

# Integration of the Al-Qur'an and Science to Improve the Intellectual Intelligence of Graduate Quality

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## Abstract

The dominance of Western scientific paradigms in the era of globalization has often overshadowed the historical and contemporary contributions of Muslim scholars to the development of science and knowledge. In response to this challenge, SMA Trensains Tebuireng 2 Jombang implements an educational model that integrates Qur'anic values with modern scientific learning to strengthen students' intellectual competence and religiosity simultaneously. This study aims to analyze the Qur'anic verses used in the integration process, examine the implementation of the integration model, and evaluate its contribution to improving graduate quality. The research employed a qualitative phenomenological approach, with data collected through observation, in-depth interviews, and documentation studies. The findings reveal that the integration model is grounded in several Qur'anic verses, including QS. Al-Syu'ara: 4, QS. Al-Rum: 25, and QS. Al-Insan: 17, which discuss creation, natural phenomena, and human existence as foundations for scientific exploration. The implementation process involves a thematic curriculum, scientific interpretation of Qur'anic verses, discussion-based learning, and student presentations that encourage critical and reflective thinking. Supporting factors include the availability of laboratories, libraries, and strong institutional commitment, although limitations in human resources and instructional media remain significant challenges. Overall, the integration model effectively enhances students' intellectual intelligence, scientific reasoning, and religiosity, contributing to the development of graduates with strong academic competence and Islamic character.

*Keywords:* Integration of the Qur'an and Science, Intellectual Intelligence, Graduate Quality

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## 1. Introduction

Modern education today faces a significant challenge in producing graduates who are not only intellectually intelligent but also have a holistic understanding of science. Integration between religious values and science is one of the important approaches to creating a broad-minded generation with noble morals and able to compete in the era of globalization (Fitri et al., 2024; Susanto & Rachbini, 2024; Wahyuni et al., 2024). In this context, the Qur'an, as a source of Islamic values, has a strategic role in providing a solid spiritual foundation while opening up deep scientific insight (A. Anisa & Khoiruddin, 2024). Many verses in the Qur'an contain scientific cues, which, if studied systematically, can become a basis for harmonizing religious teachings and science.

Integrating the Qur'an and science into the educational curriculum is increasingly urgent, especially at the Senior High School (SMA) level, where students are at a critical stage in their intellectual development (Siregar et al., 2019). According to research by Haidar (2019), This integration can improve students' understanding of scientific concepts while strengthening their faith. This integration-based curriculum aims to produce scientists and individuals with high morality, as expected in Islamic education (Rasyidi, 2024). Thus, this approach solves the problem of fragmentation of knowledge, which often separates spiritual values from rational knowledge.

In addition, the rapid development of science and technology requires the younger generation to have critical and creative thinking skills (Lestaria et al., 2023; Purnama Sari et al., 2025; Sudarsono et al., 2024). Unfortunately, conventional educational approaches that are often textual have not been practical enough to hone these skills.

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Research by Khoiri et al. (2017) shows that the learning approach based on integrating the Qur'an and science values can improve students' analytical, creative, and innovative thinking abilities. This aligns with the vision of national education to produce competent and globally competitive human resources.

Furthermore, integrating the Qur'an and science contributes to the development of students' character. Research by Sholeh (2023) shows that students exposed to integration-based education better understand the relationship between science and life values, such as justice, responsibility, and social care. Thus, this approach improves students' intellectual, emotional, and spiritual intelligence, all of which are needed to form a superior next generation.

Senior High School, as a secondary educational institution, has a strategic role in instilling the basics of science integrated with religious values. According to research results by Edison et al. (2021), High school students who received integrated learning based on the Qur'an and science showed a significant increase in learning outcomes compared to those who received conventional learning. This indicates that integration enriches the curriculum and positively impacts the quality of graduates.

