



# **Modern Conditions of Development of Science, Education and Production in the World – 2024**

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## CHAPTER 3. ANALYSIS AND PROSPECTS FOR TRAINING UAVs PILOTS IN THE SYSTEM OF PROFESSIONAL TRAINING OF FUTURE ENGINEERS- TEACHERS OF ENERGY AND TECHNOLOGICAL FIELDS

### 3.1. Prospects for Using Unmanned Aerial Vehicles in Innovative Projects

The history of unmanned aerial vehicles dates back to the end of the 19th century. In 1899, the famous inventor, physicist and engineer Nikola Tesla designed and demonstrated to the public the world's first radio-controlled boat, which did not go unnoticed in the scientific community and gave impetus to the development of the field of controlled objects. Charles Kettering, an American engineer and inventor, continued research in this direction and in 1910 presented the world with a new unmanned aerial vehicle based on the use of a clock mechanism. According to the author's idea, the device, after a certain time after launch, would drop its wings and fall on the enemy. The project was financed by the US Army, but was not approved for widespread use and did not participate in the hostilities of the First World War. Kettering's next brainchild was a flying torpedo - the Kettering Bug, but this device was not destined to see combat either: in the early 1930s, funding was cut off, considering the Aerial Torpedo expensive and ineffective compared to traditional ammunition [1]. An important milestone in the development of UAVs was the development of an automatic gyroscopic stabilizer in 1917, which made it possible to create an unmanned aircraft - the Sperry Aerial Torpedo - in 1918. However, until 1935, drones were not able to return to the launch site, so their reuse was impossible. A breakthrough was made by British engineers: the DH.82B Queen Bee UAV, created for pilot training, was controlled from a ship by radio and could return to the launch site - that is, it could be used repeatedly. The "Queen Bee" served the Air Force from 1934 to 1943.

During World War II, UAVs found wider application. German scientists developed the Henschel Hs 293 and Fritz X gliding bombs, the Enzian anti-aircraft UAV based on the Me 163 fighter, and the well-known V-1 and V-2 cruise missiles. The United States mass-produced target UAVs for pilot training, as well as Interstate TDR-1 bombers, which could carry a torpedo or a 2,000-pound bomb (a total of 195 such UAVs were created during the war). The Soviet Union also used UAVs, which were created on the basis of the TB-3 bombers that had served their purpose and were used to blow up bridges. In the post-war years, UAVs were used mainly as target vehicles for training flight personnel and as reconnaissance vehicles, conducting reconnaissance and photographing the area. Also, during the Cold War, the first unmanned helicopter was created in the United States, the purpose of which was to counter submarines. In addition, drones were actively used by Israel: from 1967 to 1970 - during the War of Attrition against Egypt, the Yom Kippur War (1973) and during the fighting in the Bekaa Valley (1982). At that time, Israeli UAVs performed reconnaissance and false target functions. The development of GPS and its introduction into service at the turn of the 1990s made it possible to use drones as a target designation device, which affected the nature of military operations: drones began to be used more actively in various combat operations. But this did not solve the problem of speed: from the moment the

drone detected the target, transmitted information to the ship basing the cruise missiles, made the decision to launch and hit the target with a missile, enough time passed for the combat situation to change, and the targets to leave the affected area. The US government decided to increase funding for the development of new drones in 2001. This has borne fruit: in just a few years, such attack UAVs as the MQ-1 Predator (2005), MQ-9 Reaper (2007) and RQ-4 Global Hawk (2004), the RQ-170 Sentinel reconnaissance drone, created using stealth technology (2007), and the Fire Scout unmanned helicopter (2009) were developed. All of them were later introduced into the US Air Force.

At this stage of technology and engineering development, automation is becoming a general trend.

Unmanned aerial vehicles are of great importance for the armed forces, since due to their features they have a number of advantages, such as:

- low cost with equal efficiency of the tasks performed;
- no pilots, which reduces the risk of personnel death;
- fuel economy;
- low weight, allowing the use of electric engines;
- significant reduction in takeoff and landing space;
- high operational efficiency;

- stealth of use due to small size and the use of synthetic materials in the manufacture of the body.

