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*Translated from the original in spanish*

**Original article**

## *Elaboration of dimensions and indicators for decision-making in the tactical preparation of judo*

*Elaboración de dimensiones e indicadores para la toma de decisiones en la preparación táctica del judo*

*Elaboração de dimensões e indicadores para a tomada de decisões na preparação táctica do judô*

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### **ABSTRACT**

The development of contemporary sport has characteristics that have a great influence on the organization of the preparation and training of athletes. This work is related to the results of the research that is carried out on decision-making in the tactical preparation of judo, for which it is necessary to evaluate the athletes in the different circumstances in which they are in combat; therefore, its objective is to elaborate dimensions and indicators for the evaluation of decision-making from the tactical preparation in the youth category judo



athletes of "Ormany Arenado" Sport Initiation School (Eide in Spanish) from Pinar del Río. The need for judo athletes to present adequate levels in decision-making in each competition they face increases the possibilities of achieving superior sporting results; fact that stimulates the search, on the part of the coaches, of novel forms of the preparation process that differ from the traditional ones. In the research, theoretical methods such as analysis - synthesis and systemic-structural-functional, as well as empirical ones like document review, scientific observation, interview and consultation with specialists were used; in addition to descriptive statistics. As a result, the indicators were determined for each established dimension with their corresponding measurement criteria that allowed the granting of a comprehensive evaluation of the decision-making process in judo athletes.

**Keywords:** Tactical actions, dimensions, training, indicators, tactical preparation, decision making.

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## RESUMEN

El desarrollo del deporte contemporáneo posee características que ejercen gran influencia en la organización de la preparación y del entrenamiento de los atletas. Este trabajo está relacionado con los resultados de la investigación que se realiza sobre la toma de decisiones en la preparación táctica del judo, para lo que se hace necesario la evaluación de los deportistas en las diferentes circunstancias en las que se encuentren dentro del combate; por lo que tiene como objetivo elaborar dimensiones e indicadores para la evaluación de la toma de decisiones desde la preparación táctica en los atletas de judo categoría juvenil de la Eide "Osmani Arenado", de Pinar del Río. La necesidad de que los judocas presenten niveles adecuados en la toma de decisiones en cada competencia a la que se enfrentan eleva las posibilidades de alcanzar resultados deportivos superiores; hecho que estimula la búsqueda, por parte de los entrenadores, de formas novedosas del proceso de preparación que se diferencien de las tradicionales. En la investigación, se utilizaron métodos teóricos como el análisis-síntesis y el sistémico-estructural-funcional; empíricos, la revisión de documentos, la observación científica, la entrevista y la consulta a especialistas; además de la estadística descriptiva. Como resultado, se determinaron los indicadores por cada



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dimensión establecida con sus correspondientes criterios de medida que permitieron el otorgamiento de una evaluación integral del proceso de toma de decisiones en los atletas de judo.

**Palabras clave:** Acciones tácticas, dimensiones, entrenamiento, indicadores, preparación táctica, toma de decisiones.

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## RESUMO

O desenvolvimento do esporte contemporâneo tem características que exercem grande influência na organização da preparação e do treinamento dos atletas. Este trabalho está relacionado aos resultados da pesquisa realizada sobre a tomada de decisão na preparação tática do judô, para a qual é necessário avaliar os atletas nas diferentes circunstâncias em que se encontram no combate; assim, tem como objetivo desenvolver dimensões e indicadores para a avaliação da tomada de decisão a partir da preparação tática em atletas de judô da categoria juvenil da Eide "Osmani Arenado", Pinar del Río. A necessidade de os judocas apresentarem níveis adequados de tomada de decisão em cada competição que enfrentam aumenta as possibilidades de alcançar resultados esportivos superiores, fato que estimula a busca, por parte dos treinadores, de novas formas do processo de preparação que se diferenciem das tradicionais. A pesquisa utilizou métodos teóricos, como análise-síntese e sistêmico-estrutural-funcional; empíricos, revisão de documentos, observação científica, entrevista e consulta a especialistas; bem como estatísticas descritivas. Como resultado, foram determinados indicadores para cada dimensão estabelecida com seus critérios de medição correspondentes que permitiram a concessão de uma avaliação integral do processo de tomada de decisão em atletas de judô.

