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Awareness and Utilization of Big Data Management System by Lecturers in Universities: A Survey of Universities in Nigeria

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Abstract. The research investigated awareness and utilization of big data management systems by lecturers in universities: a survey of universities in Nigeria. Lecturers at four (5) public universities in Nigeria namely: University of Port Harcourt, Imo State University, University of Benin, Benin City, Kogi State University and University of Lagos made up the population. The information was gathered via an online questionnaire that was distributed to respondents. Out of the 162 online responses, only 148 were valid and used for the analysis. Frequency, simple percentages and Mean scores were used to analyze the data. Results of the analysis show that lecturers are not aware of big data management tools and they do not know how to use big data management system tools. The increase in the number of data and the wide spread of technology were the two factors that contributed to the adoption of big data management systems. The study suggested, among other things, that information technology leaders of universities ideally demonstrate the importance and use of Big Data management system in their information technology strategic plans in order to address the need for big data management skills among lecturers in universities in Nigeria.

Keywords: Big Data, Big Data Management System, University Lecturers, Information and Communication Technology Skills

1. Introduction

The idea of Big Data is becoming more popular due to the proliferation of data from different sectors of human endeavor. It is noteworthy however, to note that some scholars have identified Big Data Management is a field that requires adequate planning and investment in both training and technology (Harwell, Vivian, McLaughlin, & Hafner, 2019, Heripracoyo et al., 2019, Corti et al., 2019, Ma et al., 2019) Big data has developed into a helpful tool for a variety of purposes, including social integration, excellent education, and corporate competitiveness. The proliferation of information in modern civilization has given rise to big data. The rise in public involvement in data production and sharing can be used to characterize big data. Enterprises generate vast amounts of transactional data as well; they compile billions of bytes of information on their clients, partners, and internal processes. In the era of the internet of things, millions of networked sensors that perceive, generate, and share data are being incorporated into commonplace items like smartphones, smart energy meters, vehicles, and industrial gear. In actuality, businesses and organizations produce enormous amounts of digital data as a result of how they run and engage with their customers (Oguntimilehin & Ademola, 2014). Social media platforms, cellphones, and other consumer gadgets like laptops and PCs, billions of individuals worldwide can now add to the quantity of Big Data that is available. Big Data's exponential development has also been significantly influenced by the amount of multimedia material (Lindgren, 2020). In their research work, Harwell, Vivian, McLaughlin & Hafner (2019), stated that Big Data have ushered in the promise of new research possibilities. They noted that in indicator research and development, big data has most assuredly found a home.

The Big Data management system includes tools and methods for gathering, storing, sharing, arranging, and assessing massive amounts of data in different formats (Cope and Kalantzis, 2016). The six values—volume, velocity, truthfulness, diversity, verification, and value—were used to define big data. "Volume" are large amounts of data that are difficult to handle, analyze, store, and present, whereas "velocity" refers to the speed at which information passes through an organization. Veracity means trust, biases, and uncertainty in the data, whereas variety refers to whether the data is structured or unstructured. Verification is concerned with data security, whereas value is related to the usefulness of data generated for guiding decision making. Big data is transforming into extremely structured and unstructured types of complex data. Big data is defined as information that cannot be collected, managed, stored, or analyzed using any conventional data methods due to its size, complexity, or dynamic nature. It discusses data that is too large and moves too quickly for traditional data analysis techniques to manage. It is a common data that contains all types of data (White, 2015). A single massive data collection can truly range in size from a few Terabytes to many Zettabytes, depending on the specific context in which the data is employed (Jinchuan, et.al, 2013).

The volume of data is increasing in public and private organizations with no exception to universities of higher learning. University data ranges from the personal data of staff and students to records of university dealings with other bodies. Academic data are the major information that forms the collection of university's data sets (Eneh & Opara, 2021). These data is multiplying in increasing value causing the influx of unsystematic sets of information leading to the concept of big data in universities. As a result of this, big data management system becomes a necessity to ensure proper control, evaluation and interpretation of Big Data. Big data management system is a growing technology that is used to handle big data. It is a software that helps to collect, process, organize, store and distribute large data characterized by the 6Vs. It is an educational tool that also functions as administrative software for donor tracking, student performance monitoring, recruiting and admissions, and financial planning (Eguavoen & Okodugha, 2022) Lopez-Belmonte et al (2019) asserted that the progress of technology in the field of education has led to the development of new professional skills in the teaching community, such as digital competence. Likewise, it has propagated the appearance of new learning environments mediated by technological resources that favor the generation of a large volume of data, known as Big Data, derived from the interactions of educational agents in virtual environments (Lopez-Belmonte et al, 2019).