SMA Trensains Tebuireng 2, under the auspices of Pesantren Tebuireng Jombang, initiated an idea of scientific integration that is not only at the normative-philosophical level but also touches on empirical-implementation areas into the curriculum and systematic learning of the discourse of scientific integration. The idea of scientific integration is called "Trensains," which is realized in an educational institution at the high school level called SMA Trensains Tebuireng Jombang. Trensains does not only combine pesantren material and general sciences like modern pesantren. Trensains also specializes in understanding the Quran and Hadith and natural science and their interactions. The last point, the interaction between religion and science, creates and finds a building of Islamic science, a typical Trensains material not found in other pesantren. Based on the researcher's observations, several findings were found, including, In general, the level of intellectual intelligence of students at SMA Trensains Tebuireng 2 Jombang is relatively high. This can be seen from their enthusiasm for understanding the material in presentations at school and in learning the Qur'an and science. Genetic factors and social environment are the most dominant factors in influencing students' intellectual intelligence. Students from families with middle to upper economic levels and who live in an excellent social environment tend to have higher levels of intellectual intelligence. Religious education in schools also plays an important role in increasing students' intellectual intelligence. Religious teachers at SMA Trensains Tebuireng 2 Jombang are known for their patience and exemplary behaviour in teaching and guiding students.

Several previous studies have been conducted by Purwaningrum (2015), Bahijah et al. (2022), Rodiana (2021), Rohmah (2021), and Sofi et al. (2024). This study focuses on the implementation of the integration of the Qur'an and science in the curriculum at SMA Trensains Tebuireng 2. The goal is to improve students' intellectual intelligence and religiosity through thematic and empirical learning. This study highlights aspects of the process, integration model, and evaluation of Islamic value-based education outcomes in the specific context of SMA Trensains Tebuireng 2.

## **2. Methods**

This study uses a qualitative approach with a case study type. This approach was chosen because it allows researchers to understand phenomena in a natural context deeply. Qualitative research is oriented towards understanding meaning through verbal data, direct interaction with subjects, and the role of researchers as key instruments (Sudarsono et al., 2025). Case studies are conducted to explore in-depth information about a particular program or phenomenon, in this case, the implementation of verse-based learning *kauniyah* at SMA Trensains Tebuireng 2 Jombang, which has unique characteristics compared to other educational institutions.

Data were collected through observation, in-depth interviews, and documentation. Data sources consist of primary data from interviews with the principal, teachers, and students and secondary data from scientific journals and supporting literature. Observations were conducted in a participatory manner, actively involving researchers in the school's daily activities. In-depth interviews used purposive sampling techniques to obtain relevant information. Documentation includes administrative records and visual recordings to enrich the data.

Data analysis follows the Miles and Huberman model, which involves data collection, condensation, presentation, conclusion, and verification. This process includes selecting, focusing, and transforming data to be analyzed systematically. Researchers interpret data with in-depth reflection to ensure the accuracy of the findings. Data presentation is done in an easy-to-understand format, while conclusions are supported by a verification process through triangulation and checking the validity of the data. The validity of the data is tested based on the Lincoln and Guba criteria, including credibility, transferability, dependability, and confirmability. Credibility is achieved through

triangulation of data sources and methods and member checking. Transferability is done by providing a detailed description of the research context. Dependability and confirmability are maintained through audits by internal and external parties to ensure the quality of the research process and results. This approach aims to produce valid, accountable, and relevant findings.

### 3. Results and Discussion

#### 3.1 *Verses of the Qur'an in the Integration of the Qur'an and Science at SMA Trensains Tebuireng 2 Jombang*

##### 3.1.1 *Universal Curriculum in the Integration of the Qur'an and Science*

The Qur'an is a guide to life that provides spiritual, moral, social, and intellectual guidance for the welfare of the world and the hereafter (Kusrini, 1999). The word of Allah in Surah Yasin verses 1-6, and Surah Al-Isra' verse 9 emphasizes the role of the Qur'an as a straight guide and bearer of good news for believers. As a complete and eternal revelation, the Qur'an is a solution to the challenges of the times, including the moral crisis in the era of globalization, by encouraging humans to understand and practice its contents through reason (Ma'arif, 1985)

Islam teaches the importance of studying science and researching the universe to understand the signs of Allah's power (Ali Imran: 190; Yunus: 101). Religion and science complement each other; religion provides values and goals, while science helps understand the laws of nature (Dalimunthe, 2022). Both form harmony between the world and humans, teaching that science is a way to get closer to Allah and strengthen faith (Sari, 2020).

