

Cognitive Technology for Academic Counselling in New Normal

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Abstract

The objectives of this research on Cognitive Technology for Academic Counselling in the New Normal were (1) to design an architecture of cognitive technology for academic counselling in the new normal, (2) to develop a system of cognitive technology for academic counselling in the new normal, (3) to assess the academic performance of students using cognitive technology for academic counselling in the new normal, and (4) to assess the satisfaction of students using cognitive technology for academic counselling in the new normal. The sample group in this study were 30 students at a secondary school level 1 from Ongkharak Demonstration School, Srinakharinwirot University, in the 2021 academic year. The students were enrolled on a course in Design and Technology and selected by multistage randomization, i.e. 1) group randomization and, 2) simple random sampling. The research tools were, (1) a system of cognitive technology for academic counselling in the new normal, (2) a performance assessment form, (3) a test and worksheets on design and technology, and (4) a satisfaction assessment form. The research results found: (1) learning outcomes after using the system were significantly better than before at the .01 level, and (2) the overall satisfaction of students using cognitive technology for academic counselling in the new normal was at the highest level (Mean = 4.50, S.D. = 0.64).

Keywords: cognitive technology, academic counselling, chatbot, new normal

1. Introduction

1.1 Introduce the Problem

The 20-Year National Strategy (2018-2037) is the national strategy of Thailand according to the Constitution of the Kingdom of Thailand. Its objective is to build Thailand's competitiveness and focus on enhancing the country's potential. The innovative industries and services of the future with upcoming technologies aim to drive the country forward with digital technology information, data, and artificial intelligence to increase the nation's potential and competitiveness. This covers automation and robotics, intelligent electronics and the internet of things. It intends to build a platform for the future economy and improve people's quality of life, to apply digital technology and artificial intelligence in accordance with the national strategy for human resource development with a capacity to increase efficiency and create innovation in education. The Strategy lays the foundations to support learning with digital platforms and focuses on developing digital skills, knowledge screening skills and the use of technology. It combines teachers' values to develop quality learning materials for people to access and utilize the learning system, so users can develop themselves through modern learning technologies for maximum benefit (Strategy, 2021).

Today's technologies have evolved rapidly and are widely used by many groups of people. Electronic devices are more intelligent and able to understand what humans want. Machine learning and intelligence have greatly evolved from the science of artificial intelligence (AI), which is believed to help humans use computers to solve critical problems, such as making computers understand languages. Humans learn to reason and build robots. One technology that has been used to help facilitate this is the chatbot, which today has been much developed and is widely used (Tuncel, Mumcu, & Tanberk, 2021)

In the current situation, changes must be made in terms of living, working and studying online, causing learners to request information about teaching chatbots that are modern and meet users' needs. These increase comfort in communication and interact with users automatically and instantly. Chatbots can answer questions repeatedly from

many users, which make them more convenient in terms of information and can also recommend information about online teaching.

Therefore, the researcher recognizes the importance and problems mentioned above. Cognitive technology for academic counselling in the new normal can assist in answering informational questions as well as providing assistance at all times to users while quickly providing answers. It also gives students the potential to develop themselves at higher levels.

1.2 Objective

- 1) To design the architecture of cognitive technology for academic counselling in the new normal.
- 2) To develop a system of cognitive technology for academic counselling in the new normal.
- 3) To assess the academic performance of students using cognitive technology for academic counselling in the new normal.
- 4) To assess the satisfaction of students using cognitive technology for academic counselling in the new normal.

1.3 Hypothesis

- 1) The overall results of the effectiveness of evaluating a system of cognitive technology in academic counselling in the new normal format were appropriate at a high level.
- 2) The learning outcomes of students who after using a system of cognitive technology for academic counselling in the new normal were significantly better than before at the .01 level.
- 3) The satisfaction of users of cognitive technology in academic counselling in the new normal format was at a high level.

1.4 Research Scope

- 1) Population and sample.

The population used in the research were junior high school students at a secondary school, Ongkharak Demonstration School, Srinakharinwirot University. The sample group comprised 30 students in secondary school level 1, Ongkharak Demonstration School, Srinakharinwirot University in the 2021 academic year, enrolled on a course in design and technology, and selected by multistage randomization, i.e. 1) group randomization and 2) simple random sampling.