While Sabharwal and Miah (2021) observed that a steadily expanding number of organizations has been endeavored to utilize Big Data and organizational analytics to analyze available data and assist with decision-making, several other scholars have gone ahead to expose some of the success stories of bid data analytics as used in business. Such success stories are seen in areas such as, Manufacturing industry (Zhang, Huang and Bompard, 2018), Hospitality (Richard 2017), Food industry (Anaf, Baum, Fisher, Harris & Friel 2017), Entertainment industry (Fouladirad, Neal, Ituarte, Alexander and Ghareeb 2018), Finance (Bernard M. & Co. 2018), Online business (HBS.2020), SMSE (Seseni, & Mbohwam 2019). and many others.

In the educational sector, Big Data management system are broadly divided into two such as, Learning analysis (LA) and academic analysis (AA) software (Daniel, 2014). Software designed specifically for learning analysis collects information on learners and their environments in order to enhance student learning. The goal of academic analysis software is to increase institution efficiency by using student, academic, and organizational data. Big Data management system becomes an imperative management tool in effective management of Big Data in universities. Big Data management support lecturer collection and interpretation of data and lecturer to students' assessment of learning activities. The continuous monitoring of lecturers' development, appraisal and contribution to knowledge is checkmated through Big Data management system. In today universities appraisal, the area of researches and impact to the body of knowledge is evaluated by Big Data management system. For example, monitoring and evaluation of the numbers of lecturers' work cited by researchers is a fast-growing appraisal method in universities and this could be said to be managed by Big Data management system.

Big Data management system offers opportunities for different educational institutions' information technology resources to be used effectively in order to advance lecturer development and promotion to an advanced rate of achievement as well as to improve student outcomes for the achievement of the university's goal. As a result, research of professors' knowledge and usage of big data management systems in Nigerian universities is necessary.

1.1 Statement of Problem

The increasing prevalence of bog data in today's technological landscape has prompted universities to explore its potentials applications. Big Data involves variety of data, of a high volume and very complex data and requires that it be adequately managed to enable it become meaningful to users; hence, the need of Big Data management system. However, a critical issue arises in the form of limited awareness and utilization of big data management systems within academic institutions. Despite the transformative capabilities of these systems in fostering data-driven decision-making, research advancements, and administrative efficiency, many universities face a considerable gap in understanding their functionalities and implementation strategies.

Research on the use of Big Data management systems by lecturers in Nigerian universities has not been done, despite indications from studies that the universities are implementing these systems to handle massive amounts of data. This constitutes the focus of this research work.

1.2 Objective of the Study

The objective of this study is to investigate the awareness and utilization of Big Data management systems by lecturers in Universities in Nigeria. Specifically, the study tends to:

- Determine the level of lecturers' awareness of Big Data Management Systems in Universities in Nigeria
- Investigate the advantages of Big Data Management Systems by lecturers in Universities in Nigeria.
- Ascertain the utilization of Big Data Management Systems by Lecturers in Universities in Nigeria.
- Investigate the factors influencing the utilization of Big Data Management Systems by Lecturers in Universities in Nigeria.

1.3 Research Questions

- What is the level of awareness of Big Data management systems by lecturers in Universities in Nigeria?
- What are the advantages of Big Data management systems by lecturers in Universities in Nigeria?
- What is the use of Big Data management systems by lecturers in Universities in Nigeria?
- What are the factors influencing the utilization of Big Data management systems by lecturers in Universities in Nigeria?

