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A Preliminary Study of the Integration of Big Data to Answer the Challenges of Islamic Education in the Technological Age

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***Abstract*—Along with the rapid development of technology, individuals today are required to align every aspect of their lives with the technological developments of the industrial revolution 4.0, consisting of artificial intelligence, the internet of things, and big data presented in society. Notably, it was related to education, including Islamic education, which frequently stereotyped about delays in responding to globalization's challenges. This preliminary study aims to encourage empirical research that is still lacking by exploring the role of big data in Islamic education and combining data from general education that has similar a core. The study focused on using the scoping review method as a part of a literature review. As a result of this study, there are four impacted factors for strengthening the usage of big data: the performance and behavior factors of learning; the storage of education data; the update in the education system; and the use of big data in the education curriculum. Future studies should begin empirical research to elaborate more on these four impacted factors practically.**

Keywords*—*industrial revolution 4.0; the scoping review method; literature review; learning; storage

1 INTRODUCTION

In the recent era of globalization, the need to improve the quality of education can increasingly be felt. Globally, the world of education is now required to adapt to technological developments in an effort to improve the quality of learning. The use of technology is currently considered very helpful because it can meet the needs of learning methods that more effectively and efficiently achieve learning goals [1]. Some research results have shown that the effectiveness of learning using technology is better compared to traditional learning. The use of technology in the learning process makes students more aware of the material being delivered and also makes them more interested in learning [2].

Global representation of technology is seen through technology in the Industrial Revolution 4.0, which generates various forms, namely: artificial intelligence, the internet of things, and big data. All three forms have different specifications. The utilization itself is tailored to the needs of certain disciplines. Big data is one of the interesting things to apply in the context of education. The urgency of big data today in the world of education is related to the learning paradigm. Utilization of big data can help the development of learning strategies (procedures) in order to solve problems or facilitate the learning process [3].

The use of big data can contribute to education in general and Islamic education specifically. Unfortunately, Islamic education itself is often still minimal in responding to this challenge. This refers to the interpretation of the main source of Islamic education, namely the Quran. For a long time, the knowledge of the Qur'an verses is still interpreted as a unidimensional issue that is only related to Islamic studies itself. At the same time, Dr. Mohammed Fouzan Nour Al-Din explained in his book "ICT and Islam" that there is a strong relationship between big data analysis and the Quran. Furthermore, interpretation in the Qur'an can be the thing that directs the resolution of issues in other fields of science because of its rich nature with various data points. Unfortunately, researchers in the Islamic education field have not seriously reviewed this [4].

Instead of being ready to face it, there is still a lot of effort that needs to be made to accelerate the role of big data in Islamic education. While the majority of research is still in the conceptual realm, motivating researchers in the field of Islamic education to immediately take the role of technology in the success of learning. The presence of the Industrial Revolution encourages reorientation in aspects of Islamic education as part of research in education. It can further develop big data at the practical level of Islamic studies, hopefully. This study aims to encourage empirical research by exploring the fundamental framework of big data's role in an academic context. In general, big data in the context of education is still seen as a place to store data in a large volume. To achieve the optimization of educational goals, the use of big data in a more specific scope should be one of the focuses. For example, it should be a data analysis tool for various factors supporting Islamic education. This study is expected to provide new loopholes to help Islamic education practitioners utilize big data in a broader context.

Big data itself is data that exceeds the processing capacity of conventional database systems. Data that is too large, moves too fast, or does not fit the structure of the database architecture. In order to get the value of the data, it is necessary to do an alternative selection process [5]. "Big Data" is also a very large dataset that exceeds the ability of database software to manage and analyze it. When people exchange, interact with, and keep an eye on data, they make it bigger. This is called "big data."

Big data has a variety of sources that generate large amounts of data, such as social websites like Facebook, Twitter, Google, and many more sources that produce data every day with large amounts of video, images, text, audio, and so on. Government websites and private companies also generate huge amounts of data [3].