##### 3.1.2 *Science Verses in the Al-Qur'an*

Science is knowledge about nature based on expert consensus through critical data analysis, while technology is the application of science in making productive use of nature (Bagir, 2005). Although the Qur'an is not an encyclopedia of science, it contains around 750 verses that stimulate humans to reflect on natural phenomena, just as the first revelation encouraged the investigative process (Rahman, 2000).

According to Ghursiani, the Qur'an's messages about nature aim to bring humans closer to the Creator. Understanding nature strengthens faith, as in Al-Mujjadi verse 11, which places knowledge on par with faith. The Qur'an explicitly motivates humans to seek knowledge to get closer to Allah and understand the signs of His power.

To make it easier for teachers to integrate religion and science into learning, carrying out "Grouping Verses" related to a scientific discipline is necessary. Some scientific concepts in the Quran: 1) Natural Sciences (IPA): The origin of life from water (QS. Al-Anbiya': 30), animal movement (QS. Nur: 45); 2) Physics: atmosphere (QS. Fushshilat: 12), the world of color (QS. al-Kahfi: 26), and 3) the discipline of Physics about the solar system.

#### 3.2 *The Process of Integrating the Qur'an and Science to Improve the Intellectual Intelligence of Graduates at SMA Trensains Tebuireng 2 Jombang*

##### 3.2.1 *The Role of Curriculum in the Process of Integrating the Qur'an and Science*

In the curriculum structure of SMA Trensains, there are three groups of subjects, namely, the group of compulsory subjects (11 credits), the group of elective subjects (110 credits), and the group of pesantren science wisdom subjects (14 credits). The compulsory subjects include English, Indonesian, PKN, history, PJOK, and Prakarya. The elective subjects include science subjects, namely chemistry, physics, biology, and mathematics. The pesantren wisdom subjects consist of philosophy, Arabic, aswaja, ushulul fiqh, ulumul hadith, ulumul Qur'an, and the subjects of the Qur'an and science. Integrating subjects aims to produce students as whole individuals who can play a role in society and encourage cooperation between schools and the community (Hamalik, 2011). The curriculum has concepts: ideal curriculum as a reference for expected content; actual curriculum in the form of learning activities; hidden curriculum that influences students through the environment; and learning as a gradual implementation of the curriculum (Arifin, 2011).

The Independent Curriculum provides diverse content for students to explore concepts and competencies. Clear competency standards make it easier to measure learning outcomes, especially in Islamic religious education. This curriculum is based on the philosophy of democratic education, Gestalt psychology, socio-cultural, and student development needs, with a thematic approach (Miftah, 2017). SMA Trensains Tebuireng develops a curriculum collaboratively, involving various parties, to produce superior, faithful, and pious graduates with global competencies. This curriculum integrates knowledge and religious values to prepare graduates for future challenges.

In implementing the integration of the Qur'an and science to improve the intellectual intelligence of the quality of graduates, there must be conformity in the implementation of learning so that the integration of the Qur'an and science at SMA Trensains Tebuireng will lead to the same direction and goals as the vision and mission of SMA Trensains Tebuireng Jombang. In this case, the curriculum can be adjusted as follows in its implementation:

a. Integration of Materials

SMA Trensains Tebuireng uses a unique approach integrating general science with religious values. The goal is to produce graduates who excel academically and have Islamic character. Integration is carried out through 1) Connecting verses of the Qur'an with scientific concepts, such as the solar system and the creation of the sky; 2) Teaching Islamic values, such as honesty and cooperation in every subject; 3) Active learning methods, such as discussions and experiments; and 4) Character building through extracurricular activities, such as Islamic studies and tahfidz. Bagir (Bagir, 2005) emphasized the importance of integrating science and religion to make religion meaningful to humanity and the universe. However, formal education still faces challenges in integrating science and religion, especially in the science curriculum, which refers more to Western scientists. At the practical level, the learning process in formal educational institutions, from elementary school to university level, still faces serious problems that lead to the separation of education, especially the learning of the science curriculum at the secondary school level. The main reference for the existing science curriculum refers to Western scientists. This curriculum makes Western scientists the main reference in all principles of science study.

b. Theme Selection

The selection of the theme of integrating the Qur'an and science at SMA Trensains Tebuireng is an important step toward improving the intellectual intelligence of graduates. A suitable theme supports effective learning and stimulates critical thinking and creativity. Choy & Cheah (2009) define critical thinking as a complex cognitive process, while Ennis (2011) emphasizes reflection and reasoning in decision-making. Nuryanti et al. (2018) added that essential thinking skills include clarification, decision-making, conclusion, and integration.