2. Review of Literature

One of the most important indicators for a country's development and progress is its university system. The pursuit of knowledge and the commitment to ensuring that it has been improved as well as the provision of a balanced education for the development of people's lives and society at large are two of universities' main goals. In structured institutional learning and training center, a modern university includes faculties for traditional fields of study such the humanities, arts, management, and sciences, as well as more specialized universities for the study of engineering, science, technology, and agriculture (Alemu, 2018). Through guaranteeing the supply of labor, fostering a nation's socioeconomic development, and fostering the intellectual growth of individuals, communities, and society at large, university education plays an enabling function in society. Therefore, the university system differs from all other institutions due to its key task. A university's worth as an institution is always changing and starting to take on new dimensions. The introduction of numerous technologies in modern life is enhancing higher education institutions' ability to meet the new problems. It is crucial that the vast amounts of data that the educational system generates be properly evaluated and analyzed in order to correctly respond to current issues. We will be able to project the effects of how important learning is thanks to this. In their research work titled, Impact Assessment of Big Data on Higher Education Management Based on Time-Varying Clustering Sampling Algorithm, Liu and Song (2021), stated that in university management, big data still presents many and complex characteristics, such as student registration for freshmen, book borrowing, or score entry for teachers. They noted that the generation of these data needs to be managed reasonably and effectively. Research scholars Tiwari, Wee & Daryanto (2018), have identified three big data analytics analytical classis to include, predictive, the descriptive and the prescriptive. They described the predictive as that which deals with questions such as what will or is likely to happen, by exploring data patterns with relatively complex statistics, simulation, and machine-learning algorithms. While the descriptive deals with straightforward questions regarding what is or has happened and why—with 'opportunities and problems' using descriptive statistics such as historical insights, the prescriptive deals with questions regarding what should be happening and how to influence it, using complex

descriptive and predictive analytics with mathematical optimization, simulation, and machine-learning algorithms

Big Data has the ability to completely transform academic research and instruction. Ademola (2014) defines big data as information sets that are too big and complicated for conventional data processing techniques to handle. The term "big data" describes sets of data that are too massive to be efficiently acquired, managed, and analyzed using conventional technical methods. A quantitative comparative examination of the different strategies used by 35 Charter schools was carried out in 2012 by Divyakant et al. They discovered that using big data to inform education was one of the top five strategies associated with quantifiable academic performance. Using this data, the most effective teaching methodologies might be created, starting with fundamental subjects like reading, writing, and math and working up to more difficult college-level courses. A relational viewpoint claims that big data management systems appeal to higher education institutions because they allow them to strategically use their IT resources to increase performance, increase student resilience, and increase completion rates (Anikweze, 2019).

When correctly assessed, university institution data may play a significant role in determining how some difficult problems could be solved (Marsh, Maurovich-Horvat & Stevenson, 2014). Murumba and Micheni (2017) contend that in order to provide the finest learning environments for the benefit of society, institutions must employ big data analytics. In addition to tracking use and performance statistics that support the monitoring required for developing or implementing technology, IT analytics may also be used to create data standards, tools, procedures, organizational synergies, and policies, according to Daniel (2015). Data from a range of systems, including alumni networks, learning management systems, student information systems, and systems that control learning outside of the classroom, are believed to be able to be integrated via IT analytics.

University presidents, corporate leaders, and government decision-makers must now establish new standards and expectations for data in this new era of Big Data maturity (Burns, 2016). Accountants and auditors ought to start creating some basic compliance guidelines for data management, collection, security, interoperability, privacy, and other areas despite the massive costs (Samiddha & Ravi, 2016). To handle Big Data, however, new methods of data administration must be developed. According to Kellen, Reektenwald, and Burr (2013), a class of people with particular expertise and experience are required to gather data from multiple sources, combine them, evaluate them, and identify previously concealed patterns. They admit that a recurring challenge for corporations has been the volume of data and the challenge of putting it into shape. In order to work with diversified teams of colleagues who comprehend programming languages as well as the cognitive, behavioral, social, and emotional views on learning, Nigerian higher education teachers must acquire new abilities and knowledge. Learning new professional abilities is essential (Gibson, 2012).

On the other hand, it is essential to look into innovative strategies for enhancing and monitoring students' academic progress as well as other institutional regulations (Tulasi, 2013). The way that students learn and teachers teach will revolutionize and develop cutting-edge educational strategies thanks to the use of big data management systems (Alonso & Arranz, 2016). Financial, enrollment, academic, extracurricular, and instructional information on students is crucial to doing a full study of them and learning how to choose future courses in an educated manner (Kelechi et al, 2020). It affects every part of the university system, including management, instruction, and learning. The availability of copious amounts of data in university management departments has made proper data management, use, and analysis crucial (Ahiauzu & Agundu, 2014). The ability to examine such a large amount of data and evidence for decision making has been made possible by big data management software. Businesses, governments, and academic institutions have long produced enormous data sets (Rob, 2014). Big data management systems offer higher education institutions a strong basis for leveraging the vast array of data available to them to define the future of university education (Alonso & Arranz, 2016).

