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Research Article

Decision-Making Model with Game Theory Algorithms in Education

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Abstract.
Information was obtained through an interview with a headmaster and regional coordinator, revealing that the subject was manipulated within a game. The convergence of the research results shows collaboration in the game theory algorithm, which directs the subject to a decision determined by the scenario maker. Game theory is an incremental derivative model designed to minimize alternative complexity. The research employed a qualitative approach, incorporating historical research and focused interviews. This context applies to the subject, namely student alumni who are classified as idealists with substandard economic backgrounds. Conflict arises by implanting memories with the aim of prompting the subject participates in competing for his welfare through the state civil service appointment (ASN) via the government employees with employment agreements (PPPK)/candidates for civil servants (CPNS) test. Game modeling in the form of model schools with Ericsonian heterosuggestions places the subject to a prisoner's dilemma situation. A weakness is identified when the game cannot be used to make decisions with different matrix orders. Game theory effectively instills belief in passion and subject free will in the final decision because the decision objectives differ between scenario makers, leading to the best alternative and the subject satisfaction factor.

Keywords: decision making, game theory, education

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1. Introduction

The most prominent problem experienced by private teachers is related to welfare, given the background of different needs. The results of interviews with the regional coordinator on October 11, 2021, show that teachers often complain about salary policies that don't match life's needs, so the appointment of ASN through PPPK or CPNS is a reliable alternative to enter the comfort zone. On the other hand, there is a teacher with good performance, but because of her idealism, she persists in becoming a private teacher. The gap occurs in welfare factors and opportunities that are less friendly.

A snippet of a headmaster's statement on November 2, 2021, shows, "I saw the subject being manipulated, so she found his last belief." There are many forms of manipulation, such as the subject being asked to tell about changes in belief until there

is one last belief passion that she believes in. The purpose of directing the subject to this belief is so that the spirit of becoming an ASN/PNS is embedded in the subject. The headmaster opens the veil of manipulation that has so far been hidden from the subject's views of model schools, which can trigger the subject's emotions until the subject finds her last belief. The snippet of misinformation one regional coordinator on November 1, 2021, said, "I am ready to accommodate the subject in my territory, even if only as a stepping stone, so that the subject can successfully get a permanent career."

Determination of alternatives is part of the decision-making process, which leads to the flow of action until the final choice is made. Alternatives in decision-making are generally made naturally without causing dilemmas. The alternative did not affect idealistic subjects such as the problems in this study. Games are applied to bring the subject to follow several scenarios without his awareness. The first scenario, sub-modalities, was played by the Bung Karno school model and perfect figure, which successfully brought out the idealism of fans on this subject. In the second scenario, the role is played by an empath who listens to her outpouring. The third scenario involves a partner as a competitor in competition and a solution provider.

The theory put forward by [1] is similar to the scenario experienced by the subject in this study, in which all three steps have been passed. The first step is to give visual influence through the submodalities, which become modeling games. The second step involves the pay-off matrix, and the subject decides independently. The question is, is the theory effectively applied to individuals/humans? Considering that the point of view regarding the nature of decisions between individuals is always different. The complexity of alternative decisions and conflicts that occur requires the determination of several simple alternatives.

Conflict scenarios are designed according to the ultimate goal of the subject's decision, which is related to her welfare in the public eye. The subject does not have a home as a primary need; the subject's background is often involved in spreading political hoaxes and changing beliefs because they fall in love. The subject's decision alternatives are consistently unable to convince the game scenario maker, considering that the subject is only active as a tutor for private lessons, selling online, and being an odd photographer. All of these alternatives are not commensurate with the expectations of the educational specification. This gave rise to the initiative within the scenario maker to bring the subject into the game, which can lead him to a competition that leads to a permanent career ASN/PNS.

Initial problem identification resulted in generalizing the subject's characteristics, namely that the subject most disliked value conflicts. These subject ideas were unacceptable to the decision authority holders, which made him reluctant to join any formal educational institution. Then, the subject was also obsessed with transformation ideas, so she would not be comfortable joining members of an organization that tended to stagnate/flow in mere routine. Obstacles arise when the subject's belief paradigm differs from the scenario maker, so it needs to be directed through Ericksonian heterosuggestions so that one global value is embedded as a new passion.

In a permanent career queue, conflicts related to competition factors, win or lose, are raised to trigger subjects to compete. The conflict arose after the subject was directed through the game to experience directly joining several private agencies. One agency entered the subject into the dipodic system and brought the subject to the intended competition. The conflict appears as perception and is in the subject's subconscious related to her idealistic factors and awareness between components in the realm of reality. This triggers the subject to complete through making the right decision.

Conflict is like a toxin in the body that must be removed because it is dangerous if it continues to settle. Game theory is an incremental derivative model created by minimizing the complexity of existing alternatives. Game theory is one of the alternatives in decision-making with scenarios that appear to be made natural, affecting the subject's awareness. Finally, the subject faces the pay-off matrix, which creates a dilemma. The pay-off matrix shows that the subject must take one of several choices with the slightest risk opportunity. In this case, decision-making must consider the principles of decision-making and the categories of decisions based on obtaining information. A fundamental question arises that the more considerations, the more complex the decision-making situation is, so a pattern is needed that can be simplified and followed in the next decision-making process. The problem becomes even more acute if the type of problem is in the form of needs related to optimization of finding the best potential alternative, level of satisfaction, how to reduce too many alternatives, and situational decision making.