For the use of UAVs for civilian purposes (critical infrastructure facilities), at this stage there is a need to solve organizational and technical problems, which hinders the use of this type of equipment. For example, at the moment, the issue of UAV registration and the creation of a regulatory framework allowing the use of these devices has not yet been resolved.

The areas of application of civilian drones are extensive, but one of the main areas is monitoring the technical condition of critical infrastructure facilities, forests and controlled territories. With the help of UAV attachments, terrain monitoring is carried out, which allows it to be used for protection, exploration of hard-to-reach places on the planet, as well as search and rescue in emergency situations. These aircraft are also used to transport cargo, and in the future, it is planned to create UAVs for transporting people [4].

The need to use autonomous unmanned aerial vehicles in monitoring and transmitting information is dictated not only by the optimization of the processes in which they are involved, but also by eliminating the risks associated (primarily in the military sphere) with possible losses of personnel, since a well-trained soldier and officer is much more valuable than a soulless iron machine, the production of which is incomparably less labor intensive than the amount of time spent on training a living person. Thus, the development and use of unmanned aerial vehicles for civilian needs are promising areas of development of science and technology, which contributes to the development of these areas of activity in general, and the implementation of specific tasks.

Summing up the definition of the prospects for the use of UAVs, it should be noted that in Ukraine, enterprises for the creation of UAVs are already actively working. In our opinion, manufacturers need to continue to conquer the drone market in the world, develop and produce UAVs. The possibilities of using drones, as well as other devices, are very limited by technical characteristics, improving which can increase competitiveness and strengthen the UAV market. In our opinion, such a direction as the development of artificial intelligence, as well as the training of specialists in the system of professional training of future engineers and teachers in the energy and technological fields, deserve special attention. The appearance of autonomous AI systems on board will allow Unmanned Aerial Vehicles to make independent decisions about the execution of the mission and will prevent the danger of interference, control interception and radio detection.

### **3.2. Improvement of Practical Skills of Unmanned Aerial Vehicle Operators in the Information and Educational Environment**

Training of mid-level specialists in the field of remote piloting, operation and maintenance of unmanned aerial systems is an important and one of the priority areas for the functioning of UAV companies of airborne and special forces units and formations. This is confirmed by the increasing role of using UAVs as a modern means of warfare in the context of rapid development of scientific and technological progress and increased global competition in the market of high-tech weapons and military equipment [1]. According to the qualification requirements for the professional training of graduates in the specialty 014.10 Secondary education "Labor training and technology" and 015.33 Professional education "Power engineering, electrical engineering and electromechanics", future engineers-teachers must gain practical experience in planning, preparing and performing flights on UAVs [2]. However, there is no quick start when moving from studying disciplines in this specialty to practical flights. Students need a certain amount of time to apply the theoretical knowledge they have acquired to perform a flight of an unmanned aerial vehicle in various meteorological conditions according to the created flight programs, which in turn reduces the time for consolidating practical skills in UAV control. Such results are planned to be obtained during the training of future engineers and teachers in the energy and technological fields at the Berdyansk State Pedagogical University. In order to eliminate this shortcoming, the "Operator" methodology will be developed.

The development of the methodology will be based on the implementation of practical exercises, solving test tasks in the information and educational environment of the educational institution, and the use of innovative forms of training [3].

The development of the methodology will be based on elements of the "flipped classroom" technology, practical exercises, and solving applied problems.

The training of engineers and teachers in the energy and technology fields includes mastering the disciplines of the professional cycle on remote piloting of UAVs, their operation and processing of information obtained during the UAV flight. The training includes acquiring theoretical knowledge in the field of unmanned aerial

vehicles and developing practical skills in servicing, operating and using the systems for their intended purpose, gaining practical experience in their use. When moving to practice, students lack confidence in managing systems with UAVs, in the ability to apply the acquired theoretical knowledge in practice.

The assumption that practical skills in managing systems with UAVs will be formed at a higher level using the capabilities of the information and educational environment formed the basis of the hypothesis of the scientific research.