- 2) Variables studied.

The independent variable is a system of cognitive technology in academic counselling in the new normal. The dependent variables were 1) learning outcomes and 2) satisfaction.

- 3) The content used in the research is the subject of Design and Technology.
- 4) The research tool is a system of cognitive technology in academic counselling in the new normal.

1.5 Expected Results

- 1) A system of cognitive technology in academic counselling in the new normal for teaching and learning at the secondary school level.
- 2) Guidelines for applying cognitive technology to academic counselling in the new normal format as a tool for teaching and learning in schools that can be used and developed further.
- 3) A prototype of expert cognitive technology in academic counselling in the new normal that can help students achieve better grades.

1.6 Conceptual Framework

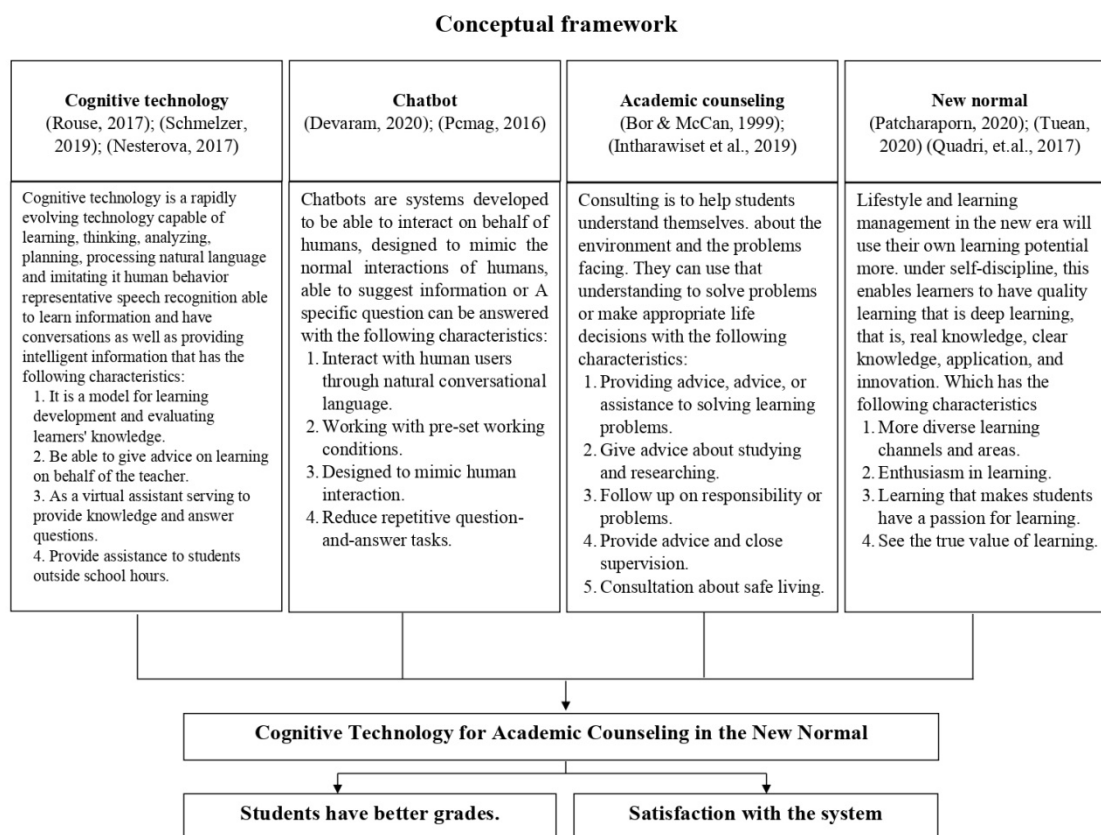


Figure 1. Research conceptual framework

1.7 Theoretical Framework

Cognitive technology:

Cognitive technology is a field of artificial intelligence designed to mimic the activity of the human brain. Using data mining techniques, pattern recognition, and natural language processing, these techniques represent a self-learning system that uses machine learning technology to perform tasks on behalf of people. In other words, thinking technology will help computers to think in a manner similar to human thinking (Whitler, 2016; Schatsky, Muraskin & Gurumurthy, 2015; High, 2012). Lynchmay (2018) offers guidelines for the use of cognitive technology in education as follows: 1) automatically score grades, 2) provide learning recommendations on behalf of teachers, 3) support individualized learning, 4) motivation in learning for learners, 5) provide assistance to learners outside of school hours, 6) analyze learners' behavior to adapt content to suit individual learners' learning style, and 7) analyze needs to support good management. Cognitive technology refers to technology that can learn, analyze, process, and imitate human behavior, and can learn information for intelligent decision-making.