The problem description indicates the need for a new decision-making model that does not reduce/eliminate the essence of a situation/system that can increase understanding of how to make decisions more efficiently and effectively. Given the importance of decision-making, implementing games requires a game theory model to minimize alternatives' complexity. The nature of the decision can be in the form of one best alternative. Based on this description, the focus of the research can be determined as follows:

1. Game theory algorithm as a derivative model of incremental decision-making,

2. Modeling games to change the subject paradigm,

3. Conflict triggers as a guide to subject competition,

4. Prisoner's dilemma game,

5. The pay-off matrix game summarizes alternative complexity, and

6. The nature of the decision because of the passion belief subject

2. Method

The study used a qualitative approach with historical research and focused interviews, where the understanding of meaning in research studies was carried out by tracing the subject's history and carrying out reductions so that the essence was found. The interview place is at the regional coordinator's office, JL. Jenderal Sudirman KM. 2, Wringinputih and SDN Ngadiharjo 2; Kalangan RT/RW 003/010, Borobudur District, Magelang Regency, Central Java, 56553, Indonesia. The informants consisted of a headmaster as witnesses to the manipulation and a regional coordinator ready to accommodate subjects until they were successful as ASN/PNS. The researcher found essential and natural meaning structures. The implication of the fundamental thinking in this study is the interpretation of the decision chosen by the subject. The research data is considered saturated when the subject makes a final decision at the end of the game. The research began with centralized interviews with the regional coordinator on October 11 and November 1, 2021, and a headmaster on November 2, 2021; then data collection was carried out until the data was considered saturated, data analysis and follow-up interviews were carried out from early May until July 2023 until the findings led to a decision structure.

3. Result and Discussion

3.1. Results

In the centralized interview, based on the presentation of an informant from a head-master, all veils revealed that what the subject experienced during her lectures and attempts at joining the former agency were a game of manipulation. The director-actor, in this case, is played by the regional coordinator as well as the informant in this study;

the subject idol lecturer plays the modeling game actor; the empath and conflict trigger is played by the teacher who listens to the subject outpouring of the subject in the previous instance; as well as solution providers played by the regional coordinator and the school principal as well as informants. Findings based on documentary evidence and convergence of interviews with regional coordinators are to lead the subject to the pinnacle of success. The subject is faced with a modeling game in the form of a model school with Ericsonian heterosuggestion, bringing the subject to the final belief passion. The informant opened this pattern by reminding him again when the subject is led to instilling that belief. The subject found the sensitivity of the sentence, "The most useless thing in the world is to prohibit people who are in love and support the president." Sensitivity is then arranged in the subject's generalization; namely, love protects the subject from distortion due to falling in love, and the various parties supporting the president protect the subject from involvement with practical politics. The findings of the belief in 2019 have been embedded but have not made the subject aware of the final pay-off matrix he will encounter.

Figure 1: The Meaning The Subject Captured in Her Facebook Account as of May 2022.

On February 17, 2022, the subject's presentation said that he observed model school accounts until she found her final belief in the seminar title listed on the account, namely, "Synergy of Taking Care of the Universe Building Civilization." Subsequent exposure to the subject showed that she was focused on the historical video of the first RI presidential inauguration, then she realized that she was in love with her idol lecturer as a character actor, Bung Karno, and the subject as the first lady; with the most profound meaning from the point of view of the subject which is enshrined in Figure 1. This indicates that since 2019, the subject has been dealing with Ericksonian heterosuggestion; her need to be loved is fulfilled. The purpose of the subject's sensing is that the subject determines the steps based on her last belief passion. The background color of the dice is red, and the dice eyes are white, showing the phrase "not just *elmu* but *ngelmu*" showing figuratively that from the perspective of the subject, decision-making, besides reviewing opportunities, is not only based on knowledge but experience, in Javanese '*elmu*' means knowledge and '*ngelmu*' means experience. This indicates that the subject's decision goals tend to be satisfactory. The white aster

flower, as a wedding flower symbol, exists of love for her idol lecturer, implying the end of her love adventure, which is actualized in a new passion control. According to them, the convergence of interview results from the witness informant and Figure 1 related to planting "With a belief passion, I can be successful," which is instilled in the subject, according to them, is expected to motivate the subject to achieve high goals. The last belief passion finding was obtained after the subject faced a matchmaking game with the previous cast, which made the subject aware of value conflicts. The decision follows the opinion of [2] that when the opportunity shows sufficient information and time but the value is not essential, the decision leads to truncated satisfaction. Then, the belief passion instilled following [2] opinion about the picture of incremental decision-making related to alternative agreements is in the right direction when the path is wrong.

The subject found another manipulation, namely harmful memory implants that had been instilled so far; the subject once wrote a draft of her novel on her Facebook, and the scenario maker forced the subject to ask if it was not a fictional story but a true story that she experienced. The subject faces the first pay-off matrix by acknowledging/not recognizing the official bond with her idol lecturer. The subject then sent a message in the form of a denial of her writing. When both parties admit that there is a marriage bond, there are three risks: both of them will lose their reputation in cyberspace, both of them will lose the trust of their families, and both of their careers will collapse. If one admits that there is a bond, then there is a risk that both careers will collapse and will lose their name in cyberspace. If the two of them do not admit they have a bond, then there is only one risk: they will lose their names in cyberspace because the draft novel they wrote is considered a hoax. Table 1 shows the pay-off matrix with A as the subject and B as the lecturer's idol.

TABLE 1: First Pay Off Matrix.

