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RUMI DOPING application development as *Anti-doping* information media for Indonesian national paralympic comittee Athletes

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ABSTRACT

Introduction: Doping is an invisible cheating act in a match; therefore, it is necessary to provide an anti-doping understanding to overcome doping behavior in a competition. The research purpose was to produce a product in the *Rumi Doping* application as a medium for anti-doping understanding in Indonesian NPC athletes.
Methods: This research used R&D with the Agile Sprint planning model, which consists of (1) planning (planning for the preparation of software components); (2) developing (start software development); (3) testing (software testing); (4) delivering (present the software product); and (5) assessing (assess and provide feedback on the products that have been made). Data were collected by observation, interviews, and questionnaires. The testing stage used experts' product validation, and the assessment stage used product users (Indonesian National Paralympic Committee athletes). Aiken V Coefficient for validity testing and descriptive percentages to measure user ratings in the form of practicality and effectiveness of the *Rumi Doping* application.
Results: The results showed that the average Aiken V value was $0.89 > 0.77$, so it could be stated that the application developed was valid. The practicality assessment of the *Rumi Doping* application showed an average percentage of 80% (24/30) of athletes stated that it was practical to use. The effectiveness assessment of *the Rumi Doping application showed that 90% (27/30) athletes disagreed about* doping in sports, which means athletes have understood that doping is prohibited in sports. Conclusion: The research concluded that the Rumi Doping application is valid, practical, and effective in providing information about doping.

Keywords: Software Development, *Rumi Doping*, APKPure.
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INTRODUCTION

Sport is defined as a human activity capable of achieving a result that requires physical exertion and/or physical ability in a natural, organized, and competitive manner.[1] Sport is a physical activity that supports the human body's health. Achievement sports are sports that foster and develop athletes in a planned, tiered and sustainable manner through competition to achieve achievements with sports science and technology support. In the process of athlete success achieving and maintaining, and improving body performance with hard training, the thing that needs to be instilled in the soul of an athlete is to compete by applying the fair play norms. Sports fair play is defined as conformity to the rules, respect for officials

and their decisions, and respect for fellow opponents.[2] Fair play is a principle inherent in the soul of an athlete, to be honest, and respect the rights of others in obtaining equal opportunities before, during, and after the implementation of competition. Every competition can be fraudulent. One of the fraudulent acts that do not appear immediately is the use of doping. The term doping *is* usually used to indicate a practice based on performance-enhancing drugs or the abuse of medical therapy (Negro, Marzullo, Caso, Calanni, & D'Antona, 2018). Athletes widely use doping to improve performance without fear or unconsciousness associated with its consequences or side effects.[4] In sporting events, doping leads to the prohibited use of performance-enhancing athletes, enhancing drugs or materials by athletes'

competitors.[5] The use of doping was banned in sports because it was violated sports and medical ethics, is contrary to the spirit of sport and is a threat to the health of athletes.

The incidence of fraudulent use of doping occurs due to a lack of understanding and knowledge of athletes about doping, such as athletes accidentally consuming drugs that are included in the doping list. Researchers have surveyed 30 Indonesian NPC athletes showing that 83% (25/30) of athletes agree that recreational drugs motivate training and competition at the highest level. This indicated the lack of athletes' doping understanding. Previous research showed a lack of knowledge of anti-doping in ASEAN Para Games Indonesia athletes by 49.5%. Based on interviews, athletes admitted

that anti-doping socialization was rarely held. Athletes only understand doping in general that doping is prohibited in the sport and are aware of the negative impact of doping use. However, there is a lack of understanding of doping substances and the prohibited list.[6] Another study claimed that elite volleyball players do not have enough information about the understanding of doping and gene doping. Volleyball elite players are aware of psychological doping, and that doping should not be in the sport, and athletes who use doping should be punished.

Regarding this information, it appears that elite volleyball players should know more about doping.[7] The role of anti-doping institutions in socializing the prohibition of doping use is very influential in eradicating and preventing doping use. In addition, athletes and sports players must open their knowledge about doping. Anti-doping knowledge provides information to athletes about doping to avoid and avoid doping in sports activities. Previous studies have shown a significant difference in the lack of understanding of doping and the use of high supplements in football players.[8] This study showed the need to implement a comprehensive doping prevention education program in the sports environment. A persuasive delivery media was needed to enhance athletes' understanding of anti-doping by utilizing technology in applications. Technological developments provide convenience in accessing applications that can be used in bulk, efficiently, and in various places. Through the application, each application user can open the application to find the information needed. So, with one click, the user can find out the information required.