The criteria for the integration theme include relevance to the curriculum, relevance to the development of science, easy-to-understand concepts, high educational value, and attracting student interest. The thematic approach compiles materials based on themes that connect scientific concepts with verses of the Qur'an. This approach provides a meaningful learning experience, supports mastery of various aspects of learning (learning to know, do, be, and live together), and organizes materials in a structured manner to avoid cramming (Muklis, 2012).

### 3.2.2 Integration of the Qur'an and Science to Improve the Intellectual Intelligence of Graduates

Integration of science in Islamic education aims to unite science and Islamic teachings through several steps, namely: 1) making the Qur'an the main source of knowledge that supports science with observation and logical reasoning to strengthen belief in Allah. 2) avoiding the dichotomy of science because Islam is universal and encourages the importance of studying all sciences. 3) developing *Ulil Albab* personalities who can use reason to understand natural phenomena and acknowledge the oneness of Allah. 4) tracing the verses of the Qur'an that are relevant to science as a source of truth. And 5) developing an educational curriculum integrating science and Islam to form individuals with spiritual depth, noble morals, and broad intellectuality. This approach aims to overcome the moral and spiritual crisis and create integrated and collaborative learning (Suprayono, 2006).

The implementation of the integration of the Qur'an and science at SMA Trensains Tebuireng Jombang is carried out in three stages: first, Preparation of the Integration Process: This stage involves introducing the Trensains concept to all elements of the school (leaders, teachers, education personnel, employees, and students) through intensive mentoring and ongoing training (Training of Trainers). The establishment of the ASS Center aims to train educators to think integrally, combining religion and science (Purwanto, 2015). The unification of perspectives is carried out by aligning the understanding of ontology, epistemology, and axiology of science and realizing that science is not value-free but full of divine values from Allah (Bakar, 1994). Second, Integration Process in Learning: The unification or universal curriculum is applied, which combines the National Curriculum (K-13), the Cambridge Curriculum, and the Pesantren Sains Tebuireng Wisdom Curriculum. Technically, this curriculum integrates the materials of the Qur'an, science, and foreign language skills, with all of these materials applied in the activities of the Islamic boarding school for 24 hours. Third, the Integration Process in Daily Life/*Uswah Hasanah*: Integration is carried out by making exemplary behaviour the main educational method, where all elements in the Pesantren Tebuireng become good examples in everyday words, actions, and attitudes. This refers to the concept of *uswah hasanah* in the Qur'an, which teaches the importance of good role models (Tafsir, 1991).

### 3.2.3 *Supporting and Inhibiting Factors of the Integration of the Qur'an and Science to Improve the Intellectual Intelligence of Graduates*

The implementation of the Qur'an and science integration at SMA Trensains Tebuireng faces several obstacles, such as limited access to books, journals, and learning resources that examine the integration, as well as limited technological facilities for project-based learning and research. These inhibiting factors affect the development of learning materials and exploration of the relationship between the Qur'an and science. Winkel (2009) stated that the learning process is an active interaction that results in changes in knowledge and attitudes, which aims to create positive changes in individual behaviour (Nugraha, 2020)

However, supporting factors also exist, such as a clear vision at SMA Trensains to integrate the values of the Qur'an with science, as well as full support from the principal and leaders. Adequate facilities and infrastructure are key to school quality, such as laboratories and libraries that support students' skills to compete in the technological era (Afriansyah, 2019). The laboratory allows for experiments that connect science with verses of the Qur'an, and the library provides learning resources to enrich students' knowledge about the relationship between science and the Qur'an.

### 3.3 *Integration Model of the Qur'an and Science to Improve the Intellectual Intelligence of Graduates at SMA Trensains Tebuireng 2 Jombang*

#### 3.3.1 *Integration Model of the Qur'an and Science*

The learning model must be adjusted to the characteristics of students and learning objectives (Yamin, 2005). Teachers play an important role in the success of learning by choosing the suitable model, mastering the material, and motivating students. Creative and varied learning resources are also needed to support learning. To integrate religion and science, developing an integrative education model that unites subjects is important. This process is more than just Islamization; it is a dissolution in which Islam (the Qur'an and Sunnah) becomes the main source in all fields of science, including social sciences (Purwaningrum, 2015).