A/B	Confessing There is A Bond	Claiming No Bonds
Confessing There is a Bond	-3, -3	-2, -2
Claiming No Bonds	-2, -2	-1, -1

On January 13, 2022, the subject was brought into the following scenario: teaching at one of the junior high schools as a mathematics teacher with a certificate of acceptance, as shown in Figure 2 (left). The following manipulation in December 2022 came from a book publisher. Then the subject was led to write down what he had found so far, namely her journey in obtaining the paradigm of the last belief that she believes is related to the global scope. The subject also did and completed the writing in just

Figure 2: Statement Letter January 13, 2022 (Left), Conflict Empath (Center), and Non-Activation of Dapodik Account March 2023 (Right).

two months, as shown in Figure 3 (left). Her explanation stated that she realized that what she had written was what she wanted as her best finding in 2019. She intended to make it an intellectual property right for herself due to auto-ethnographic research since 2001. The subject entered the following scenario until she found the second new finding, namely conducting classroom action research; she presented her findings in a national seminar, shown in Figure 3 (right). The subject realized that her findings were equivalent to those of teachers, not linear with the majors when she took the education management postgraduate program. This indicates a conflict between the subject's considerations that lead to their level of satisfaction and the scenario maker's considerations, namely regarding the expected values technique that can bring in monetary benefits. Convergence Figure 2 shows that the following scenario appears with a conflict indicated by Figure 2 (center) that aims to make the subject decide to register for ASN/CPNS selection.
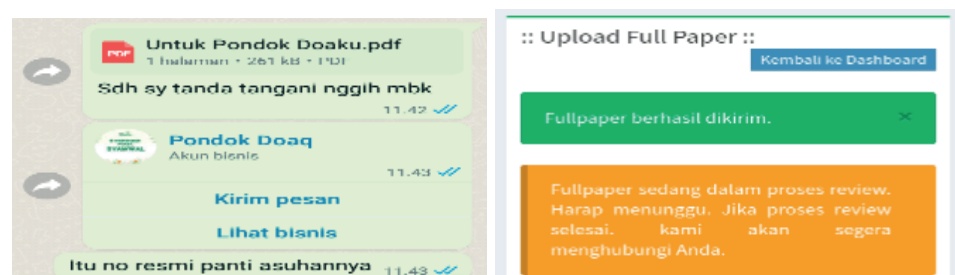
Figure 3: Author's Royalty Offering to Orphanages (Left) and Proof of Submission of Full Paper (Right).

Decisions emphasized by scenario makers, such as [3] opinion, are based on the category of conflict where the subject is facing an unclear target, alternatives are difficult to define, and information is not available if she remains in the private school. As suggested by [2], scenario makers use strategy rules by forcing subjects to select their own choices, followed by criteria in assessing solutions. Subjects face the second pay-off matrix; they experience a dilemma in choosing the two alternatives mentioned in Table 2, considering several risks. The conflict ended with the subject's decision to turn off Dapodik permanently in March 2023, supported by Figure 2 (right).

TABLE 2: Second Pay-Off Matrix.

A/B	Register for ASN/CPNS Selection	Not Registering ASN/ CPNS Selection
Register for Scholarship Selection	-2, 2	-2, 0
Not Registering for Scholarship Selection	0, 2	0, 0

Subjects are unconsciously led to face the following pay-off matrix in Table 2: the dilemma related to ASN/CPNS selection and doctoral program scholarships from one of the scholarship links. This scenario is by [2] opinion that in decision opportunities when there is sufficient information, not enough time, and essential value, the decision is adaptive satisfaction. [4] opinion is that judgments are made based on the proximity of the problem-solving time to the subject age limit. The subject explained in a conversation with one of the informants that she remembered a promise in 2011, which read, "Not willing to become ASN/PNS". The pay off matrix related to the two selections directed at him ended in a decision through a short message to her lecture, shown in Figure 4, that she decided not to register for ASN/PNS. The subject believes that the game's ultimate goal is for the subject's final decision to become an ASN/PNS, and the scholarship selection is only a manipulation path for further failure so that the subject becomes more confident in her final decision.

Table 2 shows the second pay-off matrix, showing that the subject is faced with two final decision alternatives, namely registering for a scholarship/registering for ASN/CPNS as designed by the scenario maker. The scenario maker guides the subject to apply for a scholarship, with the aim that there is a hidden scenario behind it, namely that there is an attachment to the requirements file that is made insufficient and cannot be fulfilled by the subject. The subject is faced with the risk that the attachment of a stamped statement letter is why she cannot receive a scholarship from another route. Another risk is that the subject will lose her proposal when she has uploaded it into the scholarship registration system. The game is expected to end with choosing subjects to participate

in the ASN/CPNS selection in the hope that all problems will be resolved when the subject's welfare is resolved. A positive value in the pay-off matrix 2 indicates that the scenario maker's expectations have been met. The study results show something different from these expectations because the feeling that the following manipulation will occur within the subject is powerful when one manipulation has trapped her. Then, the subject turned around from the pay-off she was facing and preferred to attend seminars/present her findings or write with a new belief, namely, "Creating without counting the steps of the career she achieved," with a firm determination. The decision is based on an algorithm: choose A is okay A but with new passion control; choose B is okay B but with new passion control; choose C is okay C but with new passion control.
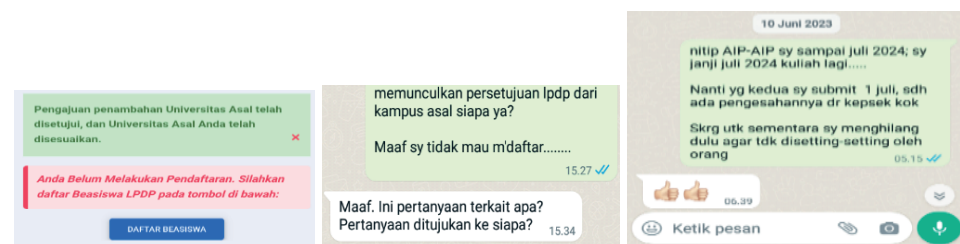
Figure 4: Final Pay-Off Matrix Decision June 10, 2023.

