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Features of YouTube video service use in the education process

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Most of the younger generation watch different videos on YouTube (YT) daily, but these are usually not educational videos, although there are educational channels on YT. We believe that video services are a familiar medium for pupils, and, accordingly, the goal of the teacher is to adapt pupils to familiar environments with educational goals. To this end, the article explores the particularities of using the YT video service in the educational process.

An explanation of the concept of "video service" as a service of the Internet, which provides the ability to see videos, comment, download, publish videos. The results of a foreign study on the use of YT in the educational process are presented. The video service Mix the Play is described. The types of educational video are outlined: professional training films, studio and natural video lectures, video scribing, video infographics, screencasts, demonstrations, interactive videos, 3D rendering, pseudo-video, video timeline, video zooming. YT educational service channels have been highlighted in various subjects (astronomy, biology, geography, informatics, history, mathematics, physics, chemistry, etc.). A list of YTC which is useful for teaching informatics in different classes is presented. The model of inverted class, the types of inverted classes are outlined: typical, discussion-oriented, demonstration-focused, group, virtual inverted classes, pseudo-inverted classroom, inverted teacher. The advantages and disadvantages of using the model of "Inverted class" for realization of the educational process are highlighted.

The advantages and disadvantages of using the YT video service in the educational process are outlined. It is suggested how to use the YT at different stages of a computer science lesson. Examples of problems using video services for 8th grade informatics pupils have been developed. A list of topics in computer science is offered, in the study of which it will be useful to use video services.

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Key words: video services, video service Mix the Play, video service YT, types of educational videos, education, video service capabilities, YT video educational channels, inverted classroom training model, inverted classes, informatics tasks.

ОСОБЛИВОСТІ ВИКОРИСТАННЯ ВІДЕОСЕРВІСУ YOUTUBE В ОСВІТНЬОМУ ПРОЦЕСІ

О. С. ДУЩЕНКО

Більшість підростаючого покоління щодня переглядають різноманітні відеоролики на відеосервісі YT, але це зазвичай не освітні відеоролики, хоча на YT є освітні канали. Вважаємо, що відеосервіси – звичне середовище для учнів, а відповідно метою вчителя є адаптація школярів до звичних середовищ з освітніми цілями. З цією метою у статті досліджуються особливості використання відеосервісу YT в освітньому процесі.

Подано тлумачення поняття "відеосервіс" як сервіс мережі Інтернет, який забезпечує можливість перегляду відеороликів, коментування, завантаження, публікації власних відеороликів. Представлено результати зарубіжного дослідження щодо використання YT в освітньому процесі. Описано відеосервіс Mix the Play. Окреслено наявні типи освітнього відео: професійні навчальні фільми, студійні й натуральні відеолекції, відеоскрайбінг, відеоінфографіка, скрінкасти, демонстрації, інтерактивні відеоролики, 3D-візуалізація, псевдовідео, відео-таймлайн, відеомаштабування. Виділено освітні канали відеосервісу YT з різних навчальних предметів (астрономія, біологія, географія, інформатика, історія, математика, фізика, хімія тощо). Наведено перелік каналів відеосервісу YT, відеоролики яких корисно використовувати при викладанні інформатики в різних класах. Представлено модель навчання "Перевернутий клас", види "перевернутих класів": типовий, орієнтований на дискусію, сфокусований на демонстрації, груповий, віртуальний перевернуті класи, псевдоперевернутий клас, "перевернутий" вчитель. Виділено переваги та недоліки використання моделі навчання "Перевернутий клас" для реалізації освітнього процесу.

Окреслено переваги та недоліки використання відеосервісу YT в освітньому процесі. Запропоновано як використовувати відеосервіс YT на різних етапах уроку з інформатики. Розроблено приклади завдань із використанням відеосервісів для учнів 8 класу з інформатики. Запропоновано перелік тем з інформатики, при вивченні яких буде корисним використовувати відеосервіси.

Ключові слова: відеосервіси, відеосервіс Mix the Play, відеосервіс YT, типи освітніх відео, освіта, можливості відеосервісу, освітні канали відеосервісу YT, модель навчання "Перевернутий клас", види "перевернутих класів", завдання з інформатики.