**Palavras-chave:** Ações tácticas, dimensões, treinamento, indicadores, preparação tática, tomada de decisão.

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## INTRODUCTION

The continuous and incessant changes that have occurred in the competitive judo regulations in recent years, by trying to make the combats more dynamic and spectacular and in order the projections have a higher incidence in the actions carried out within the combat, make the tactical preparation occupies a leading and integrating role in the training of judo athletes.

The tactical behavior of an athlete in each competition he faces, as well as decision-making during the fight, has become a determining factor in the outcome of the fights and is considered an important aspect to achieve victory or defeat in a sport like Judo, with a highly competitive level (Hernández, 2008).

Combat sports are characterized by the constant need to adapt to different adversaries and situations, while training the actions with which athletes obtain greater performance (Idem). In the case of judo, tactical preparation contributes to solve complicated tasks, increase effectiveness, use the strengths to the maximum, the economy of the strengths of the athletes and increase the speed and accuracy of movements under the changing conditions of sports competition (Sanchez 2020); that is why, within the tactical preparation process, decision making plays a fundamental role.

This must be in correspondence with the information obtained by one's own mechanisms, receptive during contact with the adversary. Selective attention must also be activated, anticipation of the opponent's action, as well as the ability to adapt to a high level of uncertainty (Sánchez, *et al.*, 2022).

This factor allows the coaches to develop the athletes, in correspondence with the possible tactical actions to be carried out in the fights during the tactical preparation process and it is executed on the basis of the possibilities, with the knowledge of the limitations of the different adversaries; condition that is shown from training, through a variety of combat situations in which the skills necessary to achieve victory are developed.



Therefore, it is essential to achieve this development, the knowledge of the particularities for decision-making in the performance of the different skills they face. During the fights, the number of decisions made is manifested in a very significant way and the number of correct decisions distinguishes the outstanding athletes and coaches, since they are in correspondence with the positive competitive results.

The process during combat is manifested through the possible solutions that are presented to a given situation, based on achieving the proposed objective, which is the projection on the opponent. For authors such as López-Ros (2011) and Hoyos (2014), athletes' decision-making is highly influenced by the different types of knowledge they have stored in their memory, the quality of said knowledge and the memorization capacity that is manifested during the competitive performance of athletes.

Decision making is the process where a choice is made between the options to solve different situations and reasoning and thinking are used, it takes place in thousandths of a second, and therefore, the player must have a cognitive ability that, related to his motor capacity, can give correct answers to the situations that are presented to him (Sánchez, *et al.*, 2022).

The answers that the athlete must offer during the fights are not fixed or schematic, through them they try to solve the demanding competitive situations they face. One of the elements that directly influences decision-making during combat is the flexibility in understanding and the variety of tactical actions that occur during each session, discovered in fractions of seconds, therefore, the speed of these actions it is another of the elements valued in the process to achieve satisfactory results.

Decision-making has a marked dependence on information as a strategic resource, it requires not only programs and procedures that reduce uncertainty, but also skills, mechanisms, dynamics, and organizational capabilities that allow making the right strategic decisions (Rodríguez, 2018).

In the training process of judo athletes, the development of decision-making has a higher level of objective difficulty that can be of a generic sense or of greater improvement in resolution. However, in any case, the level of demand must be higher than what the judo



athlete already knows or does well. It is for this reason that it is transcendental to delve into the distinctive aspects of the decision-making process in judo as a sport of great psychic tension due to the connotation of its actions.

This is why it is necessary for coaches to have references about the ways in which decision-making can be evaluated within the training process, from the tactical preparation during the fights and consider it as a complex aspect to establish the evaluation parameters.

In research in the educational and sports spheres, as an inclusive part of social research, there are aspects of the athletes' training process that, due to the high level of complexity, make it very difficult to evaluate them directly; in this context, the so-called indirect measures and with them the definitions of dimensions and indicators. This research studies decision-making from tactical preparation in Judo which, due to the level of complexity they present, cannot be directly measured; accordingly, dimensions and indicators are determined and used.

