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Analysis of The Best Strategy for Great Education Policy Using Prescriptive Analytics (Indonesian School Experience)

Marjuni[1]*, Adly Rosyad Fudhulul Ulwani[2]

[1]Institut Agama Islam Riyadlotul Mujahidin,
 Ngabar, Ponorogo, 63471, INDONESIA

[2]Universitas Airlangga, Jl. Airlangga No.4 - 6,
 Airlangga, Kec. Gubeng, Surabaya, 60115, INDONESIA

*Corresponding Author

Abstract: This paper discusses an analytical prescriptive approach to analyzing education policy. This study uses an appropriate literature review method so that the results of the study are in the form of an overview based on a critical analysis of the subject matter of the benefits of prescriptive analytics in the field of Islamic education management. The main issues discussed in this study include a prescriptive analytics approach as an educational policy analysis approach, a prescriptive approach model in education policy analysis, and the advantages and disadvantages of a prescriptive approach in education policy analysis. This study finds that a project manager must undertake prescriptive analytics today and in the Industry 4.0 era. However, managers have a weakness in skills in this area because the future of data analysis is prescriptive, despite the impact of the obligation to change management. Research advises education managers to realize that prescriptive analytics is not always correct. Prescriptive analytics products can only be applied to one educational institution. However, the domino effect of prescriptive analytics has many benefits for educational institutions, both tangible and intangible.

Keywords: Prescriptive analytics, analytical approach, education policy

1. Introduction

1.1 The Importance of the Prescriptive Analytical Approach in Educational Decision Making

Prescriptive analytics is a less mature area of business analytics than descriptive and predictive analytics. Prescriptive analytics is the next step in optimizing upfront decision-making after increasing data analytics maturity, reviewing the existing literature on prescriptive analytics, and reviewing the main methods of its implementation [1]. Analytics has progressed from providing rudimentary descriptions of what happened to insightful analysis of what is likely to happen in the future to now recommending specific actions to produce predictable results. Prescriptive analytics is the last order of analytics, prescribing actions based on desired outcomes, given specific scenarios, and past and current events. The ability to manage outcomes through prescribed actions improves decision makers' effectiveness and reduces risk in the decision-making process. Strategic decisions can now be made based not only on what has happened or is likely to happen in the future but also on prescribed actions based on why and how things happen to produce desired results.

Why did certain education policies fail, and who was to blame? What factors influence the development of public education policy? There has been a lot of research done on policy analysis. This broad term refers to a variety of approaches, including an extension of the investigative form in which policy procedures can be identified and reconstructed. Leadership and school improvement, master's development and master's quality, employability skills and abilities, equity in education, goodbye management, quality assurance, civic education, curriculum, management, and administration are examples of broad themes covered by educational research. Policy-makers must put all of this into

action. Policies, in particular — the current analytical framework does not adequately account for the complexities of policy development procedures [2]. Policy analysis in education should recognize the various levels at which policy development occurs, the various educational institutions involved, and the significance of a specific cultural context. This paper examines approaches to education policy analysis, focusing on the prescriptive approach [3].

Policy implementers and users should not underestimate the policy because it must be carefully and rationally considered. Policy analysis is an undeniable requirement for achieving high-quality education [4]. Educational policy analysts must be proficient in research and development techniques. An education policy analyst's expected competence is mastery of relevant educational issues [5]. Educational issues can arise within the confines of the education system and its constituent parts, let alone on a regional or even international scale. According to data released by the Ministry of Education and Culture, the following are critical national education issues to address at least through 2022: 1) Universal Quality Education (Quality Education for All), 2) Digital Technologies in Education (Digital Technologies in Education), 3) Solidarity and Partnership, and 4) The Future of Work After the Pandemic [6].