METHODOLOGY

Research Place

The study was conducted at the Indonesian National Paralympic Committee Office at Ir. Sutami Street No. 86 Jebres Surakarta City of Indonesia for Indonesian NPC athletes, totaling 30 athletes. Initial observations were shown that athletes do not know the terms of doping. The observation evidence that 83% (25/30) of athletes agree that recreational drugs motivate training and competing at the

highest level.

Method

Researchers used research and development to design and test *Rumi Doping* applications. Research and Development (R&D) drew on new information findings that can be validated in a peer-reviewed capacity that can be demonstrated and developed further.[9] Application development used the Agile Sprint planning model, which consists of (1) planning (planning for the preparation of software components); (2) developing (start software development); (3) testing (software testing); (4) delivering (present the software product); (5) assessing (assess and provide feedback on the products that have been made).[10]

The *Rumi Doping* application is an application that makes it easy for sports players to find substances and methods that are included in doping. This application can be accessed through the website, and the application for android users can be installed on the PlayStore. Android is the most popular mobile operating system among the most used touch devices.[11] The *Rumi Doping* application was designed with a panel web programming language using PITP with Lareval 8 Framework and a MySQL database. The *Rumi Doping* application for the Android base was constructed using the Kotlin language, with Android Studio version Android 5. This application contains an explanation of doping, such as the definition of doping, a list of prohibited drugs, doping substances, doping methods, therapeutic use exemptions, doping control processes,

anti-doping agencies, and sanctions for doping users. It also has a search feature that can match substances contained in drugs, food, and beverages to be consumed to confirm whether these substances are included in the doping category.

The product development stages are explained as follows:

1. Requirements determination
   Requirements determination was used to determine the need for making a website or application system. The description of the requirements will simplify the design process and the production process because it can be used as an initial reference in making an application. The requirements of the Doping Application are as follows:
   a. Users can register and login
   b. Users can find out the doping information
   c. Users can find out why doping is forbidden
   d. Users can find out the laws and regulations covering doping
   e. Users can find out the list of prohibited doping
   f. Users can search for doping
   g. Users can find out the content in doping and its side effects

2. Database design
   The second application creation process was database creation. The database design process determined what tables are created in the system that can affect the system's running. In making the doping application itself, starting from the creation of the ERD database, as shown below:
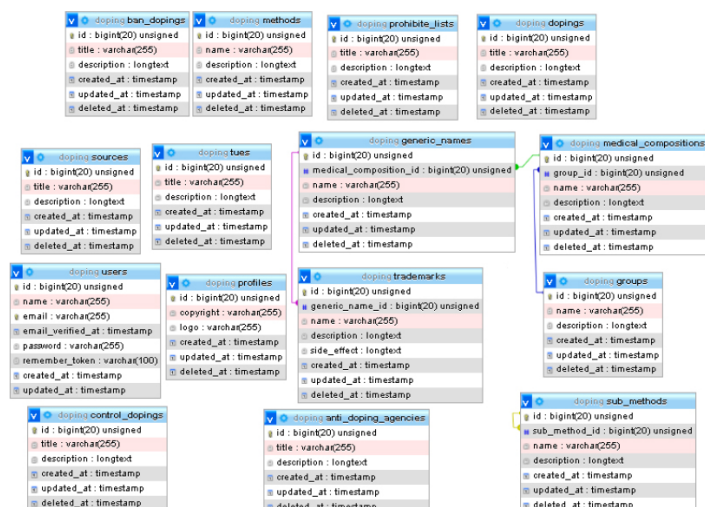
After that, ERD would be implemented in Mysql database tools to be connected to the system.

3. Design and Production

The design process began after the database creation process. The system design process included the architecture in the system. Starting from what tools would be used to implement the database. The tools used are Mysql databases. Then the programming language used PHP for websites with the framework. For implementation to the Android system, it was used Kotlin native language. The construction of the application would go through the web view process, namely the website's performance and, finally, into an android application. Admin and user were also created in which the admin would manage all kinds of data rotation on the system, while the user acts as a user who operates the system.