Within the framework of the developed methodology "Operator", which will include the performance of certain tasks and exercises by students during independent training hours, that is, the improvement of practical skills in managing UAVs occurred due to the intensification of independent training. This also contributed to better training in mastering the topics and sections of academic disciplines. The authors of the methodology applied elements of the "flipped classroom" technology [5], the cadets deepened their knowledge of the most complex topics during independent preparation, and during the lesson they performed special exercises to consolidate the acquired knowledge and skills. This contributed to the formation of independence in solving problems related to the operation of UAV systems, flexibility, adaptability, information literacy, initiative, responsibility, creativity [6]. The use of this technology was possible due to the full-scale involvement of the information and educational environment of the educational institution, which is relevant in the formation of students' competencies, contributes to its development and improvement. The created information and educational environment have the ability to provide students with access to electronic library resources, copyrighted materials with video and audio lectures, and to monitor students' knowledge. The educational and material base allows each student to study new lecture material individually or in groups during independent preparation, using electronic boards, multimedia equipment, and work on modern simulators - flight simulators [7, 8]. If necessary, students can watch the presentation author's materials the required number of times, analyze the most difficult moments. Each video is accompanied by instructions-hints. At the same time, the topic is consolidated during class-group exercises. This allows for a high-quality formation of the learning process.

The "Operator" methodology includes working with electronic teaching aids developed for conducting this experiment. With the help of such electronic means, you can study the lecture material, watch a video on the operation of various UAV systems, take a control test, and perform exercises to consolidate the material. And the developed methodological recommendations allow you to use effective methods when studying individual topics: student participation in modeling a professional situation, conducting a business game, a scientific conference, etc.

Practical activities, according to the developed methodology, include work in created educational laboratories on modern training equipment. Using a flight simulator will allow you to practice practical skills in controlling an unmanned aerial vehicle. On the simulator monitor screen, students will see an image similar to the image of the camera of a real UAV, transmitted to the screen of the ground control station. Moreover, the use of "virtual glasses" will allow you to control hand

movements, as during a real launch of a drone, assemble and disassemble all the components of the UAV, which is quite difficult to do with real unmanned aerial vehicles due to their high cost. In the lesson on developing knowledge of the specifics of performing flights with UAV systems in various conditions, students need to understand the weather conditions: atmospheric pressure, air temperature, visibility, weather conditions hazardous to aviation flights, thunderstorms, etc. 8 hours are allocated for studying these conditions (three classroom and group lessons). The main goal of the lesson is to develop skills and abilities in organizing and operating unmanned aircraft systems in any weather conditions. The use of the "Operator" technique will allow students to study the specifics of weather conditions using a video during independent training. A control test will assess knowledge and consolidate it. Students had the opportunity to refer to the video as needed thanks to the information and educational environment and consolidate their knowledge. In the lesson "Flights in Various Conditions", knowledge of the specifics of performing flights with UAV systems was developed. In this case, students relied on the knowledge obtained from video clips. In the lesson, time was no longer allocated for studying weather conditions, but exercises were practiced in performing flights using game and competitive methods.

It is impossible not to mention that the effectiveness of the developed methodology will ensure the fulfillment of certain pedagogical conditions. The analysis of scientific literature will allow the authors of the developed methodology to clearly formulate and describe the pedagogical conditions of the effective process of developing practical skills of students as UAV operators, with the aim of being able to apply the methodology to subsequent recruitments of cadets studying in the above-mentioned specialty and improving the methodology itself. Based on the definition of A. Nine, the pedagogical conditions are presented by the authors of the methodology as a set of objective possibilities, content, forms, methods, pedagogical techniques and the material and spatial environment aimed at solving the problems set in the study [9].

The first condition. The training of future engineers-teachers in the energy and technological fields is built in accordance with the developed plan (calendar plan, curriculum, subject plan). According to this plan, individual topics of the disciplines are allocated for independent study in the form of presentations, video lectures, podcasts. Consolidation and assimilation of the acquired knowledge is carried out with the help of testing and analysis by the teacher of their application by students in practical classes.

The second condition. Optimally selected methods and forms of conducting classes should contribute to the development of analytical skills in students, the development of quick, confident decisions in various situations. For example, changing the route of a UAV when encountering an obstacle in the air. There are known cases when the device could fall from a height due to the operator's uncertain control, which entailed negative consequences. However, the use of the developed methodology made it possible to minimize such errors. The operator is firmly confident in his actions, knows how to coordinate his actions when controlling the UAV.