In the context of e-Learning, instructor-created information sources (courses, modules, experiments, etc.) are part of big data management systems, also called big learning data systems, according to the organization or experts. However, they also primarily consist of student data collected by Learning Management Systems, social networks, and multimedia (Banica & Radulescu, 2015). Sources of Big Data in universities have been identified in literature. They include demographics, such as age, sex, location and professional background. Ozioma, etal (2021), in their work listed the benefits of Big Data management system, such as; Better instruction, matching students with programs and jobs, open and transparent financing of education, and effective system administration.

The development of lecturers' ICT abilities demonstrated that lecturers lacked proficiency in the creation and presentation of slides, spreadsheet creation, and computer-aided data analysis (Akinnagbe & Baiyeri, 2011). Because there is a widespread lack of ICT infrastructure and related software, managing the complicated data that comes from student enrollment, exams and examination records, and even financial problems has traditionally been done hastily or under a lot of stress. A platform that can process Big Data should also be able to manage its diversity, velocity, and volume. This may be done by employing a family of components that need integration and data governance (Mules, 2016). Few employees at Nigerian institutes of higher learning are really knowledgeable about these procedures. As a result, it is reasonable to anticipate that the problems facing the implementation of big data in Nigerian higher education would be enormous and scary. However, given the researchers were unaware of any actual data demonstrating that lecturers were involved in managing Big Data, it is plausible that the fear was all in the mind of the individual.

An inquiry demonstrates the creation, processing, and challenges with creating and using Big Data for evaluation in Nigeria (Esemonu et al, 2020). Forty-five specialists in educational evaluation and research were chosen using the purposive sample method. Interviews and written records served as the data collection's instruments. Descriptive statistics were employed in the analysis of the data to address the five research questions that framed the study. The results of the inquiry showed that the key sources of assessment data in Nigeria were identified by more than 95.5% of the experts questioned as secondary school internal and external tests and assessments as well as course work results. The experts claim that a lack of knowledge about the advantages and requirements of assessing large data processing and production (4.290.76) is the main problem. Many data are not analyzed, which results in the loss of a considerable deal of information. To improve student performance, among other things, it was advised that the stakeholders increase understanding of the importance of Big Data in the modern educational system.

Big data management systems are thought to be relatively recent. The significance of maintaining staff and student data across departments and faculties cannot be overstated, given the structure of the postsecondary institution. One new breakthrough that merits further academic study is the use of big data analytic methods to current issues in higher education. Dnuggets (2018) came to the conclusion that better and quick access to information for decision-making, more transparency, scalability, and improved change management are the main advantages of evaluating the value of big data for enterprises. This outcome was determined by a recent survey. This project was prompted by the need to investigate potential uses of a big data management system to address issues with the current state of education at Rivers State University.

3. Research Methodology

The research design utilized was descriptive. The study involved teachers from four government-owned universities in Nigeria: University of Port Harcourt, Imo State University, University of Benin, Kogi State University and University of Lagos. To collect the data, an online self-structured questionnaire was employed. The questionnaire employed a 4-point Likert scale, with a range of 4-1. Four hundred and forty-four of the 148 completed online surveys were accurate and fit for analysis. The data were analyzed using frequency of simple percentages and mean scores.

Decision Rule: Any item with a mean of 2.50 or above was accepted, and any item with a mean of 2.50 or below was rejected, according to the judgment.

4. Results and Discussion

Demographic Characteristics of the Respondents

The respondents consist of 148 lecturers from the five public universities in Nigeria. The results show that there were 69(47%) males and 79(53%) females. The result of the qualifications was: 43(29%) PhD, 65(44%) master's degree, and 40(27%) bachelor's degree. Rank results show 18(12%) Graduate Assistant, 36(24%) Assistant Lecturer, 24(16%) Lecturer II, 27(18%) Lecturer I, 19(13%) Senior Lecturer, 14(10%) Associate Professor, 10(7%) Professors. The result of the respondents' universities were; 39(26%) University of Port-Harcourt, 32(21%) University of Benin, 29(20%) Imo State University, 19 (13%) Kogi State University and 26 (18%) University of Lagos.