Chatbot:

Chatbots are computer software designed to chat with humans. Chatbots are widely used in the customer service industry where computers answer frequently asked questions or basic information. Chatbots may provide useful functions for supporting health professional trainees across geographically distributed sites including reducing the burnout of the faculty (Janet, 2021). Chatbots are artificial intelligence (AI) powered applications that help users with tasks with responses in natural language and are prevalent in various industries. Most of the chatbots and digital assistants we find on the web like Alexa and Siri do not show compassion for their users and their ability to empathize is immature. A lack of compassion for users is not important for interactive chatbots (Devaram, 2020). Chatbots are automated chat programs which are also effective teaching assistants for answering students' questions about lessons, homework submissions, scores, and issues. Teachers can monitor students' learning

progress. Chatbots can also create a bond between students and teachers. Messaging between students and teachers becomes easy and convenient for students to learn. You can also ask any questions.

Line Application:

Online chat applications such as LINE can facilitate informal communication about classroom activities. Due to its accessibility, LINE is a new communication application that allows users to make voice calls and send messages anytime, anywhere. Teachers can use LINE to contact students, while students can use it to contact teachers and colleagues. Increased engagement with peers and teachers will enhance students' learning (Van de Bogart & Wichadee, 2015).

Academic counselling:

A "consultant" gives advice and guides students every step of the way. They encourage students to have search skills and analytical thinking skills, collecting knowledge. It has been created into new knowledge and can use a body of knowledge to create innovative works that arise from learning, including knowledge about computational science which teaches students to have a systematic analytical thinking process with the ability to make decisions. Planning can be applied to creatively solve life-related problems in various disciplines, whether it is mathematics, humanities or other subjects to create a teaching style that is suitable for learners both in terms of development or the age of students. It can also reduce the individual differences of learners to lead to a change in teaching styles that are effective for learners (Intharawiset, Phulketnakhon, Charoensa, & Reaung-Rong, 2019). Wikipedia (2021) states that counselling is the professional approach of an individual using specific psychological methods to collect case history data using a variety of techniques in a personal interview and to test interest and aptitude. Counselling refers to counselling services as a relationship between a counsellor, who is a trained professional, with service recipients who need help to understand themselves and better understand others, with a clearer understanding of the environment including improved decision-making and problem-solving skills, as well as improving the ability for self-development (Submee, 2001). Academic counselling is a process of assistance that relies on a strong relationship between the counselor and the student. Counselors guide students in researching rules and regulations, provide students with accurate information about rules and regulations, or provide information to help them with their studies and in other areas.

New normal:

Educational management, according to the new normal, must be consistent and connected to children's learning. There should be an increased emphasis on the curriculum, adjusting it to be in line with the era of COVID-19 and communicating to all concerned parties increased flexibility in the structure of study times and a variety of learning styles. Teachers will design the unit and teach with a suitable plan including upgrading the assessment for development so that children do not lose opportunities to improve knowledge and skills, especially understanding languages and calculations. Assessment is an appraisal of responsibility and should give more weight to assessing children's educational opportunities rather than measuring knowledge with test scores. What is important is physical preparation and the minds of teachers and students in dealing with the new normal of education that has changed learning styles, including educational management which is no longer the same (Patcharaporn, 2020). The design of education in a new way of life is devised for adaptation or a future educational blueprint that focuses on changing concepts. The belief of personnel is that there must be a lot of adaptation and the power of self-development.

Roles and responsibilities, known as a Growth Mindset, are important. Administrators and teachers drive teaching and learning. The use of technology in administration or in educational management, such as online teaching, working at home, online meetings, and communication, including online shopping, will increase. A community relations database system and information technology will be an important mechanism to support the administration of education (Thuan, 2020). The new normal means a different way of life caused by certain factors making the old familiar life change to a new, unfamiliar way of life. Teaching and learning have more diverse channels and areas of learning. Students have returned to school with the experience of online teaching. Studying at home makes it possible to learn any content from anyone, anywhere at any time, and does not compromise the relationship between teachers and students.