The ability to analyze. In public policy analysis, there is a model to test public policy. Using this model is very useful because it is a complex process. Models serve to simplify and understand this complex reality. They must identify complex realities, explain them, and predict possibilities, offering concrete solutions. The long-term variability of organizational change for the coming period, as well as the required commitments and strategic actions involving adaptation and mitigation measures, will usually depend on the scenario. Mitigation of organizational change, member welfare, and human resource development are the basic commitments of sustainable development goals. However, the goal of sustainable development cannot be achieved without the collaboration of all interested parties. Therefore, this is an important issue in the literature regarding public policy. Within this scheme, special issues in Educational Analysis and Policy should seek to publish high-quality research results that assess, not only at national and international levels but also at micro and macro levels, the future possibilities based on critical factors, such as educational activities, structure social, technological progress, governance, and institutions. It also gives priority to studies evaluating the impact of possible organizational change scenarios on risks driven by human behavior in the era of Industry 4.0 and Society 5.0, social and environmental issues, natural resource management, the impact of organizational change on developing countries, sustainable finance, and implementation of education policy.

Policy analysis must empower education providers to make quicker, smarter, and more effective decisions that generate greater value. The analysis of education policy cannot be separated from the analysis of other fields. It occurs because education policy analysis is a task that requires analysts to have a comprehensive understanding. This comprehensive understanding takes the form of knowledge mastery in fields other than education, such as the social, economic, political, cultural, technical, information technology, and even health/medical fields. It is difficult to formulate a policy that requires compliance with all relevant factors in every field.

In decision-making, education should be subject to the integration of a comprehensive analysis. In response to the Industrial Revolution, descriptive analysis, predictive analysis, and prescriptive analytics have become the focus of the current curriculum. 4.0[7]. However, research interest in prescriptive analytics, which attempts to determine the optimal course of action for the future, has increased. The next step in enhancing data analysis maturity and streamlining decision-making during performance improvement for education management organizations in government and society is prescriptive analytics.

1.2 Research Problem

This paper discusses a prescriptive method for analyzing quality education policy. In education policy analysis, a prescriptive approach has developed recently. This paper also clarifies the study of the field of prescriptive analytics, but it does not discuss the synthesis of a literature review in order to identify the challenges associated with studying this field. Nonetheless, this paper has outlined prescriptive directions for future research in the field of education policy analysis.

The main issues discussed in this study include 1) The Prescriptive Analytical Framework as an Approach to Education Policy Analysis and 2) The Importance of a Multidimensional Approach to Policy Analysis Model with a prescriptive approach for education policy analysis, 3). Analysis of the pros and cons of a prescriptive approach to education policy.

Analysis of Islamic education policy attempts to examine these issues by weighing the benefits and drawbacks of various short- and long-term aspects. Analysis of education policy involves authentic, valid, and pertinent data for educational purposes. In-depth research yielded accurate, valid, and relevant information. The results of this study are intended to provide important information that can be considered when making decisions regarding education policy.

2. Materials and Methods

2.1 Materials

Library research employs library materials. This is a technique for collecting data that involves learning and comprehending data from books, theories, notes, and documents that are closely related to the problems. A general or specialized library collects resources for in-depth research projects. Generally, research libraries will contain scholarly

and nonfictional materials. Books, periodicals, journals, newspapers, manuscripts, and cassette tapes were traditionally included. This has evolved with the advent of technology to include C.D.s, DVDs, Ebooks, audiobooks, and online research catalogs [8].

2.2 Methods

This study employs the pertinent literature review methodology to produce a critical analysis description of the subject matter of the advantages of prescriptive analytics in the field of Islamic education management.

Observational, experimental, simulational, and derived data are the four primary types based on data collection methods. Seven steps are used for effective library research: 1) Choosing the topic; 2) Identifying keywords that describe the topic; 3) Locating background information, and 4) Writing the introduction. We are utilizing an online catalog to locate books; 5. We are utilizing research databases to locate journal articles; 6. We are evaluating the findings; 7. We are assessing the progress.

3. Results and Discussion

3.1 Results

Analyzing, critiquing, and analyzing data to comprehend and ensure the quality of policies, policy analysis is an interdisciplinary study. Policy analysis, on the other hand, is the process of generating knowledge about and, in the policy process, the principles of presenting knowledge, data, and facts related to the policy submission process [9]. The prescriptive approach is an attempt by science to provide norms, rules, or recipes that can assist users in resolving a problem, particularly a policy problem.

Prescriptions or recommendations are synonymous with policy advocacy, which is a way to create an ideology or generate policy-relevant information and solid arguments for viable solutions, as opposed to being a frightening catalyst for many people's understanding of the high costs of projects and the lack of community participation involved. This working model, according to Dunn, may imply a feasible and qualified replacement or a new perspective.