Subject

Researchers used three experts to test the product validity. The criteria for experts who test the product validity were (1) an expert in media who understands doping material; (2) a lecturer with a doctoral degree. A validity test was done by filling out a questionnaire based on media, display, and material aspects. Experts were asked to provide opinions using a Likert scale with a range of 1-4 (1 = strongly disagree, 4 = strongly agree) [12]. The Likert scale was designed to measure scientifically acceptable and validated [13]. Researchers used 30 samples of Indonesian NPC athletes as field test targets in testing the practicality and effectiveness of the *Rumi Doping* application. The criteria for athletes participating in this study were (1) 22-35 years old; (2) has attended national training; (3) compete in the ASEAN Para Games.

Procedure

Data were collected through observation, interviews, and questionnaires. This study was started by observing the understanding of athletes toward doping and developing a product in the *Rumi Doping* application. The collected data were then validated by media and material experts questionnaires and provided

input related to the products developed. Furthermore, the *Rumi Doping* application was assessed by application users, namely Indonesian NPC athletes. The assessment was carried out by testing the practicality and effectiveness of the *Rumi Doping* application. Application effectiveness testing used attitude questionnaires.[14]

Data analysis

Aiken V coefficient was used to test the validity of the expert assessment results. To achieve a 99% confidence level, an Aiken V value of 0.77 was required. Descriptive percentage analysis was used to determine the effects of user assessments in application practicality and understanding of doping.

RESULT

Expert Test

At this stage, the *Rumi Doping* application was tested by three experts. The *Rumi Doping* application was tested. Experts used the *Rumi Doping* application

and then provided an assessment in terms of appearance, ease of use, use of understandable language, and the suitability of the material presented in the *Rumi Doping* application. The following table shows the assessment of each aspect that has been assessed.

Table 1 was shown the expert's assessment of the *Rumi Doping* application. Expert assessment used a Likert scale with a range of 1-4 (1 = strongly disagree, 2 = not suitable, 3 = appropriate, 4 = very suitable). The results of the expert assessment showed an average of 4 points, which means that the *Rumi* Doping application is very suitable to be applied to Indonesian NPC athletes. Additionally, the Aiken V value showed a value of 0.89 > 0.77, which indicated that the application was valid. Using a questionnaire, the expert also gave an opinion about the *Rumi Doping* application developed according to the expert. The *Rumi Doping* application is a general-based application that can be used for other sports athletes.

Table 1.   Expert Testing Results.

No	Evaluation	Average Expert Rating	Average Aiken V Value
1	Suitability of goals and application development	3	0.78
2	Application type selection accuracy	4	0.89
3	Usability (easy to operate)	4	1.00
4	Easy to choose menu display	4	0.89
5	Voice is easy to hear or clear	4	0.89
6	Communicative	3	0.78
7	Visualization is interesting	4	0.89
8	The background color matches the color of the text and images	4	0.89
9	The typeface used is easy to read	4	1.00
10	The font size used is appropriate	4	0.89
11	Selection of appropriate text position	4	1.00
12	Selection of appropriate image position	3	0.78
13	Use of colors per screen	3	0.78
14	There is a menu of instructions for use	4	1.00
15	There is a search menu	4	1.00
16	The scope of the material is clear	4	1.00
17	Material depth is clear	4	1.00
18	Ease of material for athletes to understand	4	0.78
19	The language used is in accordance with the General Indonesian Spelling Guidelines	4	1.00
20	The language is easy to understand	4	0.78
21	There are explanations of foreign terms	3	0.78
	Average of Aiken V. Value	**4**	**0.89**

Table 2. Practicality Assessment Results

Evaluation	Percentage
Easy to use application	97%
Help in increasing knowledge about doping	87%
Can help self-study about doping	70%
Attractive application display	77%
The language used is easy to understand	70%
The developed application fosters curiosity about doping	67%
The material presented is understandable	73%
It's easy to find information about doping substances in the search menu	97%
Average Percentage	**80%**

Table 3. Understanding Assessment Results.