2. Method

Development of cognitive technology in academic counselling in the new normal. The researcher divided the research methodology into three phases as follows:

Phase 1: the process for designing the architecture of the cognitive technology in academic counselling in the new normal as follows

- 1) Study the importance and feasibility of a system of cognitive technology.
- 2) Study research related to academic consulting.
- 3) Study the tools used to develop both software and hardware.
- 4) Analyze the cognitive technology in academic counselling in the new normal.
- 5) Design the system architecture of the cognitive technology in academic counselling in the new normal.
- 6) Designing an algorithm of cognitive technology in academic consulting in the new normal.

Phase 2: the development of cognitive technology in academic consulting in the new normal the following steps.

- 1) Develop a system for cognitive technology in academic consulting in the new normal.
- 2) Test the cognitive technology system in academic consulting in the new normal by analyzing the developed system before having an expert assess the performance of the system.
- 3) Evaluate the effectiveness of a system by using five experts selected via purposive sampling, who had at least five years of relevant experience, using system evaluation from cognitive technology in academic consulting in the new normal.

Phase 3: a study of the results of the systematic use of cognitive technology in academic consulting in the new normal.

- 1) Apply a system of cognitive technology in academic consulting in the new normal for 30 students at Secondary School 1, Ongkharak Demonstration School, Srinakharinwirot University for the academic year 2021, enrolled in a course of design and technology while using the system. Finally, examine learning outcomes by using tests and worksheets.
- 2) Conduct a satisfaction study on using system cognitive technology in academic consulting in the new normal. The tool was a satisfaction assessment form.

3. Results

An architectural design result of the systematic use of cognitive technology in academic consulting in the new normal was shown in Figure 2.

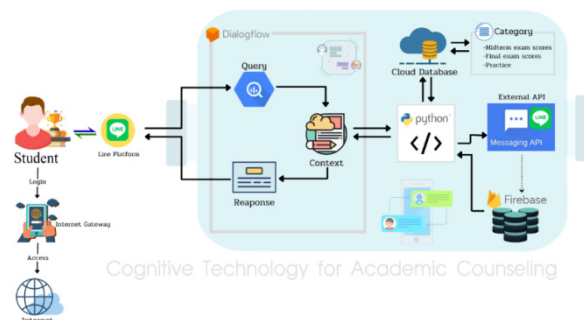


Figure 2. An architecture cognitive technology in academic consulting in the new normal

An algorithm design results cognitive technology in academic consulting in the new normal was shown in Figure 3.

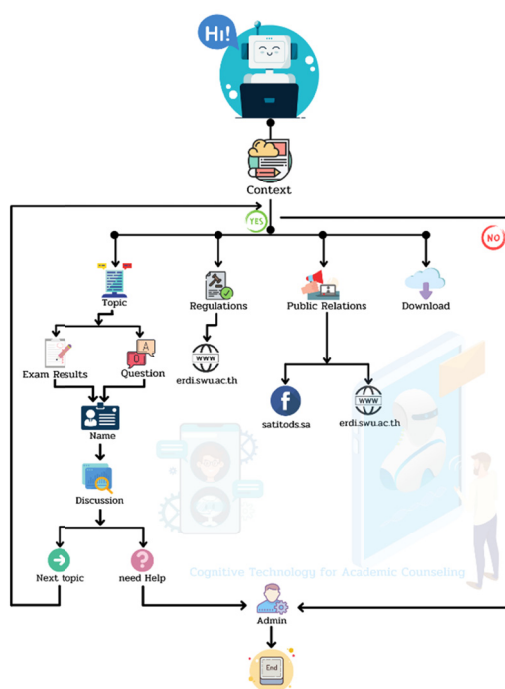


Figure 3. An algorithm of cognitive technology in academic consulting in the new normal

The results of the development a system cognitive technology in academic consulting in the new normal was as follows.