Big data also refers to a very large and complex data set that is growing in number and consists of various types of data that are transformed continuously at a certain speed and must be processed at a certain speed as well. Based on these characteristics, it is not possible for big data to be processed using conventional database management devices or other ordinary data processing applications. An industry analyst named Doug Laney mentioned that big data has three characteristics often referred to as "The 3V of Data": volume, variety, and velocity [7]. a) volume, is a matter of organizing large data, although data can be stored in a data warehouse, it will certainly have an impact on expensive financing; b) velocity, the problem faced by an institution is related to the speed of the data generated; c) variety, in terms of data variation, the problem that often arises is a varied data platform.

The evolution of educational technology today leads to big data personalized learning, which is a development of adaptive e-learning (Adele). Student learning activities through learning management systems can generate large amounts of data that can be used in learning environments, assist students in learning, and improve the learning experience. Educational institutions that use applications to manage courses, classes, and students record data digitally in large quantities. It can contain what students and academics see, what they read, their engagement and behavior, assessments, as well as their interests and preferences, thus providing a huge amount of data that can be dug into for the learning experience. The limitations of traditional data processing applications have led educational institutions to explore big data technologies to process educational data [8].

From year to year, both in Indonesia and in the world, big data phenomena have become an interesting thing to be explored. In addition, empirical research in the field of education in general can help give Islamic education a new way to look at a lot of data for learning. Big data phenomena from year to year both in Indonesia and in the world become interesting things to be explored. In addition, empirical research in terms of Education in general can help provide a

new framework in assessing big data for learning purposes in Islamic Education.

2 METHOD

This study uses a scoping review approach, which is one part of the literature review. The scoping review method itself becomes a method that is focused on looking at dynamics in big data topics in education. More specifically, the role of big data targets in Islamic education still dwells in the context of awareness drives to respond to the challenges of the times, but on a practical level, does not get much attention. All sources are taken from empirical research results, either qualitative or quantitative approaches, presented in the form of journal articles. The sources are not older than 5 years ago, in the range from 2017 to 2021. The total number of articles is 24, consisting of 15 journal articles that are international articles while the remaining 9 are national articles. The method overview in this scoping review refers to some of the stages below and described by Fig. 1.

2.1 Literature Search

All sources are collected from various journal publishers using the Google Scholar search engine or by referring to the journal provider's website directly. The listed journal articles are from international and national journals. The international journal publishers are Springer Link, IEEE Xplore, Crossref, Hindawi, Inderscience Publishers, IOP Publishing, Emerald Insight, Multidisciplinary Digital Publishing Institute, Themes in Science and Technology Education, The Light of Islam, Taylor and Francis, and ResearchGate. While the national journal providers come from most universities in Indonesia.

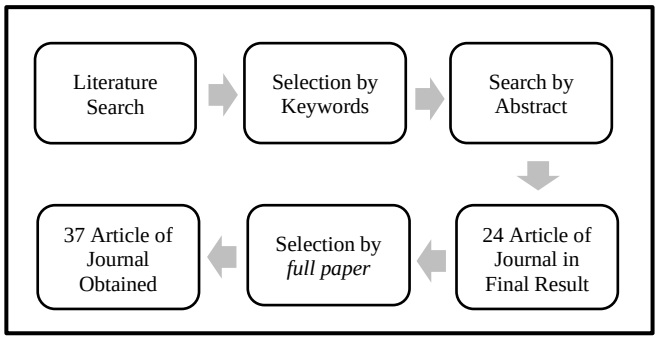

Figure 1. The Step of Literature Selection

2.2 Selection by Keywords

Some of the keywords used to do journal article searches were “big data for Islamic education”, “big data in empirical setting for education”, “detect learner performance with big data”, “big data in education”, “big data for education curriculum”, “education sector potential for big data”, “big data era”, “big data education assesment”, “big data challenges education”, “big data for creative teaching”, “big data acedemic performance of students”, “big data in academic”, “big data in education digital future”, “pendidikan”, “pembelajaran”, “prestasi belajar”, “motivasi belajar”, “teknologi informasi dan komunikasi”, “teknologi informasi”, “penggunaan manfaat teknologi”, “agama islam”, “persepsi pelajar”, “strategi komunikasi”, “belajar mengajar”, “pendidikan islam”, “pendidikan modern”, “modernisasi islam”, “tanggapan peserta didik”, “pembelajaran pendidikan agama”, “media pembelajaran”, “penggunaan teknologi informasi”, “big data”, “memanfaatkan big data”, “penggunaan multimedia”, “kemampuan belajar”, dan “media pembelajaran”.