Table 1: Level of lecturers' awareness of Big Data management systems in universities South-South Region of Nigeria

To what extent is lecturers' awareness of Big Data management systems in Rivers State Universities?	**HA**	**A**	**SA**	**NA**	**Mean**	**Decision**
Flink	22	33	40	53	2.2	NA
Atlas.ti	17	29	40	62	2.0	NA
Pentaho	17	29	45	53	2.1	NA
Cassandra	24	27	43	54	2.1	NA
Stats IQ	17	30	48	53	2.1	NA
Couch DB	20	17	49	62	2.0	NA
Storm	24	27	50	49	2.2	NA
Cloudera	25	28	59	36	2.3	NA
Apache hadoop	18	22	56	52	2.0	NA

Table 1 shows the awareness of Big Data management systems by lecturers in universities in Nigeria based on a 4 point likert scale (4-1) of Highly Aware (HA), Aware (A), Somehow Aware (SA) and Not Aware (NA). It shows that respondents were not aware of Big Data management systems such as; Cloudera (2.3), storm (2.2), flink (2.2), apache hadoop (2.1), Cassandra (2.1), Pentaho (2.1), Stats IQ (2.1), atlas.ti (2.0), and Couch DB (2.0).

This result was hitherto supported by Esomonu et al (2020), they agreed that university staff are not well aware of current ICT tools for managing Big Data however, there are indications of ICT advocacy to educate them on the available tools. Eguavoen and Okodugha (2022), exposed the importance of awareness of the prospective advantages of Big Data tools to tertiary institutions. According to Anikweze et al. (2019), there is a significant disparity in lecturers' access to and use of Big Data at higher education institutions in north central Nigeria, which may be due to insufficient advocacy and training. Findings from this study suggest that the possibility of using Big Data management tools can be hinged on the awareness of the relevant Big Data management systems in universities.

Table 2: Advantages of Big Data Management Systems to Lecturers in Universities in Nigeria

Items	**SA**	**A**	**D**	**SD**	**Mean**	**Decision**
It arranges students' information details	62	51	17	19	3.0	Agree
It enhances lecturers teaching activities	49	62	22	15	3.0	Agree
It promotes learning activities	51	59	17	21	2.9	Agree
It ensures fast collection of information	54	60	15	17	3.0	Agree
It promotes accurate in evaluation of data	48	63	24	22	2.9	Agree
It facilitates the dissemination of data	60	46	25	17	3.0	Agree

Table 2 above shows the advantages of Big Data management systems to lecturers in universities in Nigeria based on a 4 point likert scale of ranging from Strongly Agree (SA), Agree (A), Disagree(D) Strongly Disagree (SD), it revealed that Big Data management systems arranges students information details (3.0), it enhances lecturers teaching activities (3.0), it ensure fast collection of information (3.0), it facilitate the dissemination of data (3.0), it promote accurate evaluation of data (2.9) and it promote learning activities (2.9).

This finding is in line with the findings of Ozioma et al. (2021), who identified the advantages of a big data management system, including improved instruction, matching students to programs, matching students to jobs, transparent financing of higher education, and effective system administration. Key advantages of evaluating the value of big data tools for enterprises, according to Dnuggets (2018), include better and more immediate access to information for making decisions, more transparency, scalability, and better management.

Table 3: Uses of Big Data Management Systems by Lecturers in Universities in Nigeria

Items	SA	A	D	SD	Mean	Decision
It is use for analyzing and interpreting research data	64	49	16	19	3.1	Agree
It is use to gather information for academic research	54	59	20	14	3.0	Agree
It is use to increase lecturers job performance	53	47	27	21	2.9	Agree
It facilitate lecturer collaboration with other lecturers	33	27	48	40	2.4	Disagree
It is used to store large amount data	51	47	26	24	2.8	Agree
It is use as a basis to examine lecturers ICT skills	14	25	59	50	2.0	Disagree
It is use to plan curriculum	31	19	42	56	2.2	Disagree
It is use for marking and grading	51	67	18	12	3.1	Agree

Table 4 above shows the uses of Big Data management systems by lecturers in Universities in Nigeria based on a 4 point Likert Scale of ranging from Strongly Agree (SA), Agree (A), Disagree(D) Strongly Disagree (SD). It therefore

reveal that Big Data management system issue for analyzing and interpreting research data (3.1), it is use for marking and grading (3.1), it is use to increase lecturers job performance (2.9), it is use to gather information for academic research (2.9) and it is used to store large data (2.8). While the respondents disagreed that it facilitates lecturer collaboration with other lecturers (2.4), it is use to plan curriculum (2.1) and it is use as a basis to examine lecturers ICT skills (2.0).