Introduction of the issue.

According to the National Strategy for the Development of Education in Ukraine for the period up to 2021, the priority of the development of education is the introduction of modern information and communication technologies that ensure the improvement of the educational process, accessibility and efficiency of education, preparation of the young generation for life in the information society [7]. Using video services can help increase the efficiency of the

educational process, because visual information is better perceived and remembered by a person, so when teaching educational material, video services can be used as a learning tool.

Current state of the issue. The problem of using video services in education is being investigated by such scientists as Y. Bykov, N. Voitovich, S. Zaritskaya, K. Kirichuk, O. Korniets, S. Litvinova, A. Naydenova, V. Pavlova, O. Parkhomenko, V. Proshkin, I. Savchuk, T. Tikhonov and others. Thus, scientists (S. Zaritskaya,

O. Parkhomenko) [3] define video service as a service for downloading multimedia web resources [3: 42]; social service for watching and sending videos [3: 43]. V. Proshkin analyzes YT as hosting for storage of media files [9: 186]. Scientist suggests using YT video service for classroom and independent work of future teachers, giving the following examples of video service use: watching videos of school lessons for observation and analysis of the educational process, viewing speeches of scientists, webinars, forums that expose pedagogy and teaching techniques [9: 186-187]. V. Proshkin proposes to use the video service Lectr.Com to host educational video lectures for future professionals [9]. T. Tikhonova views video services as Internet sites where video clips can be stored, viewed, commented on and edited [12: 344]. The scientist offers to use video services as a source of educational materials, a repository of video archives, creative student works [12: 344].

The outline of unresolved issues brought up in the article. However, the use of video services in the educational process in different models of teaching in scientific works is not well considered.

Aim of research. We aim to review the didactic capabilities of video services and to identify the specificities of using the YT video service to solve educational tasks, through the inverted class model in particular.

Research results and discussion. Nowadays, gadgets have become an integral part of modern pupils' life, they make pictures, shoot videos and share them, all of which are their hobbies that take time that they can use to learn. So why not ask pupils to create videos for educational purposes, but it is not necessary that the first video should be, for example, how to write a program in programming language, if this video is from computer science.

You may be asked to start a video on "How did my summer go?", "My hobbies", "What bothers me?", "My fears", "My friends", etc., and the second video may be related to educational material. It's no secret that visual perception is the most effective, so can be used videos in the class to present complex, "dry" training material. Especially the use of videos is relevant in the lessons of history, biology, chemistry, physics, foreign languages, computer science, etc.

Valuable is the experience of foreign scientists regarding the use of video services in the educational process. For example, in Germany [12] a study was conducted on the use of YT in the educational process, which found that pupils use video services to repeat material that was unclear to them at school, to find info for homework, to prepare for exams, deepening their knowledge, also for classes in the visual, musical, theatrical arts.

Apropos, the British Council and the Old Vic Theater in London [11] have created a video service called "Mix the Play", where you can create a play by William Shakespeare as a director. The creation of a play involves the creation of scenery, costumes, musical accompaniment, choice of actors, manner of play, special effects [11]. Using such video service will be useful during literature lessons.

Let's take a closer look at the capabilities of video services. Thus, scientists (I. Savchuk, O. Marushchak, V. Pavlova) [10] view YT as a source of educational material. Researchers (V. Wember, D. Buchinskaya) [2] distinguish the follow types of educational video: professional educational films (films made at professional recording studios using the appropriate technique to cover complex processes of phenomena of nature, production, activities of specialists, etc.; examples of this type videos are educational, popular science films,

video lectures, video lessons); studio and full-length video lectures (creating this type of video comes from taking a lecture and editing, creating the appropriate background with the addition of regular, glass or interactive whiteboards, etc.); video scribing (animated videos that can be professional, semi-professional or amateur); video infographics ("graphic visual representation of data or knowledge intended to display complex material quickly and clearly" [2: 24]; the combination of dynamic graphics, music and sound); screencasts ("digital video recording of information" [2: 25]); demonstrations (video contains demonstrations of equipment work, experiments, laboratory work, process photos); interactive videos (videos contain texts, maps, polls); 3D visualization (animation of 3D models); pseudo videos (videos from static objects, such as slideshows) video timeline (demonstration of an object over time, such as the development of a certain stage) video zooming (demonstration of comparing object sizes in space) [2: 23-26].