Third condition. Use of the principles of systematicity, information focus, self-development, creativity and others [10]. The methodology is structured, aimed at the final result. The selected methods and forms of work are aimed at developing students' interest in the actions they perform, at realizing the importance of skillful actions of UAV operators, developing a creative approach, especially in non-standard situations.

Fourth condition. Creating a microclimate in the team. Each student must learn to effectively perform individual and collective tasks. Therefore, it is necessary to apply an individual approach and create an atmosphere of sports competition, teamwork, and organize the ability to interact in a team.

Fifth condition. Provision of software, educational and material resources, availability of IOS for each student.

The developed methodology "Operator" will show high efficiency, which will be confirmed by statistics, practical experience, and the opinion of independent experts.

Thus, this methodology is quite effective for training future engineers and teachers in the energy and technological fields, allows for more rational use of the educational and material resources and development of the educational institution's information and educational environment, and then use its capabilities to develop the skills of future operators of UAV systems.

### **References**

1. Алексієв В.О., Волков В.П., Калмиков В.І. Мехатроніка транспортних засобів та систем. Харків : ХНАДУ, 2004. 176 с.
2. Антощенко Р.В. Динаміка та енергетика руху багатоелементних машинно-тракторних агрегатів. Харків : ХНТУСГ, «Міськдрук», 2017. 244 с.
3. Богомолова Є.В., Плотнікова Є.І. Проблеми та перспективи підготовки майбутніх фахівців до використання інформаційних технологій у процесі прийняття рішення. *Питання сучасної науки та практики*. 2017. №1(63). С. 172–177.
4. Дудюк Д.Л. Гнучке автоматизоване виробництво і роботизовані комплекси : навч. посібник. Львів : «Магнолія плюс» СПД ФО В.М. Піча, 2005. 278 с.
5. Лудченко О.А. Технічне обслуговування і ремонт автомобілів : організація і управління : підручник. Київ : Знання-Прес, 2004. 478 с.
6. Найн А.Я. Про методологічний апарат дисертаційних досліджень. *Педагогіка*. 1995. № 5. С. 44–49.
7. Попович М.Г. Електромеханічні системи автоматичного керування та електропривід. Київ : Либідь, 2005. 678 с.
8. Пуха Г.П. Сучасні технології в освітньому процесі. *Вісник сучасної освіти*. 2021. № 2(29). С. 59–62.
9. Савічева Т.В. Змішане навчання у сучасному освітньому процесі : необхідність та можливості. *Вісник сучасної освіти*. 2021. №3 (30). С. 92–96.
10. Федоров А.І. Підхід до вдосконалення рівня підготовки майбутніх фахівців у сфері інформаційних технологій. *Сучасні технології у науці та освіті. СТНО-2017 : зб. тр. міжнар. наук.-техн. та наук.-метод. конф.* 2017. С. 101–103.