The results align with the quantitative evaluation of 35 Charter schools' different approaches conducted by Divyakant et al. (2012). One study found that one of the top five practices linked to measurable academic success is the use of big data tools to guide instruction. The data acquired might be used to create the most effective teaching plans, ranging from simple reading, writing, and math classes to more difficult college-level courses. A relational viewpoint claims that big data management systems appeal to higher education institutions because they allow them to strategically use their IT resources to increase performance, increase student resilience, and increase completion rates (Anikweze, 2019).

Table 4: Factors influencing the use of Big Data management systems by lecturers in universities South-South Region of Nigeria

Items	SA	A	D	SD	Mean	Decision
Large amount of data	47	53	27	21	2.9	Agree
Proliferation of technology	54	59	16	18	3.0	Agree
The need of privacy in records handling and management	51	47	24	26	2.8	Agree
variety in Big Data sources	49	62	19	18	3.0	Agree
Complexity of data	42	60	23	22	2.8	Agree
Availability of ICT skills	52	53	18	15	3.0	Agree

Table 4 above shows the Factors influencing the use of Big Data management systems by lecturers in universities in Nigeria based on a 4 point Likert Scale of ranging from Strongly Agree (SA), Agree (A), Disagree (D) Strongly Disagree (SD). It revealed that respondents agree that Proliferation of technology (3.0), Availability ICT skills (3.0), multiple Big Data sources (3.0), Large amount of data (2.9), The need of privacy in records handling and management (2.8) and Complexity of data (2.8) are factors influencing the use of Big Data management systems by lecturers in universities in Nigeria.

This study is consistent with Murumba and Micheni (2017), they identified pressing factors that necessitated the use of Big Data management systems in higher institutions of such are; increase in students and lecturer data, proliferation of ICT tools, the need to get accurate analysis and interpretation of multifaceted data related to the development of university education among others. Also, Kelechi et al (2020) pointed out that university need to be able to predict students' performance, optimize research for development and ultimately promote service delivery becomes a motivation for the adoption of Big Data management tool.

5. Conclusion

The survey on the awareness and utilization of big data management systems by lecturers in Nigerian universities sheds light on the current state of technological integration in higher education. The findings reveal a significant gap in awareness, as a considerable number of lecturers are still unfamiliar with the concept of big data management systems. This point to the need for comprehensive training programs and awareness campaigns to equip educators with the knowledge and skills necessary to harness the potential of these advanced technologies.

Moreover, the survey underscores the importance of addressing the challenges that hinder the effective utilization of big data systems in Nigerian universities. Issues such as inadequate infrastructure, limited access to relevant technology, and a lack of institutional support emerged as barriers that need urgent attention. Policymakers and university administrators must collaborate to address these challenges and create an environment conducive to the successful implementation of big data management systems.

As the global landscape of higher education continues to evolve, the integration of big data management systems becomes imperative for universities to stay competitive and relevant. Nigerian universities, in particular, must embark on a transformative journey to embrace these technological advancements. The survey findings serve as a catalyst for universities to invest in the necessary resources, foster a culture of innovation, and prioritize the integration of big data management systems into academic practices. Ultimately, by bridging the awareness gap and overcoming implementation challenges, Nigerian universities can position themselves at the forefront of educational excellence in the digital age.

6. Recommendations

The study recommends that:

Universities in Nigeria should design and implement comprehensive training programs focused on raising awareness and building the necessary skills among lecturers regarding big data management systems. These programs should cover the basics of big data, its applications in academia, and hands-on training to ensure that lecturers are well-equipped to integrate these systems into their teaching and research activities. Collaborations with industry experts and technology companies can enhance the effectiveness of such programs.

Universities need to invest in the necessary infrastructure and technology. This includes providing access to robust computing resources, high-speed internet, and data storage facilities. Additionally, universities should explore partnerships with technology providers to ensure that lecturers have access to state-of-the-art tools and platforms, fostering a conducive environment for the implementation of big data solutions

Universities should develop and implement policies that support the integration of big data management systems into academic activities

Universities should encourage interdisciplinary research projects that leverage big data for innovative solutions. Additionally, creating platforms for knowledge sharing, such as workshops, conferences, and online forums, can foster a community of practice where lecturers can exchange ideas, best practices, and experiences related to big data in academia.

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