According to Campistrous (1999) dimensions are used to measure a complex variable and employ several measurement indicators. Indicators are the intermediate variables of a complex variable in the research process. These, in most cases, require more than one indicator for their measurement that allows the correct interpretation of the dimension or variable, in correspondence with what is to be evaluated.

There have been multiple research contributions on the decision-making processes of athletes, both from the technical and psychological perspective (Gavotto, 2015); (Zarceño, 2017) and (González, 2018) have comprehensively addressed individual and collective sports, but do not refer to decision-making processes in combat sports such as judo.

Hernández (2022) in a study about the tactical thinking of judo athletes mentions the need that athletes present high levels of tactical preparation to achieve satisfactory competitive results and considers that bouts are decided in fractions of seconds, so tactical preparation must be individualized and take into account physical possibilities and level of development of the mental qualities in the athletes, as well as the inclination towards making tactical decisions during the combat.



It is considered that due to the impact of decision-making on the final result of the match, it is necessary to carry out research that enables the identification and understanding of aspects that affect the achievement of superior sports performance. That is why the research focused on developing dimensions and indicators for the evaluation of decision-making from tactical preparation in judo athletes in the youth category of the "Ormany Arenado" Eide in Pinar del Río.

### *MATERIALS AND METHODS*

On the one hand, the perceptive-cognitive paradigm was assumed with the perceptive-cognitive dimension, it focuses on the emotional and motivational aspects that can affect the cognitive processes of the athlete in order to make a decision at a given moment, which favors addressing the subjective. On the other hand, the ecological paradigm with the ecological dimension, by adapting behaviors to the environment, the biomechanics of the body, perceptual information, among others; as well as for the determination of the evaluation parameters.

In the research, theoretical methods such as analysis-synthesis were used, which allowed the study of antecedents related to decision-making in sports, specifically in combat sports, based on the references consulted.

The systemic-structural-functional method made it possible that once the results of the diagnostic instruments were processed and analyzed, the dimensions and indicators were raised to evaluate decision-making from the tactical preparation in judo athletes.

In the empirical order, the review of documents was used that allowed the study of the Comprehensive Program for the Preparation of judo athletes in Cuba (PIPD), the Comprehensive Program for the Preparation of the Athlete in its 2007 and 2014 editions, the 2017-2020 Olympic cycle and the current one. For this review, the contents, methods, procedures and means most used in the development of decision-making in tactical preparation during training and combat were taken into account.





The interview was applied to six judo coaches in charge of carrying out the training process for high performance at the School of Sports Initiation of Pinar del Río (Eide), three of them are Masters in Sciences, one is a postgraduate specialist and the remaining two are graduates in Physical Culture and Sports, with an average work experience of 15 years in teaching and training judo and a 3rd Dan black belt level. The purpose of the interview was to know the criteria about the elements to take into account to evaluate decision making during judo combat.

The scientific observation was carried out in the preparatory and competitive period, at three control limits of the preparatory period and three preparatory competitions belonging to the competitive period of the male school team, it was carried out with the purpose of evaluating the decision-making process from the preparation tactic, by registering the actions of the athletes during the combats.

Consultation with specialists was used based on the socialization of the proposed dimensions and indicators and on the assessment of their usefulness, as well as on the functionality, relevance and feasibility of these in the evaluation of decision-making from the tactical and combat preparation of judo athletes.

Descriptive statistics were used to quantify the results, after having applied the observation to the control limits and the preparatory competences. In this way, it was possible to evaluate the behavior of the dimensions and indicators for decision making from the tactical preparation in judo; Depending on the study, statistics were used such as the arithmetic mean, standard deviation, the proportion expressed in percent and the frequency distribution tables.

It was taken as population 18 athletes belonging to the youth category judo teams of the Eide "Ormani Arenado", from Pinar del Río. Of these athletes, 10 were male and eight were female. The average age of these teams is 16 years and they have been practicing this sport for an average of eight years. Eight of them present a blue belt level in judo, six are green belts and four are brown belts.



As an auxiliary sample, the six coaches in charge of carrying out the training process in the Eide were included. Of them, three are Masters in Sciences and the remaining three are Graduates; at the judo level two are 4th degree black belts, three are 3rd. degree black belts and one is a 2nd. degree black belt. Dan, they've all spent an average of ten years teaching and training judo.