The subject decides by not choosing one alternative from the two final choices shown by the convergence in Figure 4. She dropped this choice because of her sensitivity that she believed the alternative to be the following form of manipulation. The subject has another point of view that writing findings is more critical for him than success toward the top of his career ladder. Subject satisfaction is when she can continue to work through her findings regardless of the career ladder she has gone through. Another satisfaction is related to her commitment to one belief with a global scope frame that protects her idealistic attitude. The subject's decision is in line with the opinion of [2] regarding the rule of simplicity, namely summarizing the overflow of information obtained by the subject. The [3] opinion regarding the category of decisions with risk, namely when the goals and information are clear, but alternative consequences are uncertain. The subject's decision indicates that game theory is effectively applied to educated idealistic subjects, considering that she is a human being who has the freedom to choose according to her will. Decision-making in this context is classified as cooperative with the same belief, passion, and commitment, then the subject's free will is still emphasized to minimize resistance. It is the will of the subject that distinguishes humans from objects or goods that are worthy of being advertised in inter-marketing competition. The conflicting nature of the decisions in the second pay-off matrix, namely the point of view of the scenario maker, leads to the best decision, while the subject leads to the level of

satisfaction. This indicates that the correctness of decisions regarding the point of view of each individual is always relative, so game theory with the subject's free will in making decisions as a tool in overcoming welfare problems in the world of education, related to the context of this research can be used as a standard.

Decision-making models with game theory algorithms can be integrated with various lines of educational management. The line in question includes human resource management. This model can be applied to overcome conflicts, increase motivation performance, and address personal, social, pedagogic, and professional educator competencies. The keyword as a control in the intended management scope is 'belief passion', which must be the same between the scenario maker and the intended subject. The characteristics of games with conflict triggers are maintained so that they seem natural to minimize the subject's resistance/adaption in reaching the final decision.

3.2. Discussion

Game theory is used to choose the best choices that must be dropped. A mathematical model must resolve the occurrence of competition from several interests. One decision is the best if the smaller the risk that will be borne after being dropped. Decision-makers can occur in one player with several alternatives and several stakeholders with several alternatives. The variety of competition and interests will make it challenging to find convergence when the competitors are at the top of the bureaucracy. The leader has the authority to make policies, so the executors' position will be difficult when going beyond that authority. This theory can be applied to objects, but there are pros and cons when faced with human subjects who have free will.

Game theory includes core and opposing players competing for the highest position. Game theory is used to analyze the reciprocal reactions that occur. What needs to be underlined is related to the essence of independent competition and pure strategy in decision-making. [5] says the game genre is a form of game theory. [6, 7, 8, 9] says this theory uses a mathematical and statistical approach in calculating a solution to the conflict in the interactions that occur; [10, 11, 12] said that the core of the game strategy is a mutual symbiosis between decisions drawn by players and can be used as a method in selecting channels to minimize interference.

The game theory arises from the results of exploring mathematically drawn from the behavior of subjects who mutually benefit. The quotient of decision-making depends on the players and decision-makers. Each player of this game must be firmly committed to making the best decisions. Meanwhile, if the player is free to choose at the end of

the scenario, then the player bears the risk. This analysis is in line with the opinion of [13], who says there are two types of game theory: cooperative, where decision-making is based on the commitment between players, and non-cooperative is carried out independently.

[14, 15, 16, 4] say the pay-off matrix is used as a stimulus for changes from equilibrium conditions that are aligned with the expected ideal conditions; the best strategy produced can optimize the marketing aspect, apart from in the business field, game theory can be integrated with Diens Theory. The results of this study focused on the word game, in which there is manipulation. The results are obtained from the pay-off matrix scheme at the end of the scenario. Optimization of results can improve quality with the least risk. Manipulation like this is suitable to be applied to objects, but can it be applied to human subjects? More in-depth research is needed to obtain a consistent answer. [17] said that when manipulating individuals, the ego must be protected so that the subject seems to have their needs met.

In this case, the model is a pattern of something that was initially irregular to represent an object or idea in the form of information about a phenomenon to study the actual system symptoms. Decision-making, in this case, is one of the functions of thinking where there is a decision selection from two or more alternatives, and the result is called a decision. Decision-making is related to opportunities, and choices are made from several possible alternatives in uncertain situations. According to [4], game theory is used when decision makers are still vague about actual conditions in conflict situations, and effective decisions can be realized when the time of solving the problem is near. According to them, further expected values techniques can be carried out based on consideration of events and results, the combination of which produces a monetary value.

[18] says that decision-making is a process of utilizing information in policy-making where the information generated by policy analysis must be neutral to make the resulting public policy more objective. Decision-making is one of the functions of thinking in utilizing information as a neutral basis to produce objective public policies. [19] say that group decisions are more effective regarding the degree of acceptance of achieving the final solution. Still, individual decisions are superior to group decisions regarding time efficiency. Decision-making can be taken in groups or individually, each with a superior side regarding effectiveness and efficiency. Group decisions can be more effective because there are more choices to increase acceptance when a final solution is reached. While in terms of speed (time efficiency), in this case, individual decision-making is more efficient.

The theories above illustrate that the model is a tool for simplifying and analyzing complex situations or systems. So complex models, situations, or systems can be simplified without eliminating essential things to facilitate understanding. In this case, the model is a pilot with simplification elements to be imitated (if necessary). At the same time, decision-making is a sequential process that requires using models quickly and precisely. Based on the theories above, it can be concluded that the decision-making model is a pattern of the function of thinking in utilizing information by choosing between alternatives based on considerations of effectiveness and efficiency so that a decision is obtained.

The decision-making principle in [2] cannot be separated from the following rules: the decision-making strategy rules, in this case, begin by establishing criteria for a satisfactory decision before generating and selecting options, followed by using criteria in assessing solutions. The rule of simplicity, in this case, explains that under certain conditions, too much information is worse than too little information; even forgetting is functional because forgetting is a deterrent to paralysis caused by waves of information that overwhelm decision-makers.

Decision categories, according to [3] from the point of view of obtaining information, are divided into four categories, namely as follows: decision with risk, that a decision has clear goals and is based on good information; however, the future consequences of each decision alternative are uncertain. Decisions with conflict (ambiguity), the goals to be achieved are unclear, alternatives are difficult to define, and information about the expected results is unavailable.