2.3 Search by Abstract

All articles based on keywords are selected by an abstract. The categorization process is done by involving reference management. The whole article journals match with keywords and through abstract readings will enter into reference management and will go through the download stage in the full version. At the end, 24 journal articles were obtained.

2.4 Selection by Full Paper

Based on 37 journal articles, we found 13 articles that did not fit the criteria in the final selection of journal articles. As for impact, only 24 journal articles entered the stage of analysis of results.

2.5 Integration Data

Big data in the education sector that is able to be realized in the form of big data analysis has contributed to solving educational problems. This is evidenced by the adoption of big data at Georgia State University, which experienced problems in the form of not impacting big data for a period of 10 years, taking students. This data has absolutely no significant impact on conducting analysis for the sustainability of education in institutions. However, using big data analysis, it significantly showed an increase in the number of students who dropped out. Even through the analysis of big data, universities can find a certain amount of revenue increases when compared from year to year [9].

Through this data, it can be seen that a university’s work becomes easier in taking policies to improve the quality of learning. Based on this, the urge to evaluate every aspect of learning becomes clearer. If institutions were only based on existing raw data in the absence of effective action to process the huge amounts of data taken from thousands of students each year, it would take a lot of time. This big data analysis makes it easier for people to get raw data and process it quickly, which makes policy analysis to improve the quality of institutions more accurate and can be used as a preventative measure for new educational problems.

This is known to be one of the roles of big data in the education sector. So, the elaboration of the use of big data in the context of education and other educational issues becomes more crucial.

All journal articles that have been selected through the selection process move on to the process of data integration. This integration aims to map the problem for analysis. Based on the origin of the journal article, two categories are either international or national and provide a more specific description of this study. It will also facilitate further analysis after finding various similarities and differences in the problems seen by both.

3 RESULT AND DISCUSSION

3.1 Result

Results in each empirical study, as shown in Table 2 and Table 3, are classified into two forms. The first form is the result of an international journal article, while the other result is an analysis from a national journal. The entire analysis is delivered in table form to clarify the critical points of each study from year to year, sorted from the bottom of the year. After the analysis of important points is done, the next step is the final synthesis of the results, which is called the next step.

Table 2. Results of Critical Analysis Based on International Journal

Journal	Critical Analysis
British Journal of Sociology of Education	Aspects of customization, better content provision and rapid data acquisition are key in qualifying in big data [10].
Industrial and Commercial Training	The level of education will affect the complexity of big data work. In higher education, some aspects are reporting and compliance, analysis and visualization, security and risk prevention, predictive analysis [11].
10th International Conference on Measuring Technology and Mechatronics Automation (ICMTMA)	Big data in education contributes to the evaluation of learning efficiency. Innovation in big data usage can be a novel parameter in teaching [12].
IEEE Global Engineering Education Conference (EDUCON)	Analysis with the help of big data can contribute markedly to performance [13].
Journal of Physics: Conference Series	COBIT 5 as a one of big data results generates assessment for making policy in academic settings [14].
2019 6th International Conference on Research and Innovation in Information Systems (ICRIIS)	Big data analysis at every level of education demands variety in generating technological frameworks [15].
Computers in Human Behavior	Big data has become a part of decision-making in the field of education [16].
Evolutionary Intelligence	Big data becomes an analysis tool to predict learning output specifically study performance [17].
International Journal of Continuing Engineering Education and Life Long Learning	The accuracy of the use of data that is often polemic can be overcome by setting the appropriate algorithm [18].
IST-Africa Conference	The Importance of big data is not in a doubt. In fact, the equality with stakeholder is still lack [19].
Social Sciences	Big data can be a supportive means in the education process desired according to individual tastes [20].
Mathematical Problems in Engineering	Curriculum targets predicted towards intelligent curriculum in the future [21].
Entrepreneurship and Sustainability Issues	Big data can predict educational phenomena [22].
IEEE Transactions on Emerging Topics in Computing	Big data can be a means to carry out correlations in an academic context [23].
Technological Forecasting & Social Change	Big Data becomes an essential facilitator for High Education Institution when used to improve performance in university [24].