No	Statement	Disagree	Agree
1	In the match requires doping	100%	0%
2	Doping is not one of cheating in matches because every athlete uses doping	87%	13%
3	Doping helps athletes to make up for previous losses due to injury	90%	10%
4	The way to achieve achievement is not needed, but the quality of performance needs to be considered	87%	13%
5	When competing, athletes must use doping	100%	0%
6	Doping is needed by athletes when dealing with competition situations	87%	13%
7	Athletes don't need to be burdened with mistakes due to doping violations	100%	0%
8	The risks of using doping are exaggerated	87%	13%
9	Alternative careers do not exist for athletes who use doping	83%	17%
10	Increasing motivation for training and competition requires doping	80%	20%
11	When competing, athletes cannot avoid doping	100%	0%
12	Boredom during exercise can only be overcome by doping	83%	17%
13	There is no difference between drugs, fiberglass polishes, and speedy swimsuits, which are all used to improve performance	80%	20%
14	The media only talks a little about doping	93%	7%
15	Media exaggerates doping issue out of proportion	100%	0%
16	The health problems associated with rigorous training and injuries are as bad as doping	87%	13%
17	Legalizing performance enhancement would be beneficial for sports	90%	10%
	Average	**90%**	**10%**

User Rating

This stage was assessed by users, namely 30 Indonesian NPC athletes. The assessment was based on the practicality and effectiveness of the *Rumi Doping* application.

Table 2 shows the practical assessment of the *Rumi Doping* application according to users. The results showed an average percentage of 80% (24/30) of athletes who stated that the *Rumi Doping* application was practical to use.

Table 3 shows the assessment of the effectiveness of the *Rumi Doping* application. The results showed that 90% (27/30) of athletes did not agree about doping in sports. The percentages for each statement are as follows: 100% (30/30) of athletes dis not agree that doping is necessary to be competitive; 87% (26/30) athletes disagreed that doping is not cheating because everyone does it; 90% (27/30) of athletes disagreed that athletes often lose time due to injury and doping can help make up for lost time; 87% (26/30) athletes disagreed that only the quality of performance should be considered, not how the athlete achieves it; 100% (30/30) of athletes disagreed that athletes in sports are pressured to use performance-enhancing drugs; 87% (26/30) athletes disagreed athletes use recreational drugs because it helps them in sporting situations; 100% (30/30) of athletes disagreed that athletes should not feel guilty for breaking the rules and using performance-enhancing drugs; 87% (26/30) of athletes disagreed that the risks associated with doping were overstated; 83 % (25/30) athletes disagreed that athletes do not have alternative career options; 80% (24/30) athletes disagreed that recreational drugs provide motivation to train and compete at the highest level; 100% (30/30) athletes disagreed that doping is an unavoidable part of competitive sport; 83% (25/30) of athletes disagreed that recreational drugs help boredom during exercise; 80% (24/30) athletes disagreed that there was no difference between drugs, fiber glass polishes, and speedy swimsuits which were all used to improve performance; 93% (28/30) athletes disagreed that the media has little to say about doping; 100% (30/30) of athletes disagreed that the media was exaggerating the doping problem out of proportion; 87% (26/30) athletes disagreed that the health problems associated with rigorous training and injury are as bad as doping; and 90% (27/30) of athletes disagreed that legalizing performance enhancement will be beneficial for the sport.

Final Product

The following figures show some pictures of the final product from the *Rumi Doping* application that have been validated by experts and tested for practicality and effectiveness by users. The following figures will also explain how to use the *Rumi Doping* application.

a. When opening the *Rumi Doping* application, a display like this will appear.

b. After click on *let's go* option, a display will appear to register the application.

c. After registering, users can start using the *Rumi Doping* application to find information about the definition of

Figure 1. *Rumi Doping* Application Main Screen Display.

Figure 2. *Rumi Doping* Application Registration Screen.

doping, the types of drugs included in doping, why doping is prohibited, and what the user needs.