The decision-making model is a pattern that is made without eliminating essential things from the existing complexity, including the principles of decision-making and the selection of decision categories from the point of view of obtaining information. Classical decision theory, according to [2], is a theory that explains that decisions should be entirely rational; this theory applies an optimization strategy by looking for the best potential alternative to maximize the achievement of goals and objectives.

According to [2], administrative decision-making provides a more accurate picture of the actual and ideal ways school administrators make organizational decisions. The basic approach is gratification-meaning finding a satisfactory solution, not the best one. This decision-making focuses on the satisfaction aspect, highlighted in this case, including the actual and ideal ways agency managers make in making school decisions. The administrative decision model departs from assumptions that are part of the principles of decision-making and assumptions based on considerations for choosing a decision category, including considerations of satisfaction, scope limitation,

adherence to values, and general pattern of action. The incremental model (Sequential Limited Comparison Strategy) departs from the basic assumption of a sequential limited comparison strategy according to [2] that when relevant alternatives are difficult to obtain, or the consequences of each alternative are so complex that it is difficult to predict, then even a satisfactory strategy does not work well, so what is done is to reduce the number of alternative by considering the narrow range of interests of decision makers.

The incremental model is a pattern that is carried out by filtering from various types of existing alternatives so that it is focused only on alternatives that suit the specific interests of the decision-maker. The characteristics of the incremental model according to [2] include: (a) The analysis of the means of the goal is not correct because the determination of goals and alternatives takes place simultaneously, (b) A good solution is a solution that is agreed upon by decision makers regardless of objectives, (c) Alternatives and results have decreased drastically solely by considering solutions that are similar to the problem at hand, (d) The analysis is limited to the differences between the existing situation and the proposed alternatives, (e) The incremental method rules out the theory in favor of sequential comparisons of concrete and practical alternatives.

In this case, the incremental model focuses on the interests of decision-makers where solutions are made based on the agreement of decision-makers, and goals are set simultaneously with the creation of concrete and practical alternatives so that analysis is limited if there are differences between the situations/alternatives proposed. According to [2], the contingency model is one whose decision strategy can be arranged based on its ability to deal with complexity and conditions of increased uncertainty and conflict. The contingency model is situational, where from the complexity, uncertainty, and conflict that occurs, choices (decisions) are made that have the power to minimize complexity, uncertainty, and conflict. The word minimize is the same as the incremental model, so it can be concluded that the contingency model is the same as the incremental model.

The characteristics of the contingency model, according to [2], are based on three things, namely: (a) Information, if there is sufficient information to determine satisfactory results, then satisfaction becomes the primary model; (b) If there is sufficient time to undertake a comprehensive search, but the decision is not as important, then truncated satisfaction may be the appropriate strategy, (c) If there is not enough information then adaptive satisfaction is the chosen strategy, but depending on the timing/importance of the decision, adaptive satisfaction can be cut by blending. Satisfying, adaptive, and truncated versions of each potential path and blending are deemed appropriate

depending on the situation, while the situation is determined by information, time, and essential values; more details in Figure 5.
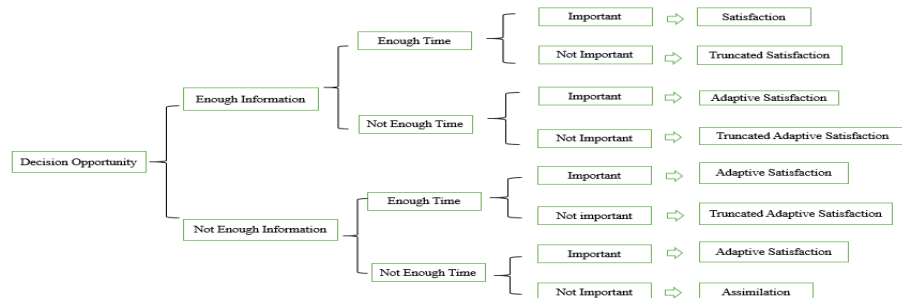

Figure 5: Contingency Model: Matching Strategy with Situations [2].

An overview of incremental decision-making according to [2] when comparing it with the classical and administrative models, namely goal setting and alternatives are closely related because the means and goals are one unit, the analysis of means and goals is not appropriate, the decision maker agrees on an alternative in the right direction when the path is wrong, limit search/analysis, focus attention on the same alternative, sequential comparisons reduce the need for theory.

The importance of the decision-making model in this case is to determine whether the elements' single relationship is relevant to the problem to be solved. The model is essential to clarify the significant relationship between the elements explicitly. Models help formulate hypotheses regarding the relationships between variables. This relationship is usually expressed in mathematical form. Models are also used to provide management of decision-making. Based on the theoretical analysis of the various decision-making models, it can be reduced to a game theory model. In this case, the generalization of game theory is a derivative form of the incremental/contingency model where what is done in general is related to minimizing very complex alternatives to become more straightforward. The goals are either satisfactory or the best depending on the needs of each context, with consideration of cooperative commitment or individual freedom in choosing alternatives—a game scheme to reach the top. The game theory scheme in [1] illustrated in Figure 6 begins with creating conflict scenarios with the hope that the subject can reach the pinnacle of success. The expectation of the emergence of a set conflict causes competition, which triggers the subject to follow the competition in fulfilling his needs. The game seems ridiculous, affecting the subject's awareness to make the impression as if it is natural.