11. Форнальчик Є.Ю., Оліскевич М.С., Мاستикаш О.Л., Пельо Р.А. Технічна експлуатація та надійність автомобілів : навч. Посібник. Львів : Афіша, 2004. 492 с.
12. Яглінський В.П. Моделювання динамічних процесів роботизованого виробництва. Одеса : АстроПрінт, 2004. 234 с.
13. Яцун М.А. Експлуатація та діагностування електричних машин і апаратів : навч. Посібник. Львів : Видавництво Національного університету «Львівська політехніка», 2010. 228 с.
14. Anna Khatsko, Serhii Onyshchenko. Construction of Mechatronic Modules Based on Synergetic Integration of Elements. *Наукові засади підготовки фахівців інженерно-педагогічного та технологічного напрямків : матеріали V Всеукраїнської науково-практичної інтернет-конференції (15 травня 2024 року) : збірник тез [за заг. ред. С.В. Онищенко]. Запоріжжя : БДПУ, 2024. С. 126–128.*
15. Bishop R.H. The Mechatronics Handbook. Boca Raton : CRC Press, 2002. 1229 p.
16. Fletcher J.D. Education and Training Technology in the Military. *Science*. 2009. №2. P. 72–75.
17. Maksym Bezhan, Serhii Onyshchenko. Concept of Design and Application of Mechatronic Systems in Modern Mechanical Engineering. *Наукові засади підготовки фахівців інженерно-педагогічного та технологічного напрямків : матеріали V Всеукраїнської науково-практичної інтернет-конференції (15 травня 2024 року) : збірник тез [за заг. ред. С.В. Онищенко]. Запоріжжя : БДПУ, 2024. С. 120–122.*
18. Onyshchenko S. Design of Mechatronic Industrial Systems. *World science : problems, prospects, innovations : Materials of the IV International research and practical internet conference (October, 20, 2023) : collection of abstracts // for the general ed. Ph.D Serhii Onyshchenko. Zdar nad Sazavou : "DEL c.z.", 2023. P. 17–18.*  
<https://dspace.bdupu.org.ua/handle/123456789/2208>
19. Onyshchenko S. Electromechatronic Complexes and Modules. *Development of scientific and educational system: European vector – 2023 : collective monograph.* (Series of monographs Slovak publishing house NES Nová Dubnica s.r.o. Monograph 1). Nová Dubnica : NES Nová Dubnica s.r.o., 2023. P. 71–86.  
<https://dspace.bdupu.org.ua/handle/123456789/2202>
20. Onyshchenko S. End-to-End Programs of Classes for Energy Profile Students During Internship at Energy Enterprises. *Fundamental and Applied Scientific Research : Topical Issues, Achievements and Innovations : Materials of the V International Research and Practical Internet Conference (March, 27, 2024) : collection of abstracts [for the general ed. Ph.D Serhii Onyshchenko]. Zdar nad Sazavou : "DEL c.z.", 2024. Pp. 10–12.*
21. Onyshchenko S. Formation of ICT-Competence of the Future Specialist in the Energy Industry in the Conditions of Informatization of Education (Distance Education). *The latest foundations for the development of production, science and education – 2023 : collective monograph.* Nová Dubnica : NES Nová Dubnica s.r.o., 2023. P. 37–55.  
<https://dspace.bdupu.org.ua/handle/123456789/118>
22. Onyshchenko S. Implementation of Studying the Section “Mechatronic Modules” Into the Course “Hydraulics”. *Development Strategies for Modern Education and Science : Materials of the V International Research and Practical Internet Conference*

(February, 27, 2024) : collection of abstracts [for the general ed. Ph.D Serhii Onyshchenko]. Zdar nad Sazavou : "DEL c.z.", 2024. P. 10–11. URL : <https://dspace.bdpu.org.ua/items/03f22c31-58e9-45ab-9f71-a0523b71edc8>

23. Onyshchenko S. Mechatronics in Mechanical Engineering : monograph. Zdar nad Sazavou: Publishing House "The company "DEL c.z."", 2023. 76 p. URL : <https://dspace.bdpu.org.ua/handle/123456789/2242>

24. Onyshchenko S. Principles Development of Modules Mechatronic Systems. *Promising Scientific Achievements in Science, Education and Production – 2023 : collective monograph.* (Series of monographs Slovak Publishing House NES Nová Dubnica s.r.o., Monograph 2). Nová Dubnica: NES Nová Dubnica s.r.o. 2023. P. 82–96. <https://dspace.bdpu.org.ua/handle/123456789/2205>

25. Onyshchenko S. Psychological and Pedagogical Foundations of the Application of Modern Information Technologies in the Educational Process of Future Specialists in the Energy Industry. *European vector of modern education, science and production – 2023 : collective monograph.* Nová Dubnica : NES Nová Dubnica s.r.o., 2023. P. 57–73. <https://dspace.bdpu.org.ua/handle/123456789/117>

26. Onyshchenko S. Research and Application of Mechatronic Devices. *Наукові засади підготовки фахівців інженерно-педагогічного та технологічного напрямків : матеріали V Всеукраїнської науково-практичної інтернет-конференції (15 травня 2024 року) : збірник тез [за заг. ред. С.В. Онищенко].* Запоріжжя : БДПУ, 2024. С. 123–125.

