and graduates who are adept in knowledge and skills for processing, management, and analysis of data in various forms.

➤ *Threats*

The course's reliance on government funding may make it difficult to get additional equipment needed.

V. **CONCLUSIONS AND RECOMMENDATIONS**

The study revealed that offering an additional course like the Bachelor of Science in Data Science and Analytics is feasible. According to the SWOT Analysis, the external and internal aspects are favorable to the College. The necessary tools, equipment, and human resources to participate in the proposed program are available based on the supplied data. Moreover, the College's outcomes-based education is also a strength, as evidenced by AACUP's Level III, Phase 2 accreditation and the CHED's certification of the College's conformity with its criteria.

Weaknesses were discovered to be dependent on government financing, while potential was defined by industry demand and the certification that it is one of CHED's priority courses. The initiative will be jeopardized if the government's budget is not available.

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