## RESULTS AND DISCUSSION

The present research focuses on the ways of evaluating the decision-making process in judo athletes, an exploration of the current state of this process was carried out, from the tactical preparation in the sport; the methods and instruments provided were applied and the main results were assessed.

The decision-making process is considered decisive in sport, to achieve great competitive results and implies the choice of procedures and actions in different situations that have different degrees of complexity, dynamism and uncertainty; therefore, there is no security in the decisions made, this is only achieved through the skill of the abilities acquired in the sporting experience or the talent that the athletes present.

This process responds to the different combinations of situations and behaviors that can be described in terms of three essential components, alternative actions, consequences, and uncertain events (García, 2017). During the fight, the elements that directly influence decision-making are different depending on the situations that are presented to the athlete and, in turn, become flexible in their understanding due to the characteristics of the rivals to whom they are faced. that they face during each competition.

The fear of making a decision is the expression of different psychological mechanisms, for example, intolerance of possible negative consequences, difficulty giving up options that are not chosen, and perfectionist and excessively self-critical styles with internal dialogues that tend to be enunciated; in this way, the decision-making process is a reflection of the execution of a solution that fits into a situation to achieve an objective.



The establishment of existing relationships between psychology and sports actions leads to an increase in cognitive abilities that athletes must obtain in order to achieve a subsequent sports development. For the analysis of decisions, the different behaviors of the athletes that go through subjectivity in the understanding and interpretation of the dissimilar alternatives and variants for the solution of problems that arise in combat must be taken into account.

Another important aspect of decision-making is, according to Liébana (2017) and Lagos (2017), ensuring that athletes can reduce uncertainty in the face of new decisions and in the cognitive processes of analysis and assessment of different combat situations in greater depth; to do this, it is based on the characteristics and the competitive experience itself. It is considered that in combat, what at one moment may be an appropriate response, at another time it is not, because decision-making encompasses different cognitive tasks in a very dynamic way whose nature varies as a response is available. greater knowledge in the sport.

When carrying out a deep analysis of normative documents that govern the sports preparation of judo athletes in Cuba, the Integral Program for the Preparation of the Athlete in its editions (Leyva, 2007) and (Mesa, 2014 and 2017) methodological indications related to tactical preparation are seen, in favor of the acquisition of motor habit and, to a lesser extent, to the perceptual-cognitive aspect.

It is considered that there is a scarce presence and assessment of specific tasks derived from the contents of the tactical preparation for the development of decision-making and there are no references that address the forms of control or evaluation of the development of decision-making.

For the evaluation of the tactical preparation process, it is necessary to take into account the perceptual-cognitive aspects and sports situations that encourage a rational understanding of the different combat situations. Which undoubtedly raises the quality of decision-making in athletes.



As a result of the interview carried out with the coaches, 83% of them considered the methodological guidelines that appear in the Judo PIPD on the evaluation of decision-making from the tactical preparation of athletes insufficient, they stated that this process occurs from the beginning, support that they provide to each other and based on practical experiences as coaches and former athletes.

100 % attached great importance to the correct decision-making from the tactical preparation, for the achievement of satisfactory results in the combats; in addition, they expressed ignorance of the elements that can be taken into account for the evaluation of decision-making from the tactical preparation in the athletes and during the combat, since the evaluation process of tactical preparation in this aspect is limited, and the interviewees agreed that a proposal of dimensions and indicators would be very beneficial to evaluate decision-making from tactical preparation, since it allows to clearly measure the behavior of athletes in real combat situations.

As a result of the observations to the control limits and preparatory competitions, it is three observations made at the national level and three preparatory competitions of the preparatory and competitive period, of the judo athletes youth category of the Eide "Ormani Arenado", from Pinar del Río were evaluated and indicators were evaluated to measure the level of tactical performance of athletes during combat.