27. Onyshchenko S. Structure of Information Competence of Future Engineers-Educators. *Development of the educational system : European vector : Materials of the IV International research and practical internet conference (September, 15, 2023) : collection of abstracts / for the general ed. Ph.D Serhii Onyshchenko.* Zdar nad Sazavou : "DEL c.z.", 2023. P. 17–19. <https://dspace.bdpu.org.ua/handle/123456789/1116>

28. Onyshchenko S. Theoretical Analysis of the Independent Work of Future Engineers-Pedagogues in the Teaching of Professionally Oriented Disciplines in Higher Education Institutions. *Modern conditions of development of science, education and production in the world – 2023 : collective monograph.* (Series of monographs Slovak publishing house NES Nová Dubnica s.r.o. Monograph 1). Nová Dubnica : NES Nová Dubnica s.r.o., 2023. P. 70–88. <https://dspace.bdpu.org.ua/handle/123456789/732>

## ANNOTATION

### **CHAPTER 1. MODERN BASICS OF ECONOMICS, MANAGEMENT AND TOURISM**

#### **1.1. Taisiia Nakonechna, Nataliia Mashchak SERVICE SYSTEM IMPROVING FOR CUSTOMERS OF PRIVATE MEDICAL INSTITUTIONS**

Private medical institutions market analysis in Ukraine was carried out. The main influencing factors on the medical industry development, in particular private institutions, have been identified and formed. On the activities basis of the private medical center "VeroMed", the medical services range and the demand for them were analyzed, as well as the comparative characteristics of the "VeroMed" center pricing policy and its main competitors. The main stages and features of private medical institutions customers service are highlighted. Improving communication methods with clients have been developed.

**Keywords:** private medical institutions, customer service, communication with customers.

#### **1.2. Nadiia Vasylytsiv CONSUMERS BEHAVIOR RESEARCH IN THE CONTEXT OF GENERATIONS THEORY**

The researching necessity of consumers purchasing behavior in the generation's theory context is indicated. The main nowadays generations, which have purchasing power, are considered. Their main parameters, values, attributes and factors influencing their formation are highlighted. On the conducted research basis, the main differences in the purchasing behavior of different generations representatives were analyzed for a better consumer understanding by business.

**Keywords:** consumer behavior, generation theory, consumption priorities, consumer trends, Gen X, Gen Y, Gen-Z, Gen Alpha.

### **CHAPTER 2. INNOVATIONS IN MODERN MEDICINE AND BIOLOGY**

#### **2.1. Dariia Kichura, Iryna Sobechko ARTIFICIAL INTELLIGENCE AND MODERN MEDICINE**

The article presents an overview of the current state and development of artificial intelligence in the medical field, existing implementations, and shows the use of implementation in medical institutions. Historical aspects, the current state of the development of artificial intelligence, its methods and tools in various fields of medicine are considered: cardiology, orthopedics, ophthalmology, laboratory diagnostics. The relevance of the implementation of artificial intelligence in the field of health care for increasing the accuracy of diagnosis, correct treatment and quality of service, as well as reducing the workload of medical workers is shown.

**Keywords:** artificial intelligence; information security; medicine; national security; cyber-attacks.

### **CHAPTER 3. Serhii Onyshchenko ANALYSIS AND PROSPECTS FOR TRAINING UAVs PILOTS IN THE SYSTEM OF PROFESSIONAL TRAINING OF FUTURE ENGINEERS-TEACHERS OF ENERGY AND TECHNOLOGICAL FIELDS**

The article considers the prospects for using unmanned aerial vehicles (UAVs), describes programs that promote development and problems that hinder the use of

UAVs in the system of professional training of future engineers-teachers of energy and technology industries.

The article also considers the issue of improving the practical skills of UAV control of future engineers-teachers of energy and technology industries due to the capabilities of the information and educational environment, which is one of the priority areas, according to the requirements of the modern educational standard. The methods of analysis, observation, experiment, systematization, statistical processing was used.

**Keywords:** unmanned aerial vehicle, information technology, innovation, information and educational environment, engineer-teacher.

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### **CHAPTER 1. MODERN BASICS OF ECONOMICS, MANAGEMENT AND TOURISM**

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### **CHAPTER 2. INNOVATIONS IN MODERN MEDICINE AND BIOLOGY**

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### **CHAPTER 3. ANALYSIS AND PROSPECTS FOR TRAINING UAVs PILOTS IN THE SYSTEM OF PROFESSIONAL TRAINING OF FUTURE ENGINEERS-TEACHERS OF ENERGY AND TECHNOLOGICAL FIELDS**

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