Let's take a look at YT's video service. A YT Learning section was created on the YT platform in July 2018, featuring educational videos in English. This channel is useful for teaching English and integrated lessons such as biology and English. For anyone who uploads educational videos, YT developers provide guidelines on how to create such videos. YT has already created a project for children called YT Kids to provide child content.

Here are some examples of YT video education channels. Thus, The Village website [14] offers popular YouTube channels (YTC) in Ukrainian and English to cover educational content in such subjects as astronomy, biology, geography, mathematics, physics. For example, the Alpha Centauri Ukraine YTC (<https://www.youtube.com/channel/U>

[CbhABWj6Ijp1dYG3Wo5Ek3Q/feed](https://www.youtube.com/channel/U/CbhABWj6Ijp1dYG3Wo5Ek3Q/feed)) contains videos about the first stars of the universe, telescopes, Mars bases, spacecraft protection, the ionosphere, artificial stars, the transformation of the Big Red Spot on Jupiter, the search for exoplanets, earthquakes on Mars, life support systems in space, heat balance on Earth and more.

The 360 Science YTC (https://www.youtube.com/channel/U/Cf3rRbOjyNRB_e6K6gtISMA/featured) contains videos on astronomy, space exploration, and biography of scientists. For example, the future of mankind in space, the Bermuda Triangle and more.

YT's Science and the Universe (<https://www.youtube.com/channel/U/C9gDR8zmbMhgEULgXipm3OA/feature>) offers videos about the Universe, science, and man, such as Mars, the Moon, Mercury, black holes, satellites, burnt planets, exploration of the planet's atmosphere, ancient clusters of galaxies, solar wind, atmospheric luminescence, space-time funnel around the Earth, solar system, confirmation of Einstein's general theory of relativity near a supermassive mountain hole, a new equation for intelligence (Alex Weros), nanotechnology development Fourth dimension, Venus, Titan, future manned missions and robotic research Carina Nebula, Andromeda and the Milky route from editing human DNA and more.

The ToBeUkrainian YTC (<https://www.youtube.com/channel/U/CpFKlj193lNquqj4vyY2qyA/featured>) contains videos from school subjects (astronomy, biology, chemistry, physics, mathematics, computer science, etc.).

English language channels ("Science Channel", "SmarterEveryDay", "Brusspup", "TED-Ed", "AsapSCIENCE", "Kurzgesagt", "Life Noggin", "Looking Glass Universe", "Intelligent Channel", "Stanfordonline", "Word Science Festival", "Institute of Physics", "Minute Physics", "Veritasium", "Seeker", "Nova

PBS Official", "It's Okay To Be Smart", "Reactions", "Explorium", "Vsauce", "Gross Science", etc.) [14] provide information on science news; outer space; new technology; experiments; optical illusions; Universe; knowledge of the outside world; mathematics and physics; the human body and psyche; philosophy; games; technique; culture; insect life; animals; plants; planet Earth, etc.; educational videos developed by multipliers and scientists.

The Lesson Education Project website [4] offers a selection of videos on physics. For example, the English-language mobile application Lab4Physics (<https://lab4u.co/en/lab-in-your-pocket/lab4physics/>) can be used to conduct experiments on physics, the YTC of which is located at: https://www.youtube.com/channel/UCYQomVkugwb-OU6TOicZQzw/videos?disable_polymer=1; The Mini Gear YTC (https://www.youtube.com/channel/UCNZMEiM-ZMYmEk2CG3mr1_Q/playlists) contains videos of models of mechanisms, devices, and devices; educational project Minutephysics (<https://www.minutephysics.com/>) offers videos about physical processes, phenomena; GetAClass educational resource (<https://www.getaclass.ru/course/fizika-v-opytah-i-eksperimentah>) contains videos on physics; Thang010146's YTC (<https://www.youtube.com/watch?v=Rb37-daSLQ4&list=PLhoXNQqrCmEfAaTf0AfQ1Ztxmz2DoZiCk>) contains videos on how the mechanisms work.