Regarding the evaluation issue, what was expressed by Janjaque (2005) is assumed, who states that the tactical effectiveness in judo is equal to the number of effective attacks among the total number of attacks made, multiplied by 100; which gives a quantitative measure of the relationship established between the total number of attacks carried out and the number that is effective, the analysis carried out showed the following results:

The first indicator observed was direct attacks, a total of 1,482 attacks were carried out, of which 726 were effective, for 49% effectiveness. In the results of this indicator, it was verified that the athletes did not select the moments to carry out the attacks well and had difficulties in the perception of the moments that they generated in their opponents to carry out the techniques, which meant that they did not take advantage of the seconds in which the opponent was in a disadvantageous position.



The second indicator observed was that of direct attacks with the Tokui Waza, which is the favorite technique; Of a total of 997 attacks, 638 were effective, for 64% effectiveness. In this indicator, the main deficiencies were marked in the indecision that the athletes presented in the selection of the moment to perform the technique, this negatively influenced the decision-making of these athletes during the combats.

The third indicator observed was the performance of combinations, which is when the athlete manages to chain two or more techniques. A total of 920 actions were carried out, of which 608 were effective, for 66% effectiveness; it was possible to verify that the athletes had little motivation when facing opponents that they considered to be of a lower competitive level, which caused them to fail to choose the appropriate moments to carry out the combinations by underestimating the opponent and not taking into account the reactions. In addition, the tactical actions were carried out with little cognitive reflection when doing them quickly.

The fourth indicator observed was the realization of counterattacks, a total of 689 were carried out, of which 221 were effective, for a 32 % effectiveness; the main deficiencies in this indicator were when deciding when to counterattack, hiding the tactical plan they had in mind when they had to counterattack, and the fear of failing with their counterattacks and that they would be projected, which led them to remain static and not react. in the moments of the counterattack (Table 1).

*Table. 1 - Results of observations at control points and preparatory skills*

Indicators observed	Bumpers	Preparatory competitions	Total attacks	Effective attacks	% effectiveness
Direct attacks	3	3	1482	726	49%
Direct attacks with the favorite technique	3	3	997	638	64%
Combinations	3	3	920	608	66%
Counter attacks	3	3	689	221	32%



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*Proposal of dimensions and indicators to evaluate decision-making from the tactical preparation in judo athletes youth category of the Eide of Pinar del Río*

Once the results of the instruments applied in the present research have been processed and analyzed, it became necessary to propose dimensions and indicators to evaluate decision-making from tactical preparation in judo athletes, through the use of the systemic-structural- functional method.

To determine the dimensions and indicators that are proposed in the research, it was considered that a variable in the research is a characteristic that can reach different values (Bisquerra, 1989, p 71). In addition, the general model of Quintana (2017) was consulted so that the indicators allow evaluating the development of the decision-making process from the tactical preparation that the athletes achieve, in the proposed dimensions.

The dimensions proposed in the Ruiz and Arruza model (cited by Velásquez, 2022) and Pacheco *et al.* (2017) were assumed in the research. Next, the dimensions and indicators are expressed to evaluate the decision making from the tactical preparation in judo.

Dimension 1. Perceived decisional competence, according to the authors Ruiz and Arruza (2005), athletes with this decisional tendency present a propensity to make risky decisions during combat and tend to be very optimistic in them, so the evaluation of this dimension has to point out the successes and weaknesses of the athlete in the precise use of perceptions, as well as the motivation they present towards the different opponents they face.

Dimension 2. Anxiety and overwhelm when deciding, athletes with this decisional tendency express a predominance of the pessimistic style, since they value previous failures that significantly influence the decisions they make during combat. They consider that they do not have the necessary resources for the situation they are facing; in this dimension, the analysis of the different situations that the athlete faces that allow him to make decisions during the combat is evaluated.

Dimension 3. Commitment to tactical and decisional learning, athletes with this decisional tendency follow the coach's advice, therefore, they present a tendency towards a conservative style; they adhere to an established tactical plan, prior to combat, and it is very



difficult for them to separate from it. In this dimension, the speed with which the actions are carried out, how they react to the opponent's actions and the degree to which they modify the actions they carry out to meet their objectives during combat are evaluated.

Given the complexity of the research being carried out, indicators are elaborated for each proposed dimension.

Dimension. Perceived decisional competence

Indicators:

- Perception of timing and distance of actions.
- Perception of time and speed of actions.
- Level of motivation against different opponents.