Table 3. Results of Critical Analysis Based on National Journal

Journal	Critical Analysis
Jurnal Sains dan Teknologi	The lack of role in big data among students when making an argumentative task although online learning became the only one approach to encourage learning in schools for couple years ago [25].
Jurnal Teknologi dan Terapan Bisnis	Mobile campus portal as new breakthrough on online learning experience [26].
PERDIKAN (Journal of Community Engagement)	Islamic education learning solutions must be reorienting the curriculum that is adapted to the existence of the industrial revolution 4.0 with integrated assessment with some of processes, for instance: learning is more contextual than just textual, digital literacy, mix learning process with e-learning, and hidden-based learning curriculum [27].
Pre-Print Digital Library UIN Sunan Gunung Djati Bandung	There is a crucial point related to Islamic online learning in this era of big data revolution explosion namely scientific information management into the systematic knowledge. Through the utilization of big data, systematic knowledge is formed in the preparation of proposals, writing scientific articles, and practical knowledge of hadits research. This systematic knowledge has been implicating into a collective intelligence [28].
Al Marhalah: Jurnal Pendidikan Islam	A significant relationship can be seen between the effectiveness of learning technology and the learning interests of Islamic Education students [29].
AL-USWAH: Jurnal Riset dan Kajian Pendidikan Agama Islam	There is a significant difference based on the teacher's last education, because judging from the teacher's education period against mastery in the field of technology when teaching [30].
Seminar Nasional Teknoka	Big Data becomes a fast data processing opportunity that in order to produce important information, such as student learning success and student performance [6].

Journal	Critical Analysis
JEP (Jurnal Eksakta Pendidikan)	Some teachers have not prepared themselves carefully for changing times and lack of literacy related to technology [31].
Journal of Social Sciences and Technical Education	The use of multimedia technologies such as animation, visuals, annotations of real presentations according to real situations or simulations, audio, and text can be an alternative teaching in the field of Islamic education [32].

According to the results of data integration in both critical analyses, four main factors were identified as factors that have a significant impact on this study: First, performance and behavior in learning, which include teacher performance, predictors of learner performance, efficiency and effectiveness of learning; secondly, the storage of educational data, in which it focuses on technological frameworks; thirdly, updates in the education system that include data speed, data analysis quality, data security, data accuracy, and systematic knowledge; and lastly, curriculum development.

The results of this discussion show two important issues about big data that differ from the source of the study and the year of research. By looking at Fig. 2 at the source of research acquisition, we found several factors of big data that became an extension of the role of big data in the educational context.

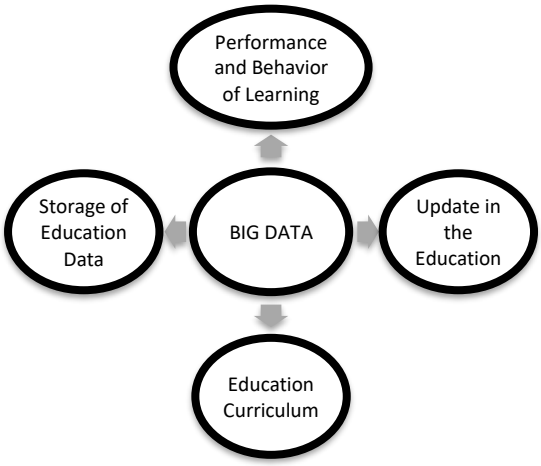

Figure 2. Synthesis of Critical Analysis Results

The focus on the use of big data in Islamic education today which is still trying to answer challenges can at least be illustrated from the existence of Islamic education as part of education in general. Through four factors that are the determining element of the successful optimization of big data, it can then be adjusted to the needs of Islamic education. The system that is currently developed in the education especially because the presence of learning management system since covid-19 hits the world, it has become the main source of digital alternatives so that it can be used as raw data containing kind of information to update the education system at related institutions. While for the development of curriculum and performance and learning behavior also has a similar elaboration tendency.