The substitute model can represent a substantive substitute issue. The implementation of the replacement model is contingent on the applicability of the premise that the legal issue applies to the substantive issue. The model point of view and prescriptive models both refer to the assumption that legal issues do not always have the same significance as substantive issues. In public policy analysis, the distinction between surrogate and prescriptive models is crucial. Policy analysis is a set of activities intended to generate prospects for a public policy model [10].

As is typical for complex activities, policy analysis is a problem-solving discipline that draws on the theories, methods, and substantive findings of the behavioral and social sciences, social professionals, and political philosophy. Policy analysis has existed since the dawn of humanity. Duncan Mac Rae (1976) states in Suryadi and Tilaar (1994) that policy analysis is an applied social science discipline that focuses on rational arguments and evidence to explain, measure, and generate in-depth ideas for resolving public issues. Thus, policy analysis is a method or strategy for maximizing human comprehension and resolving policy issues [11].

The introduction of new quantitative and statistical methods and data summaries has established a promising field in data analysis. Companies can leverage big data analytics in their evaluation and decision-making processes by combining a culture of data-driven decision-making with a strategy for incorporating these knowledge domains. Extensive data analysis enhances learning procedures, assesses efficiency, provides feedback, and enriches the learning experience. It has an effect on the education and learning field. As every online action can be monitored, analyzed, and utilized, there is great potential to improve student learning procedures. First, data analysis techniques can enhance student learning by providing immediate feedback or by enhancing the learning experience. The second application of data analysis is to aid educators.

Using data analysis, teachers are able to more effectively monitor and improve student learning procedures. Utilizing data analysis to evaluate instructor performance is a third possibility. Finally, policy-makers are frequently unaware of how schools utilize available resources to "create" outcomes. By combining structured and unstructured data from multiple sources, data analysis can provide answers for governments seeking a more in-depth examination of school performance. Data analysis in education should not be limited to a single discipline. Economists must collaborate with a heterogeneous team of pedagogical philosophers, computer scientists, and sociologists to debate potential, challenges, and normative considerations by combining diverse disciplines and more comprehensive solutions to foreseen development challenges. This book introduces the topic by presenting various economic perspectives on the application of data analysis in education. This book introduces a broad multidisciplinary dialogue that can make data analysis in education appear as natural as a classroom instructor.

In February 2020, the International Journal of Information Management published "Prescriptive analytics: Literature review and research challenge" by Katerina Lepenioti, Alexandros Bousdekis, Dimitris Apostolou, and Gregoris Mentzas. This study concluded that prescriptive analytics is necessary for the advancement of analytical studies. The authors acknowledge that there have been previous studies on prescriptive analytics as an emerging technique to be used in educational policy analysis while providing clarity on the field of prescriptive analytics research. In a relatively small number of application domains, prescriptive analytics appears to have garnered interest. We are reviewing the synthesis

of literature reviews to identify the challenges of prescriptive analytics studies and to describe future research directions in the field of Prescriptive analytics of education policy.

3.2 Discussions

Education policy research products are the primary source of information in implementing education policy analysis [12]. Consequently, Education Policy Analysis (EPA) is a tool for disseminating educational policy research findings. The distinction between education policy research and education policy analysis is due to the dialectic of the conception of education policy analysis, which can be observed in both education policy research and education policy analysis. Analysis of education policy corresponds to what they perceive as the equivalent of education policy research, namely research on existing education policies. In contrast, education policy analysis occurs prior to the formulation of education policy.

Table 1 - Differences in Education Policy Research and Education Policy Analysis[13]
(Adapted from Simatupang, P. (2017) Agricultural Policy Analysis, 1(1), 1-23)

No.	Aspect	Education Policy Research (EPR)	Education Policy Analysis (EPA)
1.	Target Area	Education	Education
2.	Reason	The client and researcher need to guide	Client's specific requirement
3.	Product	Description of education policy	Education policy prescription
4.	Service Goals	All enthusiasts of related policies and disciplines	Individual or group-specific policy interest
5.	Methodology	Formal scientific method (scientific model approach)	Sintesa teori, hasil penelitian, dan informasi (data) terkait
6.	Ingredient	Primary Data (raw)	Processed (finished) + raw data
7.	Deadline	loose, depending on the emergence of issues	Strict deadlines, depending on specific decision time points
8.	Share	More technical and systematic (scientific publications)	Practical, easy for clients to understand quickly and thoroughly
9.	Disseminate	The publication is open to all parties, not directly to clients	Delivered directly to clients
10.	Common Weaknesses	difficult to "translate" into the language of policy-makers, and there is no direct researcher-user relationship	There is a direct relationship between researcher-policy makers, and the results are according to user needs