At SMA Trensains Tebuireng, an integrative learning model combines science and the Qur'an, such as the correlation model. The Qur'an contains many verses that invite reflection on the universe, which can inspire the development of science. Science and the Qur'an are seen as two sources of knowledge that complement each other, not contradict each other. Scientific discoveries are often in line with those stated in the Qur'an. Integration emphasizes more profound dissolution, while Islamization tends to add Islamic elements to the curriculum.

#### 3.3.2 *Learning Methods and Media*

Integrating the Qur'an and science at SMA Trensains Tebuireng uses a thematic approach to connect Islamic values with scientific knowledge. Thematic learning links several subjects with relevant themes, providing meaningful experiences to students (Puskur, 2016). By connecting scientific concepts and verses of the Qur'an, students can understand the universe holistically, develop critical thinking skills, and increase learning motivation. Some steps that can be taken in thematic learning are choosing a relevant theme, setting measurable learning objectives, and compiling teaching modules in detail. The benefits of thematic learning include improving students' conceptual understanding, developing high-level thinking skills, strengthening student relationships, and improving teacher professionalism (Muklis, 2012). Some themes often raised include the creation of the universe in the Qur'an and scientific theories such as the Big Bang and the solar system's formation. Teachers must also master classroom management skills with a preventive and curative approach to create a conducive learning atmosphere (Gafur, 2019). Based on Vygotsky's theory, cooperative learning strategies encourage students to work together in small groups, help each other, and reach the Zone of Proximal Development (ZPD). Cooperative learning supports a constructivist process in which students receive information and actively construct knowledge, especially in connecting the Qur'an and science.

The method at SMA Trensains Tebuireng Jombang can be done in various ways, such as thematic learning that integrates Qur'an and science materials, problem-based research projects that examine natural phenomena from a scientific and Qur'anic perspective, and class discussions that involve students in analyzing various religious and scientific texts. In addition, schools can also invite experts in the fields of science and religion to give lectures or workshops to enrich students' understanding. Thus, SMA Trensains Tebuireng Jombang graduates are expected to have high intellectual intelligence, strong character, and a deep understanding of the relationship between religion and science. The learning method for integrating the Qur'an and science is explained as follows:

#### a. Tafsir' ilmi

Tafsir' ilmi, or an interpretation that connects the verses of the Qur'an with the discoveries of modern science, aims to show the Qur'an's miracle and its conformity with scientific facts (Ichwan, 2004). This interpretation assumes that the Qur'an contains knowledge that has been discovered and has not and does not contradict common sense or science (Ardianto & Rubini, 2016). In the context of education at SMA Trensains Tebuireng, the tafsir ilmi approach can help students integrate religious and scientific knowledge, improve their understanding of both, and train their communication skills to explain the relationship between the Qur'an and science. In addition, studying the Nizam of the Qur'an, which includes the external and internal meanings, is important for understanding the wisdom and rules of Islam and achieving al-huda and al-taqwa (Jalil, 2014).

#### b. Group discussion

Group discussion is an effective learning strategy involving interaction, goals, leadership, norms, and emotions, per the concept of dynamic groups explained by Barbour (2000) and Latifah (2013). Through group discussions, students can think critically, analyze, and synthesize information from various sources, both the Qur'an and science, which hone their high-level thinking skills. Integrating the Qur'an and science in group discussions helps students understand that science and religion complement each other, not contradict. This learning can increase students' learning motivation and contribute to developing their potential, especially at SMA Trensains Tebuireng.

#### c. Presentation

According to Bowman (1998), the presentation method is a way to convey and explain a topic to an audience or learners. This method trains students to develop activeness, critical thinking, and analytical skills. Presentations also create a lively classroom atmosphere where students feel proud to be able to express their ideas. Another benefit of this method is to train writing and critical thinking skills. Presentations also effectively integrate the Qur'an and science, allow visualization of abstract concepts, and increase students' understanding and motivation to learn through exciting media and develop their communication skills (Millah, 2015).