3.2 *Discussion*

The common function of big data refers to managed, stored, and then used in the world of education, namely DAPODIK. Data Main Education, or DAPODIK, is an integrated national-scale data collection system and is the main source of national education data, which is part of the national education development program to realize smart and competitive Indonesian people. Because without careful educational planning, the entire program formed as a result of the planning will fall far short of the expected goal [33].

The strong influence between performance in higher education and that resulting from the analysis of large datasets will lead to decisions. The role of data in decisions also known as data drive decision making (DDDM) consists of 3 main concepts namely is big data analytics technological capabilities, big data analytics organizational capabilities, and big data analytics people capabilities. It can be concluded that bringing these 3 main concepts together refers to the combination of organization, technology, and human resources in it. Each of these key capabilities has several dimensions to further represent each area. Big data analytics technological capabilities contain dimensions of connection, compatibility, and modularity, while big data analytics organizational capabilities contain dimensions of coordination, investment, planning, and surveillance. As for knowledge of relationships, processes, and technical and technology management into dimensions that meet the concept of big data analytics capabilities, big data analytics technological capabilities protect the dimensions of connectivity, compatibility, and modularity, while big data analytics organizational capabilities protect the dimensions of coordination, investment, planning, and supervision. There is a knowledge of relationships, processes, and technical and technology management into dimensions that meet the concept of big data analytics people capabilities [34].

Big data techniques can be used in analyzing learning in ways such as: first, performance prediction refers to student performance; it can be predicted through the analysis of student interaction and student interaction with teachers in the learning environment. Second, attrition risk detection through analysis of student behavior. It is possible to detect and measure students who drop out of learning, and that is done at the beginning of learning to minimize the risk of drop out. Third, data visualization is a report on educational data that will continue to grow in size and become complex. The data can be visualized using visualization techniques to make it easier to identify data trends and relationships between data only by looking at the view of the report. Fourth, intelligent feedback is a learning system that provides intelligent feedback to immediately respond to student input and improve interaction and performance. Fifth, the course recommendation is a new study program to be able to

recommend the interests of students identified by analyzing their activities and ensuring that students do not get lost in choosing a field of study they like. Sixth, student skill estimation is an estimate of student skills achievement. Seventh, behavior detection is a way to detect student behavior in their environment based on activities and play patterns that help develop students. And lastly there are applications grouping and collaboration of students, social network analysis, developing concept maps, constructing, courseware, and planning and scheduling.

Big data analytics can periodically analyze student experiences on campus, such as lecture registration, payment, classroom participation, online learning, and assessment. The use of analytic big data includes analytic learning, academic analytic, and mining processes [8]. Learning analytics is the analysis of learning data periodically to estimate the success of students and students who are at risk in academics. With big data applied in college, we can take precautions for students who are at risk of dropping out of college or provide support to increase success and confidence during the learning process before they fail [8]. Learning analytics provide tools, technologies, and platforms to empower educators and open the gate to meaningful learning experiences that can engage, inspire, and prepare current and future students for success [8]. Academic analytic is a periodic analysis of academic staff performance in order to identify academic staff who have achieved and those who have less ability to run [8]. The mining process, which is the process of analyzing periodically using log data or data on the activities of students, lecturers, and related units in the college. With this, it can generate new business and also has the possibility of being able to conduct conformity inspection processes, detect irregularities, estimate delays, provide decision-making support, and recommend redesigning the process [8].

There are needs and some issues that must be considered in the implementation of big data in the field of education and research. Data privacy is the way a person has control over the level, time, and circumstances of sharing (physical, behavioral, or intellectual) with others. Data protection, also known as information protection, is the ability of an organization or individual to determine what data about them can be shared on a computer system. Second, confidentiality refers to the treatment of information disclosed by an individual in a relationship of trust and the expectation that the information will not be disclosed to others without permission in a manner contrary to the understanding of the original disclosure. Third, data security, which is closely related to the extent to which data is stored and used, is protected from illegal access in the event of theft or other unauthorized access to data with sensitive personal data that could potentially compromise data confidentiality. Fourth, there is a security breach when there is a theft or other unauthorized access to data that contains personal information that could be used to break the rules on data confidentiality.

As is known, the data contained in big data includes text, audio, video, social media, and predictions. The analytical methods used for each type of data in big data are described below.

- Text Analysis (Text Mining).