Prescriptive is derived from the English word prescribe, which means to determine. Prescriptive analytics is a statistical technique used to generate recommendations and make decisions based on the results of an algorithmic model's computations. This can range from simple automated recommendations for employees participating in online training to recommendations indicating how the instructor or course designer can enhance the course or program design.

To develop and implement a prescriptive analytics solution in public-sector organizations, namely a data-driven approach to placing charge points for electric vehicles. First, we have outlined the challenges associated with leveraging prescriptive analytics for public value by building a strategic triangle and expanding it into a framework to investigate the public value of analytics. Although a challenge related to prescriptive analytics, it is central to the guiding questions we pose as the results of data analysis inform the policy-making process. Successful implementation (which protects privacy) could increase public support for such measures and strengthen the operational capacity of public institutions when faced with similar challenges in the future[14].

With the rise of big data analytics, decision-making requires more assistance to gain momentum. Potentially, the resulting analytical results are inferior. Increasing the efficacy of prescriptive analytics across a broad range of applications by optimizing the decision-making infrastructure. In big data analytics, the application of prescriptive analytics has proven effective. On the basis of input data, it generates precise and contextual recommendations[15]. Because educational institutions within the national education system always intersect with community interests, prescriptive policy analysis is a crucial issue. Due to the complex requirements of the field of technical learning, prescriptive analytics is not widely used in the field of learning and development at present. It is a characteristic of adaptive learning and certain platforms for experiential learning.

Decisions regarding human resource planning made by firms providing contract-based consulting projects reveal that high levels of uncertainty in transactions and revenue forecasts make it difficult for consulting firms to recruit the

appropriate personnel to execute their projects. The model used to solve this issue is a concept-based human resource planning model with robust optimization that enables firms to make dynamic hiring decisions to maximize profits while maintaining flexibility and demonstrating the potential for increased profits through the simulation of accurate data.

The applicable model is Prescriptive Analytics for Human Resource Planning in the Professional Services Industry[16]. The study demonstrates three significant findings: For human resource planning, a robust and adaptable method of optimization is proposed. Deterministically, adaptive methods increase profits and decrease risk. Methods are traceable and effective based on accurate data gathered from international consulting firms.

Margaret Rouse defines prescriptive analytics as "the area of business analytics (B.A.) devoted to determining the optimal course of action in a given circumstance. Importance Prescriptive analytics is a subfield of business analysis that focuses on determining the optimal course of action for a given circumstance. Still related to descriptive and predictive analysis is prescriptive analytics. While descriptive analysis aims to provide information about what is occurring, and predictive analytics helps to model and predict what may occur, prescriptive analytics seeks to identify the optimal solution or outcome based on parameters that are already known.

Prescriptive analytics is a technology-based data analysis that helps organizations make better decisions by analyzing raw data and employing it for any time frame, from immediate to long-term. The prescriptive analytic strategy is based on machine learning techniques that include detailed representations of non-stationary arrival structures and vast amounts of additional data. In particular, prescriptive factor analysis provides information about potential situations or scenarios, available resources, past, and current performance, and suggests actions or strategies[17].

Prescriptive decision science (PDS) prescribes how individuals should make decisions (including a distinctive fusion of the descriptive and normative). PDS supports the development and validation of decision-supporting technology to make it suitable for particular circumstances, balancing considerations of practicable input, useful output, logical coherence, and implementation cost[18]. Prescriptive analytics represents a significant development in analytics. It can improve decision-making and process efficiency by enabling analysts to relate outcomes more closely to particular circumstances. Prescriptive analytics seems to have garnered interest in a limited number of application domains[1].