It is important to keep in mind that specialized perceptions are very important in determining the correct actions that athletes must perform during combat to achieve victory, together with the motivation with which they face the opponents.

The following is taken as a measurement criterion for the quality of compliance with the indicators:

- If the three indicators meet optimal quality, it is evaluated as adequate.
- If they comply with limitations and partially the three indicators, it is evaluated as not adequate.
- If one indicator meets quality and the remaining two with limitations and partially, it is evaluated as not adequate.
- If they do not meet any of the three indicators, it is evaluated as inadequate.

Dimension. Anxiety and decision overwhelm

Indicators:



- Ways of conducting combat against opponents of different heights and postures.
- Level of anticipation of the opponent's tactical actions.
- Level of analysis of the tactical actions of the combat with markers for and against.

In this dimension, it is important to take into account the level of attention that the athletes show towards the actions carried out by the opponent. This allows a satisfactory analysis and choice, in a short time, of the tactical actions to be carried out according to the given combat situations.

The following are taken as measurement criteria for the quality of compliance with the indicators:

- If the three indicators meet optimal quality, it is evaluated as adequate.
- If they comply with limitations and partially the three indicators, it is evaluated as not adequate.
- If one indicator meets quality and the remaining two with limitations and partially, it is evaluated as not adequate.
- If they do not comply with the three indicators, it is evaluated as inadequate.

#### Dimension. Decisional Learning Commitment

Indicators:

- Carrying out tactical actions in short times.
- Reaction level to the opponent's actions while hiding yours.
- Modification of the tactical actions for the fulfillment of the objectives.

In this dimension, it is important to know the level of reaction that the athletes present, the speed with which the tactical actions are carried out, as well as the modifications that the athletes make during the fight to achieve the objective. All these aspects are important within the decision-making process from the tactical preparation to combat in judo.





The following is taken as a measurement criterion for the quality of compliance with the indicators:

- If the three indicators meet optimal quality, it is evaluated as adequate.
- If they comply with limitations and partially with the three indicators, it is evaluated as not adequate.
- If one indicator meets quality and the remaining two with limitations and partially, it is evaluated as not adequate.
- If they do not meet the three indicators, it is evaluated as inadequate.

In high performance sport, as De lucio (2019) states, most of the research is oriented towards solving the problems in preparing athletes to obtain the medal in the events of the Olympic cycle. However, in Cuba and as part of the development and preparation of the sports reserve, as one of the fundamental pillars of the high-performance pyramid, the multilateral development of judo athletes is necessary.

There are several researchers who have delved into the tactical preparation, but not in the formulation of dimensions and indicators. Castellanos *et al.* (2017) specialized in the critical appraisal of preparation focused on the Tachi Waza. Rodríguez and Alemany (2020) focused on fatigue as an aspect that could trigger against good performance in competitions. Robles-Rodríguez *et al.* (2020) dealt with the psychological factor in this sport and Fernández *et al.* (2020) contributed the construction and application of tests to improve the selection process of judo athletes in women's teams.

In these cases, the establishment of dimensions and indicators to optimize judo tactics was not addressed, but these antecedents served as cognitive and referential elements to carry out the investigation.



In general, the need to have dimensions and indicators that would allow the evaluation of the decision-making process from the tactical preparation of athletes, is considered an aspect of great importance in achieving satisfactory competitive results, in each competition.

## CONCLUSIONS

The proposed dimensions and indicators made it possible to objectively and comprehensively assess the progress of the tactical preparation process from decision-making in the athletes and, at the same time, contributed to raising the quality of the high-performance judo sports training process, which enriched the knowledge of the coaches and provided different elements to take into account for the evaluation of this process, based on the specific characteristics of judo combat currently.

The elaboration of the indicators proposed for each dimension of knowledge with its corresponding measurement criteria allowed an efficient and inclusive evaluation of the decision-making process from the tactical preparation in judo athletes.

The modification of the training process of tactical preparation that emphasizes decision-making in judo athletes made it possible to evaluate the athletes, based on the proposed dimensions and indicators.

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**Conflict of interests:**

The authors declare not to have any interest conflicts.

**Authors' contribution:**

The authors have participated in the writing of the work and analysis of the documents



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