Text analysis is a technique for extracting information from text data. Text analysis includes statistical analysis, computational linguistics, and machine learning. The process of text analysis involves converting large amounts of text data into meaningful summaries that ultimately aid fact-based decision-making [35]. Some methods of text analysis include information extraction (IE), which is a technique of extracting structured data from unstructured text (e.g., extraction of drug names based on medical prescriptions). Then there is a technique of summarizing text (text summarization), which produces the most concise summary of one or more documents, and the summary contains key information contained in the original text. Furthermore, there is the technique of answering questions (QA) with an approach based on information recovery (IR), knowledge-based, or a combination of both, and finally, the excavation of opinions (sentiment analysis) with sentiment analysis techniques analyzing texts that contain people's opinions of entities such as products, organizations, individuals, or activities [36].

- Audio Analysis

Audio analytics analyzes and extracts information from unstructured audio data. Applications in human spoken language are known as "speech analysis." Speech analysis uses two technical approaches: a transcription-based approach (commonly known as Continuous Long Vocabulary Speech Recognition, or CVCSR) with two stages: indexing and searching processes; Also, phonics-based approaches work from sounds or phonemes [36].
Video Analysis

Video analysis, also known as video content analysis (VCA), consists of a variety of techniques for monitoring, analyzing, and extracting meaningful information from video footage. Although video analysis is still new compared to other types of data mining [36], various editing techniques have been developed to process periodic and recorded videos.

- Social Media Analysis

Social media analysis is understood as the analysis of structured and unstructured data obtained from social media channels. "Social media" has a broad meaning that includes a variety of online platforms that allow users to create and exchange content. User-generated content and links and interactions between networking entities are the two sources of information on social media. Based on these categories, social media analysis is classified into two groups, namely:

- Content-Based Analysis

  Content-based analytics focuses on data submitted by users on social media platforms, such as customer feedback about product reviews, images, and videos. Social media content is often large, unstructured, vulgar, and dynamic. Social media analytics can look at text, audio, and video to get information from data.

- Structure-Based Analysis

  This type of analysis focuses on the synthesis of the structural attributes of social networks and the extraction of intelligence from relationships between connected entities. The structure of social networks is modeled through a series of nodes and edges, each of which represents participants and their relationships. The model is displayed as a graph consisting of knots and edges. There are two types of network graphs: social graphs and activity graphs [36]. In social graphs, the side that connects a pair of knots shows only the existence of relationships (e.g., friendships) between related entities. In a business network, the edge represents the actual interaction between a pair of nodes. Such interactions can take the form of information exchanges (such as likes and comments) [36].

- Prediction Analysis

  Prediction analysis compares various techniques of external prediction based on historical and present data. Regression techniques (like multinomial logit models) and machine learning techniques (like neural networks) can be broken down into two groups: regression and machine learning [36].

Aspects of the educational curriculum can also be developed with the existence of big data. One of them is shown by the utilization of the Dick and Carey model that fully uses big data technology. The curriculum is structured starting from the identification of various objectives needed and continuing through the analysis stage to the content studied as well as the characteristics of learners. Development of some instruments also fills certain spaces during the curriculum development process. The last stage goes into the evaluation of the pre-designed design [37].

The development of technology today in the era of big data contributes to the field of education in the form of changes in someone who learns online. An optimistic view of an information-rich future becomes a futuristic view of big data. Today (in the era of big data), students as well as teachers promise learning by operationalization (personalized learning), providing fast formative values (responsiveness), and establishing cooperation [37]. Big data in education can be analyzed as accessibility and duration of time for adaptive teaching and learning profile development, such as providing records on activities and interaction relationships in digital media and events in digitally connected learning environment conditions [37].

Teacher as a primary medium in the learning process, receiving a novel challenge from time to time. Especially since technology has become an unseparated aspect of education. One of the demands for teachers is obtained through innovation and development. A teacher's professional development consists of [38]:

- Professional belief

  Referring to teachers as being free in choosing the concept of education,

- Professional Knowledge

  Ensuring that the teacher's expertise is appropriate for transmitting knowledge.

- Professional Ability

  The ability to act professionally means both general and specific ability. Specific here in terms of allowing themselves to develop special abilities that support the needs of teaching and learning activities.