Rajeev Bukralia provides twelve (12) ideas for achieving success with prescriptive analytics[19], namely: 1) Carefully choose the problem to solve; 2) The model must be cross-validated; 3) Businesses should promote employment; 4) involve professionals in defining business rules; 5) Data should not be used arbitrarily; 6) prioritize data management; 7) Prescriptive analytics is the project to be managed; 8) skills may be lacking; 9) prepare for change management; 10) A model that works for one agency may not work for another; 11) The advantages of prescriptive analytics are twofold; 12) Prescriptive analytics is not always correct.

While Bukralia believes that the use of predictive and prescriptive models holds promise, statistical modeling still has limitations. "*Teachers must be able to account for abrupt shifts in human behavior*,"[20] he stressed. "*The teacher may have had excellent students during this time, but the student's life suddenly changed, and he or she decided to drop out. It would be an abrupt shift.* We *would refer to it as a "mutation*." *It is difficult to predict a significant change in a person's behavior, he explained. "Statistical models cannot account for unpredictable human conduct*."[21]

The common thread between descriptive, predictive, and prescriptive analytics is as follows[22].

Fig. 1 - Common threads of descriptive, predictive, and prescriptive analytics work domain

i.   Descriptive Analysis

Data is the new fuel that has become indispensable to the success of any enterprise. It can provide information and knowledge and direct strategic business owners to the patterns they need to know in order to make quicker decisions. For quicker decision-making, visualization and descriptive analytics are crucial[23]. Understanding the characteristics of the area under study is the outcome of descriptive analysis: what is reasonable/unnatural, what occurs frequently, what stands out, and the relationship between variables and data. Descriptive analytics provide factual information about investigations and events that can be utilized to connect the organization's environment to its activities. However, descriptive analysis alone is insufficient for gaining insight and predicting the future. Concerning oneself solely to the outcomes of such an analysis can mislead researchers and decision-makers. Numerous variables influence outcomes; therefore, it is essential to improve predictions of future challenges through statistical analysis and factual patterns that determine the environment using scientifically validated models. Important factors include data patterns, types of analysis, and attributes underlying predictions. Data affected by unexpected variables, such as the evening occupancy report for this study, will result in inaccurate predictions[7]. Data summarization and aggregation, data mining methods, descriptive statistics, and data visualization are examples of descriptive analysis activities. Examples of applicable questions for descriptive analyses: a) Who are the top ten students in terms of academic performance? b) On which days are students typically tardy to school? What is the average academic performance of every student? d) Does the average academic value of science, and social studies students differ? e) Is there a correlation between full-day schooling and academic performance?

ii.   Predictive Analysis

Descriptive analytics, the most fundamental type, is used by 90% of organizations. Descriptive analytics can be defined most simply by providing an answer to the question, "What happened?" In order to gain insight into how to approach the future, this type of analysis can examine incoming historical and real-time data. Finding the causes of prior significant successes or failures is the main goal of descriptive analysis. The time of the event is what is meant by "past," which could be a month or a minute ago. Descriptive analytics make up the majority of big data analytics used by businesses. The simplest type of analysis describes or summarizes existing data using existing business intelligence tools. As a result, it is simpler to comprehend what is happening and what happened. In this case, data mining and data aggregation are the primary techniques used. On already-existing data, the descriptive analysis applies descriptive statistics, such as arithmetic operations. Investors, shareholders, and management can make sense of the unprocessed data thanks to these operations. The clarity in data can therefore aid in analysis by both individuals and industries. Results of predictive analysis are forecasts about a particular variable based on other variables in the data. Various data mining techniques, machine learning, linear regression, and simulation are a few examples of predictive analytics activities. Using predictive analysis, you can Example questions include the following: a) How many students will enroll in public universities the following year? b) Will the university accept our graduates if there are more exceptional students at the district or provincial level? c) Which university does not currently accept graduates from our institution?