[20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33] show that game theory is a reliable tool in formulating/analyzing competitive behavior between competitors to achieve success; [34] say that the pure strategy can be used as a decision support system.
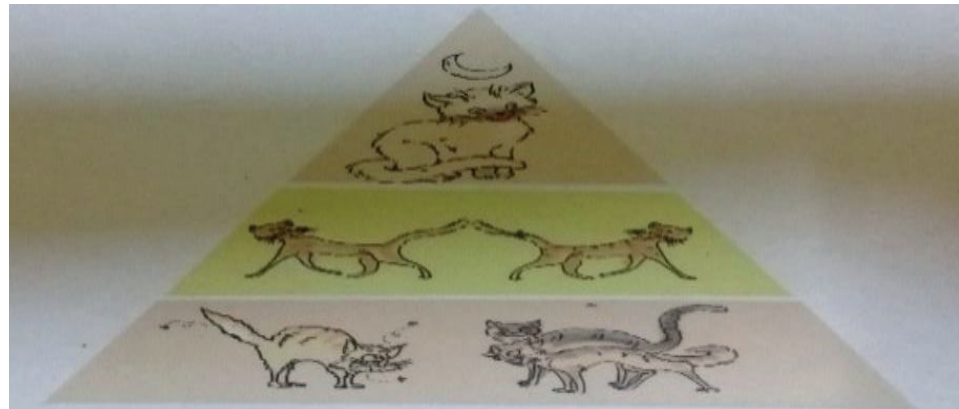
Figure 6: Game Theory Hierarchies [1].

The overall results of these studies indicate that game theory is classified as effectively applied in the economic field, and there is competition within it. This has not proven effective when applied to education or subjects in the form of individuals/humans. The nature of satisfaction is always relative from the point of view of several different subjects.

Research by [35] says game theory is used to overcome customer satisfaction from the offers of 2 different e-commerce parties. This shows that the object being set is e-commerce, and the level of customer satisfaction, as a result, indicates that the best decision is not necessarily satisfying from the point of view of each individual. [36] added that the drawbacks of game theory are in the counting process; namely, calculations can only be done when the matrices used are of the same order. According to [37], the ineffectiveness of decision-making is caused by conflicting philosophies. According to [38], decision-making needs to involve all parties to reflect a democratic attitude. According to [39], humans have a mentality and thoughts/that drive their free will, and the value system that applies feelings to individuals also influences their decision process in terms of psychological aspects. These statements indicate the need to pay attention to individual free will when making decisions related to individuals. According to [40], a decision tree is a tool for mapping alternative solutions to problems. According to [41], decision-making includes clarifying and formulating target priorities to create alternative choices. According to [42], the lack of information causes a greater adverse risk from the decision taken. Entire research shows the need for a new model in education management whose characteristics represent the incremental model, namely in setting interrelated goals and alternatives and equating values that underlie decisions between parties and give rise to belief passion.

The similarity of values underlying 'belief passion' is applied after a needs analysis and setting of the game's primary goals. Game actors are determined, among others, as director actors, game models, empathizers, conflict triggers, and solution providers. A cooperative nature and subject-free will minimize resistance are emphasized when running the game. Consistent and continuous similarity of 'belief passion' controls every subject's decision. The final decision after the dilemma is experienced is the result of summarizing the complexity of the alternatives or identifying the conflicts that occur.

The novelty in this research lies in applying game theory in education as a derivative of the incremental model. The subjects in this study were individuals/humans, with the final decision being independent and left entirely to the subject. The subject is faced with a modeling game so that belief passion grows, then faced with a pay-off matrix, with the final decision being chosen by the subject. The level of effectiveness will be seen when the final decision has been made, with the best/satisfactory nature of the decision. The nature of the decision indicates a tendency toward the classical model if it is best and the administrative model if it is satisfactory. Differences in matrix orders that cannot be resolved in previous studies are answered in this study in the form of subject-free will algorithms in making their final decision.
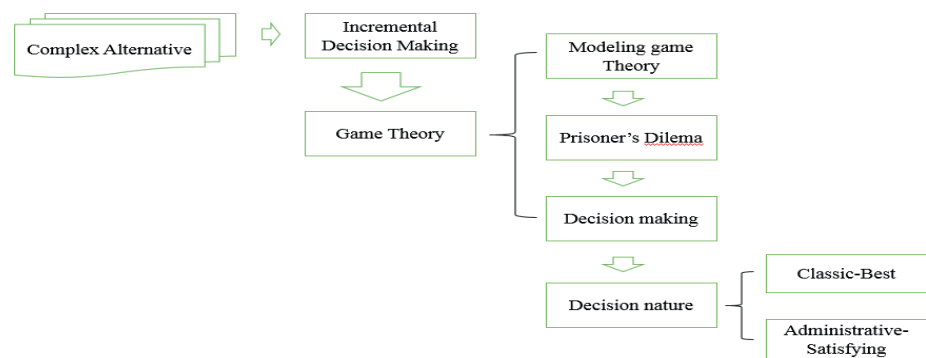
Figure 7: Game Theory Scheme in Educational Decision-Making.

The scheme in Figure 7 can be analyzed from the complexity of the alternatives; an incremental decision-making model is drawn by minimizing complexity. Game theory is an incremental derivative model. The first step is to load game theory modeling by building fan idealism from predetermined submodalities. After the game has been running for a long time, the subject faces a prisoner's dilemma in the form of a pay-off matrix. The subject makes decisions with freedom of his will. Then the nature of the decision leads to the classical model with the best decision for himself and all parties involved in the dispute or leads to an administrative model related to the subject's satisfaction with his own decisions.

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4. Conclusion

The application of game theory to human subjects is practical in instilling belief passion. Still, the point of view of the scenario maker in an educational institution is not always the same as the subject that is classified as idealistic. The study results show that the scenario maker wants the subject to be successful in the public eye, namely, reaching the peak of her comfort zone by becoming an ASN/PNS. The study's results also show that the subject wants different things; her satisfaction in producing works through her writings and findings is more important than success towards the top of her career. The final decision shows a satisfactory nature for the subject and is identical to the administrative model. There is a discrepancy between the nature of the subject's decision and the expectations of the scenario maker; namely, the best decision/tends to be classic.