- Professional Ethics

  Referring to the ethics code

- Professional Character

  The teacher's background is good in terms of the education undertaken by teachers. Teaching activities related to the quality of teaching in the classroom

- Professional Wisdom

  Wisdom in teaching is not an element obtained instantly. However, it generates various valuable experiences and values during teaching.

Each of the six professionals for a teacher has a different point of view when faced with today's big data situation as a challenge. There are strategies that can be considered to improve quality, starting with increasing awareness of big data. Since there are still many who have awareness in this regard, this is realized by knowing and understanding the scope of big data in the education context while practically Human resources in education can collaborate with experts in the field of information systems technology. Some of the aspects referred to here are: making ourselves able to use big data intelligently, managing and adding new existing data, actively building big data systems that rely on their own concepts to avoid duplication of the system, and looking for new solutions to the problems faced during this phase.

- Teachers can use online learning media to improve their teaching skills. Because of the existence of teaching materials that collaborate with teachers that are not limited in space and time, the exchange of information, for example, in teaching materials, teaching methods, media, new knowledge, current and other issues in teaching, becomes increasingly interactive and time.

- Facilitating self-improvement in the ability to analyze data. This opportunity has increasing potential even as the

MOOC (Massively Open Online Course) program becomes more massive. All the information inside can be used to be the main raw data in conducting analysis of various components that want to be known.

- Teachers need to direct careers that are futuristic. This visionary state becomes more apparent with a lifelong learning mindset. This mindset will lead a teacher to construct knowledge and evaluate old thoughts with new ones.
- Efforts to realize novelty in abilities and knowledge can be supported by training. As a teacher, self-esteem is the main thing that needs to be considered continuously as a teacher to achieve the goals of the profession as a teacher. There are several steps that need to be mastered to run the analysis process with large data [36].
- Vision & Planning. Plans and visions must be made to keep the analysis process moving in the right direction so that the goal of getting analytical results can be met.
- Scalability. This component refers to efforts to consolidate scattered data.
- User-Friendly Interface. This section ensures that technology system-based analysis can be easily understood by any individual and every circle, even though the design and direction of development seem sophisticated.
- UpToDate. Always pay attention to the novelty aspect by following the development of technology in the process of developing analysis with big data.
- Real-time collaboration. One of the advantages of using large amounts of data is the tendency to get data in the network that is not limited to just the portals we have but also receives data that is not limited to the issues being analyzed. So, the limit to data is something that is not recommended because it will prevent interaction between data users who want to share data.
- Installation, maintenance, and rapid upgrades. Any individual who has an interest in using data online can do what they want even in terms of installation, maintenance and speed improvements and can even be dispelled by others who do not directly perform data analysis.
- Reliability and security. The principle of security is important to maintain the data. So, collaboration with IT companies will have a very significant impact on realizing this goal.

The purpose of big data in the world of education is to improve the quality of decision making, setting goals, supervising, planning and scheduling, selecting, designing curriculum, identifying and addressing problems, and research objectives. The goal becomes a focus resulting from the combination of organization, ethics, and social implications, which are elements that affect the usage of technology [39].

Algorithms in big data are able to see which positions in the lesson part are difficult to understand. The data can be presented in real-time so that it can be monitored directly and provide an overview of the lessons that are being carried out. Applications in big data allow for the monitoring and evaluation of an even broader range of students' actions, such as the intensity of time they devote to reading, obtaining electronic resources, and the time it takes them to master a concept. This can provide an input to a lesson that is undertaken so that students can determine their own changes related to reading patterns and learning patterns to overcome the problems faced and influence an increase in learning outcomes. Big data analysis is also able to provide an overview of the quality of learning from a student, and if it is associated with repeated test performance, the teacher will be able to further analyze what his student knows and find out what techniques he thinks are most effective for his students. Students will be able to learn in a more varied way by focusing on data analytics [3].