- 1) Start by adding Line Chat Bot ODS as a friend by scanning the QR Code below



Figure 4. Qr code for adding Chatbot ODS as a friend

- 2) Press the Add Friend button, then press the Chat button to start a conversation

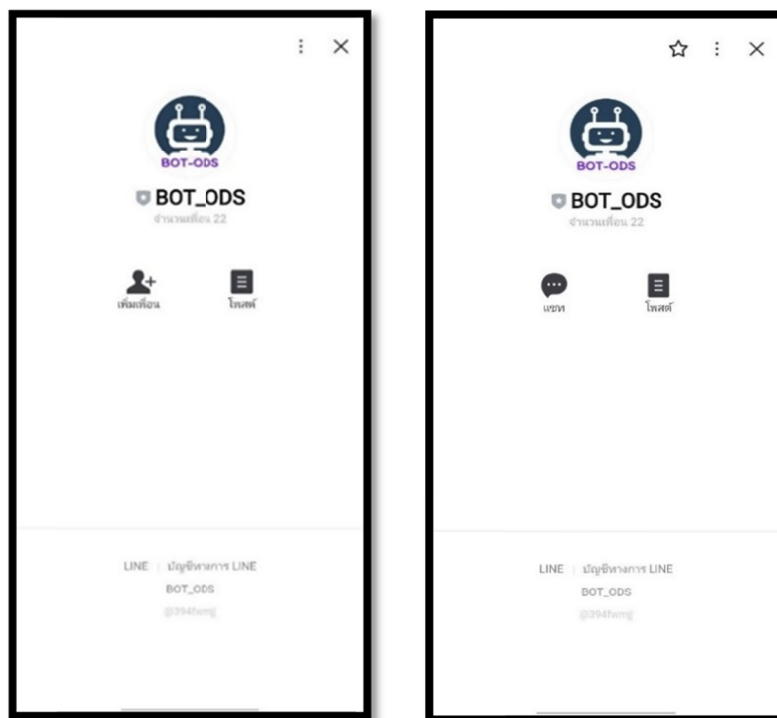


Figure 5. Shows adding friends

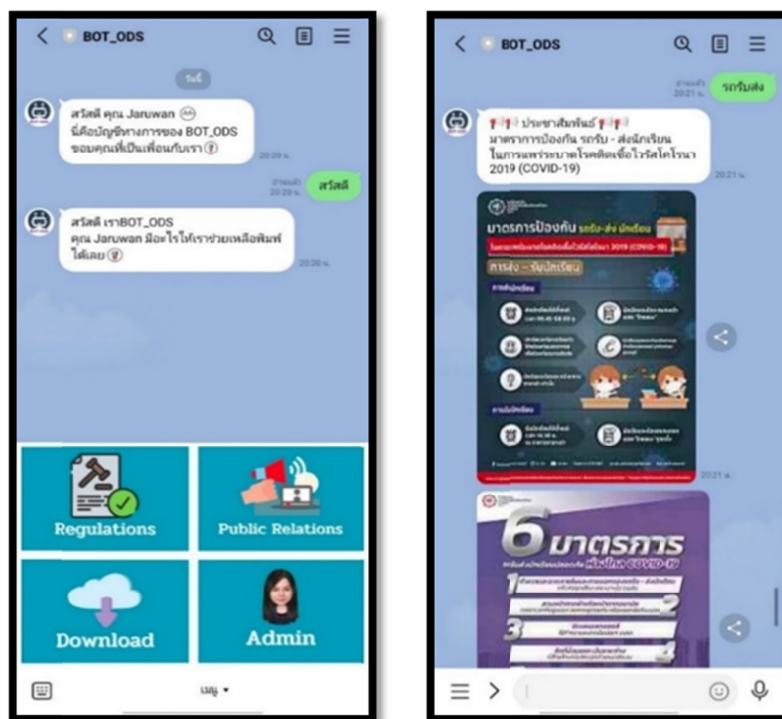


Figure 6. An example picture of BOT-ODS answering questions

The results of evaluating the effectiveness of a system of cognitive technology in academic counselling in the new normal are in the following table.