The weakness of game theory lies in its inability to make decisions when the pay-off matrix shows a different order. Then, it cannot satisfy the subject between alternative pay-off matrices. The point of view of the nature of decisions in individual/subject reviews is relative, so it can be concluded that game theory without free will is more appropriate to be applied to research objects in the form of facilities/infrastructure or other factors that are like inanimate objects in competition in a marketing office; for the purpose that are commercializing educational institutions, not manipulating the subject. Another weakness of the game theory is that many victims are harmed, considering that the subject always decides to enter and leave educational institutions because what she does is not according to her conscience and the lack of time efficiency from the subject perspective. The application of game theory to subjects with free will in making decisions in this research is practical, considering that free will can lead the subject to a stable decision by first bringing the subject to direct experience to consider each alternative and the risk.

References

[1] Daphne L. MIAU Management in Absudr Way. Jakarta: PT. Elex Media Komputindo; 2014.

[2] Hoy WK, Miskel CG. Administrasi Pendidikan. Yogyakarta: Pustaka Pelajar; 2014.

[3] Nuryaman H. Teknik Pengambilan Keputusan. Tasikmalaya: Universitas Siliwangi; 2016.

[4] Muhdi N, Widodo S. Teknik Pengambilan Keputusan dalam Menentukan Model Manajemen Pendidikan Menengah. Kelola. Jurnal Manajemen Pendidikan UKSW. 2017;4(2):135–45.

[5] Novayani W. Game Genre untuk Permainan Pembelajaran Sejarah Berdasarkan Kebutuhan Pedagogi dan Learning Content. Jurnal Komputer Terapan Politenkin Caltex Riau. 2019: 54-63. https://jurnal.pcr.ac.id/index.php/jkt/ https://doi.org/10.35143/jkt.v5i2.3360.

[6] Rachmat MT, Agung MB, Sari RP. Analisa Perbandingan Perpindahan Nasabah dan Strategi Bersaing pada Bank. Jurnal INTECH Universitas Serang Raya. 2022;8(1):29–34.

[7] Sirait DE. Implementasi Teori Permainan pada Strategi Pemasaran Produk Kecantikan Oriflame dan Jafra. MES UISU. 2021;7(1):35-40. https://jurnal.uisu.ac.id/index.php/mesuisu https://doi.org/10.30743/mes.v7i1.4513.

[8] Cahyani RY, Triyanasari D, Tri PA. Pengaruh Teknik Treasure Hunt Game Berbasis Model Think Pair Share Terhadap Pengaruh Hasil Belajar Matematika Siswa Kelas III. JRPIPM UNESA. 2019; 3 (1): 1-7. journal.unesa.ac.id/index.php/jrpipm https://doi.org/10.26740/jrpipm.v3n1.p1-7.

[9] The R. Penerapan Teori Game dalam Perancangan "Belajar Budaya Nusantara Indonesia" yang Edukatif untuk Anak-anak. Jurnal Fakultas Humaniora dan Ilmu Kreatif Universitas Kristen Petra: 1-9.

[10] Reni, et al. Game Solvable by Backward Reasoning. Jurnal Pendidikan dan Konseling Universitas Pahlawan. 2023; 5 (2): 3022-3029.

[11] Wijayati D, Supriyadi E. Aplikasi Teori Permainan dalam Penentuan Strategi Pemasaran Program Studi Teknik Informatika dan Teknik Industri. E-Jurnal Matematika Unud. 2021;10(2):131–6.

[12] Amalia N, Hindani IF, Wahyudin A. Analisis Pendekatan Game Theory untuk Pemilihan Kanal pada Jaringan Radio Kognitif. Transmisi UNMER. 2018; 20 (2): 57-63. https://ejournal.undip.ac.id/index.php/transmisi https://doi.org/10.14710/transmisi.20.2.57-63.

[13] Andrianto FK. Analisis Risiko Performance Based Contract dengan Menggunakan Game Theory (Studi Kasus: Proyek Jalan Bojonegoro, Padangan Jawa Timur). Thesis. Surabaya: ITS; 2015.

[14] Alfarisi S. Penerapan Game Theory Assessment terhadap Implementasi Green Manufacturing. Seminar Nasional IENACO UMS; 2018. pp. 359–64.

[15] Setiawan A, Aziz DB, Birawaputra I, Triyanto B, Ismiyati. Azis, dkk. Penerapan Game Theory dalam Pemasaran Fraksi Sirtu pada PT. X dan PT. Y, INTAN. Jurnal Penelitian Tambang Universitas Papua. 2022;5(1):7–14.

[16] Fakhri M, Taufik M, Ismail AD. Improvement of Mathematics Learning Outcomes by Applying The Missouri Mathematics Project Learning Model and Dienes Game Theory. Mathematics Education Journal UMM. 2020; 4 (1): 95-101. http://ejournal.umm.ac.id/index.php/MEJ https://doi.org/10.22219/mej.v4i1.11474.

[17] Havens RA. The Wisdom of Milton H. Erickson, The Complete Volume. Wales: Crown House Publishing Ltd; 2011.

[18] Fattah N. Analisis Kebijakan Pendidikan. Bandung: PT. Remaja Rosdakarya. 2012.

[19] Robbins SP, Judge TA. Perilaku Organisasi. Jakarta Selatan: Salemba Empat; 2015.

[20] Amarullah, et al. Aplikasi Game Theory pada pengelolaan Sumberdaya di Pesisir di Selat Sebuku, Kabupaten Kotabaru, Kalimantan Selatan. JAM Universitas Brawijaya. 2015;13(2):353–61.

[21] Imsar, Marliyah, Harahap FH. Strategi Pemasaran Warung Kopi di Kota Medan dengan Game Teory. Human Falah Uinsu. 8 (2): 20-32.