iii. Prescriptive Analytics

The outcomes of prescriptive analytics are suggestions for actions that will maximize our anticipated goals' achievement. Decision analysis, machine learning, optimization, and simulation are a few examples of prescriptive analytics tasks. a) What proportion of students who received a 9 to 10 on the national exam actually attend the pilot school at the provincial level? b) What initiatives ought to be made available to the localities impacted by the zoning regulation? c) How can educational institutions create plans to increase the number of postgraduate students enrolled in medical programs via the Joint Selection to Enter State Universities and National Selection to Enter State Universities pathways? William N. Dunn (2011) asserts that policy analysis includes the following four components[11]. 1) According to the definition of policy analysis as applied social science, it is a reality in the form of precise findings from the science that resulted from the professionalization of the movement of the social sciences. Policy analysis uses research and reasoning techniques, employing types, methods, and techniques of policy analysis, such as descriptive, prescriptive, quantitative, and qualitative methods, or mixed methods. Policy analysis produces and uses information, namely the collection, processing, and use of data as input for decision-makers. This approach is dependent on the political issues raised and their nature; 4) Policy analysis as a method of making decisions is political because it aims to make the best use of information available to it. The prescriptive approach is a method for developing goals that serve as the mainstay of strategy development[24]. This approach can start with analyzing the company's external environment and resources and developing organizational goals. It is followed by developing strategic options for achieving objectives, from which one (or more) we can select decision-making, so executing option[25]. There was descriptive analytics, which uses data to describe current or past situations. Then came predictive analytics, the analysis of data to predict future outcomes. Prescriptive analytics suggest the best options for dealing with this future scenario.

Strategic management requires the development of strategies and the formulation of policies in order to achieve the goals and objectives of the organization. This method emphasizes both internal resources and outside tactics. Strategic

management offers a framework for adapting to the whims of an unpredictable environment and an uncertain future. Establishing a connection between a company's ability to perform and the opportunities and challenges it faces in the wider environment. Determining a long-term course in relation to these resources and opportunities is the focus of strategic management. Additionally, it links organizational resources to opportunities and problems in the broader environment.

Prescriptive analytics looks for the best option among several possibilities, whereas descriptive analysis sheds light on what occurred, and predictive analysis concentrates on predicting potential outcomes. Additionally, this field offers a model for researching them and enables businesses to make decisions based on optimizing the outcome of potential risks or future events.

The third and final stage of business analysis, which also includes descriptive and predictive analysis, is known as prescriptive analytics. However, the first level of business analysis is descriptive analysis. By analyzing historical data, descriptive analysis examines past successes or failures. By identifying the steps necessary to achieve the desired result and the connected effects of each choice, prescriptive analytics goes beyond predictive analysis. Using descriptive and predictive analysis, prescriptive analytics, also known as "the end of analytical skills," makes suggestions for potential courses of action.

Significant advancements in machine learning, simulation, optimization, and system recommendation. Analysis of uncertain decision-making from the perspective of textual analysis. Prescriptive Analytics hot fix update refresh was anticipated to become more common. Data retrieval necessitates immediate action. We need to know what to do and when to take prompt, deliberate action. Prescriptive approaches to the analysis of education policy have gained popularity because they enable quick, accurate, and forward-thinking decision-making. Prescriptive educational institutions compete fairly thanks to sophisticated data distribution, administration, and processing. In business scenarios, next-generation analytics tools will be able to spot risks and potential issues, suggest solutions, and aid business users in making decisions in real-time.

4. Conclusion

Descriptive analysis is a traditional form of business intelligence (data-to-knowledge systems) and data analysis that aims to provide an overview or "summary view" of facts and Fig.s in a format that can be understood, either by unit or entity. This is the key distinction between descriptive, predictive, and prescriptive analytics. To report on historical events of organizational performance, it employs two fundamental strategies: data collection and data mining. It offers historical data in an approachable format that will be useful to a large business audience. Predictive analytics has developed into a middle ground in the development of data analytics, despite becoming a recent tech buzzword. The two types of data analysis previously mentioned are combined in prescriptive analytics (descriptive and predictive). The use of big data and computing to produce instantaneous responses is the key to prescriptive analytics. Prescriptive analytics has a number of traits, some of which are as follows: It is highly accurate in providing solutions to the issues at hand, but it still needs cross-validation. In order to drive high organizational performance, prescriptive analytics is required. Because the nature of the data is not general and crucial for administrators, it is imperative that their educational institutions have experts to determine the working rules of the administration of educational institutions. Even if the head of the educational institution lacks expertise in this area, the project of prescriptive analytics will be handled by the leader of the institution. But when we conduct research, we must alter our course. The results of the research can only be applied to one educational institution, but the impact of research has numerous positive effects on educational institutions, both obvious and subtle. Leaders of educational institutions must understand that prescriptive analytics still has a number of flaws for this reason.

Acknowledgement

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