Table 1. The results of evaluating the effectiveness of a system of cognitive technology in academic counselling in the new normal

Assessment details	Expert opinion		
	Mean	S.D.	Appropriateness
1) The suitability of the system.			
1.1 The spontaneity of human conversation.	4.20	0.45	High
1.2 The language level is appropriate for the user.	4.80	0.45	Highest
Sum	4.50	0.53	Highest
2) System operation accuracy.			
2.1 The appropriateness of the message can be communicated to the user to understand.	4.80	0.45	Highest
2.2 Appropriateness of format, size, and image.	4.80	0.45	Highest
2.3 Conversations or answering questions from the system are easy to understand and clear.	4.40	0.89	High
2.4 Responses from the system are accurate and relevant to the questions.	4.80	0.45	Highest
Sum	4.70	0.57	Highest
3) Convenience and ease of use of the system.			
3.1 Convenience and accessibility of using the system.	5.00	0.00	Highest
3.2 Overall screen design suitability.	4.80	0.45	Highest
Sum	4.90	0.32	Highest
4) The speed of the system.			
4.1 System response time.	4.60	0.55	Highest
4.2 The system has up-to-date information and updates regularly.	4.60	0.55	Highest
4.3 The suitability of the speed of the system as a whole.	4.80	0.45	Highest
Sum	4.67	0.49	Highest
5) System security.			
5.1 The system is logged in before adding friends.	4.80	0.45	Highest
Sum	4.80	0.45	Highest
Total average	4.70	0.50	Highest

The overall results (Table 1) of evaluating the effectiveness of a system of cognitive technology in academic counselling in the new normal format were appropriate at the highest level (Mean =4.70, S.D.=0.50). The results found convenience and ease of use of the system were at the highest level (Mean = 4.90, S.D.=0.32), followed by system security (Mean=4.80, S.D.=0.45) and accuracy of system operation (Mean=4.70, S.D.=0.57), respectively.

The results of students' learning outcomes after using cognitive technology in academic counselling in the new normal were higher than before using cognitive technology, as shown in the following table.

Table 2. Results of students' learning outcomes after using the cognitive technology in academic counselling in the new normal

Learning outcomes (points)	N	Mean	S.D.	t-test	Sig.
Before using a system	30	21.30	3.63	13.38	0.001
After using a system	30	28.43	1.73		

The students' learning outcomes after using the cognitive technology in academic counselling in the new normal were statistically significantly higher than before at the .01 level (Table 2).

The results assessing satisfaction after using cognitive technology for academic counselling in the new normal are shown in the table as follows.

Table 3. The results assess satisfaction after using cognitive technology for academic counselling in the new normal

Assessment details	User satisfaction		
	Mean	S.D.	Appropriateness
1. Ease of access to information.	4.30	0.95	High
2. System response time.	4.57	0.50	Highest
3. The text used can be communicated to the user to understand.	4.43	0.73	High
4. The system has up-to-date information and updates regularly.	4.40	0.67	High
5. The system provides accurate results that meet the needs of users.	4.57	0.68	Highest
6. This system is close to human conversation.	4.53	0.51	Highest
7. Appropriateness of size, color, and legibility.	4.50	0.63	Highest
8. The clarity of the text displayed on the monitor.	4.67	0.48	Highest
9. Overall screen design suitability.	4.47	0.63	High
10. Overall satisfaction with the use of the system.	4.53	0.57	Highest
Total average	4.50	0.64	Highest

The satisfaction of students after using cognitive technology for academic counselling in the new normal format was appropriate at the highest level (Mean = 4.50, S.D. = 0.64) (Table 3).

4. Discussion

The results of using a system of cognitive technology for academic counselling in the new normal found that the satisfaction of students was at the highest level. The overall results of evaluating the effectiveness of cognitive technology in academic counselling in a new normal format were appropriate at the highest level. This is consistent with the research of Hien, Cuong, Nam, Nhung, and Thang (2018) who studied intelligent assistants in a higher education environment: chatbots for administrative and learning support. It was found that the students were able to interact directly and with high satisfaction. This is consistent with the research of Wuthiphapinyo (2021). Studying the factors affecting the satisfaction of using a chatbot service, it was found that satisfaction was high. According to the hypothesis, this is consistent with the research of Sirat and Jaithip (2020) who investigated the effects of online learning-enhancing chatbots on computational thinking among Grade 4 students with different personalities. It was found that both groups of online learning-enhancing chatbots had higher mean scores of computational thinking after the experiment than before.

For research on cognitive technology for academic counselling in the new normal, most found that it was consistent with their academic performance after school and was better than before. Learners were satisfied with using the system at most levels, and the results of this summary can be used as a guide in other research studies.

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