In addition, Islamic education is a conscious effort in the formation of an ideal human character, starting from the standpoint of planning, structuring, organizing, and also systematic. But until now, the problem of Islamic education related to conceptual and practical implementation is practically unresolved. This stereotype suggests that Islamic education still lags behind general education more than digital technology education. Here we need to do the formulation, which is the actualization of planning. Planning here is done by looking at internal and external conditions using critical analysis. Planning in determining the function of education must be accompanied by transformative concepts that can make the improvement and development of a nation's educational journey dynamic and adaptive. This means the critical struggle over the development of Islamic education cannot be separated from the problems of education globally. One of the biggest global problems today is big data. With these problems, it is necessary to be appreciative towards the transformation of Islamic education so as not to be left behind in the course of the education of the Indonesian nation, especially [40].

Big data Islamic education through Islamic da'wah activities becomes the solution to Islamic education's problems. The big data about profiling scholars is very important and needs to be appreciated by the government, which in this case is the Ministry of Religious Affairs of the Republic of Indonesia, which has initiated and initiated the profiling idea. Thus, the government and the community can quickly and easily know the regulation of da'wah, or implementation of Islamic education in the midst of society, which can then be easily analyzed to implement. The Da'wah carried out is still on the same path or off track so that the anticipation will be able to make it easier for the government and the public to know the regulations and development [41].

In an effort to improve the harmonization and implementation of Islamic education in the community, the government made a policy of big data profiling ulama (certification of scholars). Big data profiling of scholars

issued by the government gives birth to pros and cons because they also have privacy rights that need to be respected, the right to express opinions in public and so on. While others assume that big data profiling scholars is one alternative step so that the government and the public can get a complete picture of development and progress.

These individuals and internet-related interactions will result in opportunities to measure and understand human behavior. Basically, the internet allows a person to obtain large amounts of data. Even if individuals do not try to analyze it, they can easily access thousands of existing datasets. But without a science, all the accessed data cannot be meaningful when the purpose of data acquisition is to conduct an analysis of human behavior that is effective so that it can be concluded. Therefore, there is a new face in science called data science.

The main stage of data science that is related to big data is scrapping data. Scraping this data can be done through a variety of data dissemination networks, like social media, websites, mobile web hosting apps, video, audio, emails, financial communication, and many more [24]. These networks can be used to get this data.

If implied by the use of data science in Islamic education, an example is from the interpretation of many mufassir in a qur'anic verse. Or also knowing the behavior of Muslims by using social media analysis, issues about Muslim women's views on the Quran's perspective mean the role of women that today can be used to analyze gender in each individual, negative views about Islam phobia and various phobias that have strengthened since there is negative propaganda from westerners. Various other Islamic and educational issues can also be captured according to your needs. Of course, because the process that must be passed is a systematic process, it requires practitioners in the field of data science to utilize big data that starts with a research plan [40].

Islamic educational institutions deserve to be the potential element through their existence in a golden age of civilization. Meanwhile, this long-standing challenge fosters a desire to investigate the strength of Islamic institutions, despite the fact that Islamic education is frequently regarded as a secondary option for affording education in general [41].

The principle of working with big data is that by knowing more things or understanding various conditions and situations, it will be faster in gaining new insights and estimating the future. This condition is obtained from the distribution of irregular data. The mechanism is first by structuring the data. The characteristics of data included in big data make processing difficult for humans. Machine learning and artificial intelligence are used to carry out the process [42].

4 CONCLUSION

As an initial step to starting empirical research in Islamic education. This preliminary study has provided a key framework for facing the challenges of the industrial revolution in this context. The main framework is contained in four main factors, for instance: performance and behavior factors of learning, the storage of education data, the update in the education system, and the use of big data in the education curriculum. Bg data in an academic setting is still considered narrowly as data storage in huge volume. Those are reflections to be combined with big data technology. This innovation process should also keep an eye on new sub-topics on big data that are to be developed, so that the development of this technology can remain in harmony with the needs of Islamic education and education areas today without denying care to old sub-topics that have been developed. Future studies should begin empirical research to elaborate more on the four impacted factors practically.

AUTHOR'S CONTRIBUTION

Sarah as the first author contributed to ensure the whole content of this article according to research objective both technically and conceptually. Fadli as the second author supported the description in results and discussion and Dinne as the third author supported detailed information in discussion mostly.

COMPETING INTERESTS

Based on the publication ethics of this journal, Sarah, Fadli, and Dinne declare that this article is free from conflict of interest.

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