DISCUSSION

Doping is a sensitive issue for athletes because doping violates the rules of fair play in the competition. Fair play means being honest and respecting the rights of others in getting the same opportunities before, during, and after the competition. Without fair play, sport and other competitive endeavors are simply a matter of winning in all ways. Doping behavior is the same as athletes cheating in competition. Doping behavior is an individual's act of considering drugs to increase physical ability.[15] Problems related to doping were found in a lack of knowledge and understanding of PABBSI athletes in the Padang city regarding the use of supplements and drugs classified as doping.[16] In addition, the results of Kuswahyudi, Dlis, & Tangkudung (2020) research also show that trainers' doping knowledge is still minimal, with a percentage of 39.43% in the poor, 56.34% in the good category, and 4.23% in the excellent category.[17] One of the factors that influence the lack of knowledge in

education. This statement is supported by Syampurna & Sepriani (2019), who pointed out that there was a problem with the high use of doping among athletes due to lack of information and lack of education from related parties.[16] Research by García-Grimau, De la Vega, De Arce, & Casado (2021) also showed that positive doping behavior predicts high doping susceptibility related to the use of doping substances and prohibited doping methods.[18] The factors that most influence doping behavior are morality and individual opinions. The study also found that there were 9.6% of self-reported doping users. Therefore, it is necessary to increase knowledge about risk factors and understand the causes of doping behavior into an efficient prevention program to deal with fraud due to doping. To better understand the doping-related attitude changes, it is essential to consider the number of messages recipients' thoughts and responses. The findings show that perceiving one's thoughts plays an important valid role in persuasion.[19]

A study conducted by Eduansah, Nuzuli, & Mansur (2020) showed that KONI had made efforts to prevent its fostered athletes from the dangers of doping by instilling traits that prioritize honesty and the health of athletes as well as providing counseling about the risks of using doping for the physical and mental health of athletes.[20] However, this is not enough to increase knowledge, as Kurnianita's research (2016) showed that counseling is not effective in increasing knowledge about drugs.[21] Therefore, preventive measures through technology-based education were needed because of its various benefits such as (1) it can be repeated repeatedly on mobile phones; (2) avoiding formalities in counseling; (3) can find needed information.[22] Development research aims to improve performance in the technological era.[23] This study shows an update of doping socialization for athletes to avoid doping violations through the application. Researchers have carried out the development stage to produce a product in a *Rumi Doping* application. It begins with an expert assessment to test the product validity. To test content validity, knowledgeable individuals who served as experts provided feedback on
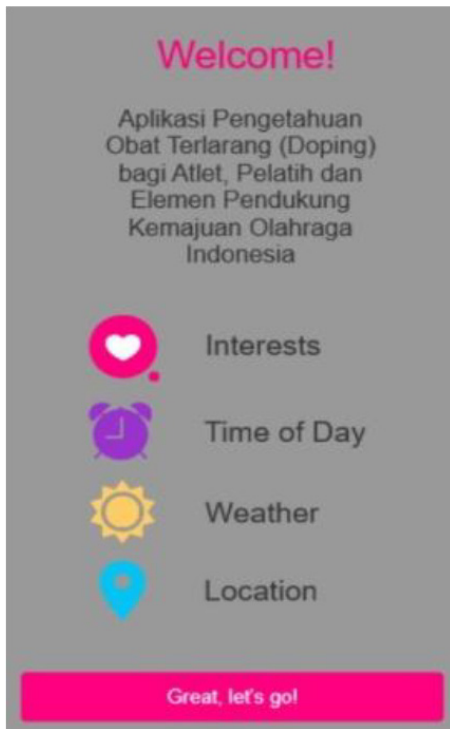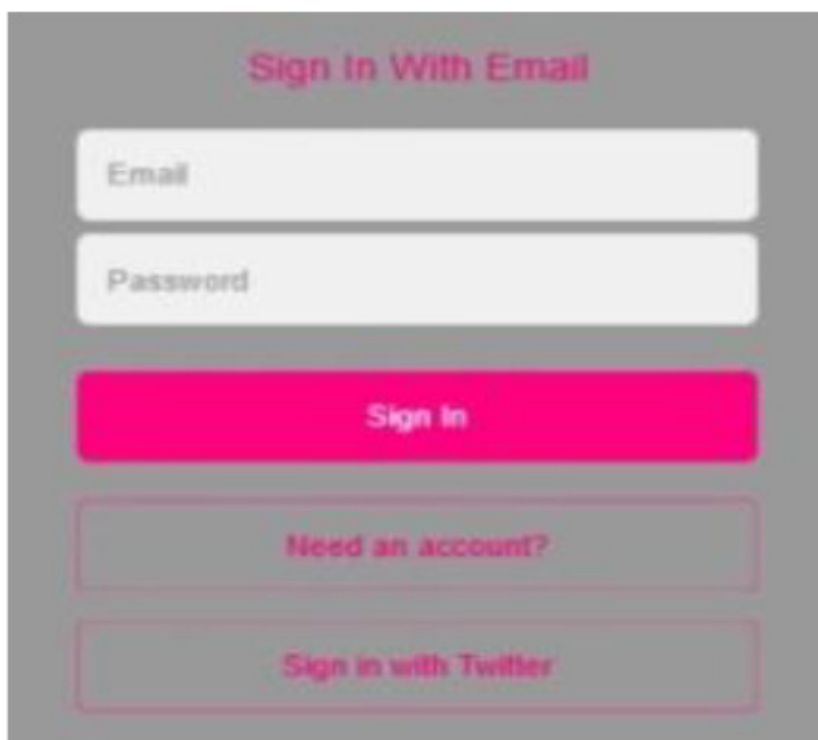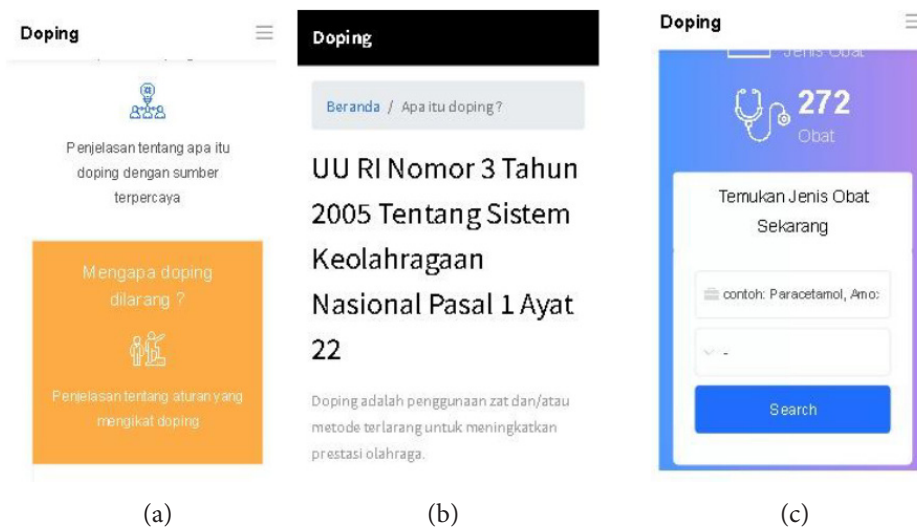
(a) The menu of what is doping?; (b) display of information regarding the definition of doping; (c) Search option for the drug included as doping.