### 3.4 Impact of Integration of the Qur'an and Science on the Intellectual Intelligence of Graduates

According to Muhammad In'am Esha (2009), integration is combining separate parts into one unit. In science and religion, integration means bringing together the perspectives, thoughts, and actions of science and Islam (Safiq, 1995). Science, as a science that refers to general natural objects and uses definite laws, originates from the verses of *kauniah* and responds to the development of Islamic thought, such as restorationist, reconstructionist, and pragmatism.

Learning the Qur'an and Hadith aims to form spiritual intelligence, help students recognize religious norms and develop good behaviour (Chaniago et al., 2022). Islam, as the science of the Qur'an, shows the unity and interconnectedness between life and revelation, guiding people towards happiness in this world and the hereafter (Tasrif, 2008). Integrating the Qur'an and science in the education curriculum, especially at SMA Trensains, has a significant impact on increasing the intellectual intelligence of the quality of graduates. Here are some positive impacts that can be felt:

#### a. Strengthening Critical Thinking Skills

SMA Trensains Tebuireng Jombang hones students' critical thinking skills through integrating the Qur'an and science, discussions, debates, research projects, problem-based learning, and cooperative learning. This approach encourages students to analyze, compare, and evaluate information, collaborate, and share ideas (Ennis, 2011). Critical thinking is an important skill for diagnosing problems and making rational decisions, which can improve student learning outcomes (Susilawati et al., 2020). SMA Trensains has succeeded in producing graduates who are academically intelligent and critical thinkers, ready to face global challenges. The curriculum relevant to local needs supports the development of students' creativity and critical thinking national education goals (A. N. Anisa et al., 2024).

#### b. Increasing Creativity

SMA Trensains Tebuireng integrates Islamic values and science to stimulate students' creativity. Inspiration from the verses of the Qur'an and a focus on real problems help students think creatively and find innovative solutions. Student learning creativity is measured based on five indicators: fluency, flexibility, originality, elaboration, and evaluation (Rahmayanti et al., 2020). This creativity is important for solving problems (Ernawati et al., 2019). It includes generating new ideas, seeing issues from various perspectives, and choosing the best idea (Setiawan et al., 2021).

### c. Improving Problem-Solving Skills

SMA Trensains Tebuireng has excellent potential to develop students' problem-solving skills. Problem-solving is a process of overcoming difficulties in achieving goals, and in mathematics, students must be able to solve problem-based problems (Hendriana et al., 2017). Bell (1978) identified five real-world problem-solving strategies: presenting problems clearly, formulating hypotheses, testing hypotheses, and choosing the best solution. This process enhances students' intellectual intelligence and trains their cognitive abilities to think critically, analytically, and innovatively, in line with the educational goal of producing graduates ready to face real-world challenges.

## 4. Conclusion

This study concludes that the integration of the Qur'an and science combines the understanding of Islam from the Qur'an with scientific knowledge about the universe. By linking the verses of the Qur'an that discuss the universe with scientific theories, it is hoped that students can: 1) See the harmony between religious teachings and scientific knowledge. 2) Think more critically and analyze information in depth. 3) Develop creativity in understanding the universe. Second, integrating the Qur'an and science at SMA Trensains Tebuireng 2 Jombang is a complex process that is very important to do. With the support and cooperation of all parties, the goal is to produce a generation of believers and knowledge that can improve the intellectual intelligence of the quality of graduates. Integrating the Qur'an and science has great potential to improve the quality of graduates. However, this process requires careful preparation and faces several challenges. The main difficulties lie in lacking competent human resources, limited learning media, and suboptimal curriculum development. Third, the model of integration of the Qur'an and science at SMA Trensains Tebuireng 2 Jombang aims to improve the quality of graduates by connecting Islamic values in the Qur'an with scientific discoveries. This model uses the Scientification of Islam and the Islamization of Science as its basic framework. The main step in integrating the Quran and science model is the thematic approach, which links themes in the Quran with scientific concepts. Cooperative Learning Strategy: Encourage students to actively participate in learning and find the relationship between religion and science. Scientific interpretation method: understanding the verses of the Qur'an related to the universe with the help of modern science. Discussion method: stimulating students to think critically and analyze information from various sources. Presentation method: visualizing abstract concepts and improving students' understanding.

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