[22] Halim BM, Lisnawati, Nuryatma. Implementasi Game Theory pada Strategi Pemasaran Ban Roda Dua di Kecamatan Sambutan Samarinda. Prosiding Seminar Matematika, Statistika, dan Aplikasinya Universitas Mulawarman. 2022: 9-15.

[23] Haryanto ND, Ismaliyati E. Game Theory in Marketing Mix Strategy Between Bukalapak, Shopee and Tokopedia. Journal of Business Administration Economic and Entrepreneurship STIA LAN. 2022;4(2):68–76.

[24] Jenar M, Sutopo W. Yuniaristanto. Pengembangan Model Game Theory pada Skema Persedaan Penyangga untuk Menjamin Ketersediaan dan Kestabilan Harga Komoditas Gula Pasir. Jurnal Teknik Industri UNS. 2015;X(2):97–102.

[25] Putra DY. Ahmad. Strategi Kompetisi antara Tokopedia dan Shopee menggunakan Teori Permainan. Journal of Mathematics UNP. 2021;6(3):85–90.

[26] Juliyanto F, Sari EY. Analisis Persaingan Perbankan dengan Game Theory serta Upaya Meningkatkan Kepuasan Nasabah dengan Pendekatan Importance Performance Analysis. Jurnal Ilmiah Teknik Industri ITATS. 2017;5(1):54–62.

[27] Nirmala BM, Mustika IW. Penerapan Game Theory: Alokasi Resource Block secara Dinamis pada Multi-Tier Cellular Network untuk Mencapai Kondisi Nash Equibrium, SENAPATI ITATS. 2016: 151-156. http://pti.undiksha.ac.id/senapati

[28] Windasari W, Zakiyah T. Analisis Game Theory pada Strategi Bersaing Grab dan Go-Jek di Kabupaten Kebumen. PRISMA, Prosiding Seminar Nasional Matematika Unnes. 2020; 3 (32): 194-198. https://journal.unnes.ac.id/sju/index.php/prisma/

[29] Anton M, Irawan C, Sukmawan D. Analisis Persaingan Pasar Saham dengan Cryptocurrency dengan Game Theory. Jursistekni Universitas Nusa Putera. 2022;4(1):28–38.

[30] Ma'rifah D, Windasari W. Implementasi Game Theory dalam Penentuan Strategy Bersaing pada Produk Smartphone. Jurnal Fokus Bisnis STIE Putra Bangsa. 2018;17(02):57–61.

[31] Yuhelson. The Implementation of Game Theory Models in Transportation. Jurnal Ilmu Pendidikan Non Formal: AKSARA PPS UNG. 2018; 04 (01): 41-44. http://ejurnal.pps.ung.ac.id/index.php/AKSARA/index

[32] Siregar LH. Game Theory dan Keungulan dalam Bersaing Perspektif Konvensional dan Syariah. Jurnal Bisnis Net Universitas Dharmawangsa. 2019;II(3):55–60.

[33] Nurcahyo, Setiawan TH. Penentuan Strategi Pemasaran Kartu GSM Menggu-nakan Teori Permainan Fuzzy. Jurnal Lebesgue UNIBA. 2022; 3 (1): 90-107. http://lebesgue.lppmbinabangsa.id/index.php/home

[34] Harun M, Suseno A. Penentuan Strategi Optimal dengan Game Theory pada Persaingan 3 Kuliner Baso Galuh Mas Karawang. Jurnal Pendidikan dan Aplikasi Industri UNISTEK. 2021; 8 (2): 77-81. http://ejournal.unis.ac.id/index.php/UNISTEK

[35] Praditya AR, Prasetyo SY. Game Theory dalam Penentuan Strategi Pemasaran Optimal dalam (Studi Kasus Persaingan E-Commerce Shopee dan TokoPe-dia. TIN Universitas Tanjungpura. 2021; 2 (2): 53-57. https://ejurnal.seminar-id.com/index.php/tin

[36] Mutaqin G, Admaja FP, Mardhiyah A. Mardhiyah. Implementasi Game Theory pada Simulasi dan Perancangan Software Berbasis Matriks Pay-Off dengan Metode Non Zero Sum Game. ILKOMNIKA UNU Blitar. 2021;3(2):266–72.

[37] Erawadi SL, Sitorus MW. Pengambilan Keputusan dalam Peningkatan Mutu Pendidikan Islam di Madrasah. Bunayya. Jurnal Pendidikan Guru Madrasah Ibtidaiyyah STIT Al-Ittihadiyah Labuhanbatu Utara. 2022;III(1):57–81.

[38] Tamiang Y. Pengambilan Keputusan dan Peningkatan Mutu Pendidikan di SMK Negeri 2 Medan. Journal Ability. Journal of Education and Social Analysis. 2022;3(1):46–35.

[39] Ahmad MH, Nurjaman U. Pengambilan Keputusan dalam Pendidikan Berbasis Agama, Filsafat, Psikologi dan Sosiologi. Al Qalam: Jurnal Ilmiah Keagamaan dan Kemasyarakatan STIQ Amuntai. 2022; 16 (1): 88-102. https://jurnal.stiq-amuntai.ac.id/index.php/al-qalam

[40] Yusmansyah EF, et al. Konsep Dasar-Dasar Pertimbangan dan Strategi Pengambilan Keputusan dalam Kepemimpinan Pendidikan. Jurnal Jagaddhita. 2022;1(1):36–47.

[41] Salim. Pengambilan Keputusan dalam Mewujudkan Efektivitas Lembaga Pendidikan Islam. ITTIHAD. 2019;III(1):44–52.

[42] Trisharsiwi SY. Karakteristik Metode Pengambilan Keputusan Kepala Sekolah. Wacana Akademika: Majalah Ilmiah Kependidikan. 2020: 4 (2): 83-92. https://jurnal.ustjogja.ac.id/index.php/wacanaakademika/index https://doi.org/10.30738/wa.v4i2.7451.