Figure 3. Example of Display Menus on *Rumi Doping* Applications.

whether the constructs described on each subscale were adequately represented by items.[24] The results were shown that the *Rumi Doping* application is valid so that the user can assess it. Researchers conducted an assessment to test the practicality and effectiveness of the application. The results of user assessments state that the *Rumi Doping* application is practical and effective so that users can use it. The *Rumi Doping* application makes it easy for users to search for substances and methods that are included in doping. This application contains an explanation about doping, such as the definition of doping, a list of prohibited drugs, doping substances, doping methods, therapeutic use exemptions, doping control processes, anti-doping institutions, and sanctions for doping users. It also has a search feature that can be used to match the substances contained in drugs, food, and beverages to confirm whether the substance is included in the doping category.

CONCLUSIONS

Based on expert judgment, practicality assessment, and application effectiveness tests, it can be concluded that the *Rumi Doping* application is valid. Furthermore, the *Rumi Doping* application can be used by athletes to add information about doping. So that in the match, there will

be no more cheating regarding the use of doping because they do not know that what is consumed includes doping substances.

AUTHOR CONTRIBUTION

All authors have contributed to all processes in this research, including preparation, data gathering and analysis, drafting and approval for publication of this manuscript.

ETHIC APPROVAL

This study has been ethically approved and an ICJME form has been filled to accompany this paper.

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CONFLICT OF INTEREST

The authors declare no conflict of interest regarding the publication of this article.

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