The YT Grade 1 YTC (https://www.youtube.com/channel/UCAu_hCCOpLvqYluOe8wolg/featured?disable_polymer=1) contains videos of Maths, Languages, Arts, Music for Grade 1, and partners of this YTC "New School Grades 2-11" contain videos on subjects (language, art, chemistry,

biology, physics, history, history of Ukraine, world history, mathematics, drawing, geography, music) for grades 2-11.

The MagneticOne Org 21st Century Child Education YTC (<https://www.youtube.com/playlist?list=PLshJpmmXcDiS8dpWOOELfBMcKnFhM0B>) features video lessons in English, science, math and more.

After analyzing computer science content on YT, we recommend that you use computer science videos at the following links:

1. https://www.youtube.com/channel/UC2oHIO5pU-Uceb_xmbvzDPg, which presents practical assignments for grades 5-11 by textbooks of different authors (Y. Rivkind, N. Morse, O. Bondarenko, V. Rudenko).

2. https://www.youtube.com/channel/UCrvXPmPZ8pXsMtLRAfb-vIA/videos?disable_polymer=1, which provides video tutorials for grades 5, 7, 8.

3. https://www.youtube.com/channel/UC-FKRzOSTH_HF9-J9rMJ3ng/videos?disable_polymer=1 providing examples of games, working with Scratch, sample programs, exercises in the Lazarus programming environment.

4. https://www.youtube.com/channel/UCJhLUyWnIQ8WdcDJ-NjWasg/videos?disable_polymer=1, which contains sample practical assignments for grades 6 and 8.

5. https://www.youtube.com/channel/UCb1D14BI413znjuPnGg_zOA, featuring work in Paint.Net, CorelXara, Scratch, etc.

So, from the topics of the videos it is clear that the videos posted on YT video service can be used both during the lessons when studying the subjects of the school course of the subject, and in the afternoons for self-education.

It should be noted that YT's video service has a "filters" feature that appears after a user enters keywords or phrases into the search bar. Filters

provide refinements to search results by upload date: recently, today, this week, this month, this year; type: videos, channels, playlists, movies, shows; duration: short (less than 4 minutes), long (more than 20 minutes); Features: Live streams, 4K, HD, Subtitles, Creative Commons license, 360*, VR180, 3D, HDR, location, acquisition; sort: by relevance, upload date, number of views, rating. So, we see that this feature increases the ability to find the necessary videos.

Teachers can use existing videos as well as create their own videos. This can be done using Windows Studio or other video editors, online editors [1], including 123apps (website for

recording videos and performing actions with video, audio), Infogr.am (website for creating infographics using templates), Pablo (graphic creation service and intended for use with social networks, contains text layout options), Picovico (slide show creation service, contains templates and implements the ability to import pictures from Facebook social network and Flickr photo service, provides audio), Genially (service that provides the interact with content, create graphics, infographics, presentations using visual effects and animation).

In turn, the Web site pages [16] offer steps for creating video lessons (Tab. 1).

Table 1

The steps for creating video lessons

№	Step
1	Select the audience for which the video lesson is being created
2	Determine the purpose of the video lesson
3	Plan the content of the video lesson
4	Create a video tutorial structure
5	Record video
6	Publish a video tutorial on a video service
7	Improve the video tutorial after viewing comments on it
8	Determine the effectiveness of the created video lesson

The educational web site The Lesson Magazine identifies the following reasons for using YT in its learning: to make an interesting lesson, to offer interesting auxiliary tasks, to record video lessons for future use, to use non-standard forms of work (quest), to inspire students [15].

Scientist O. Novozhnik outlines the following approaches to engaging students in educational activities using audio-visual materials: consumer, where consumers are students, and the teacher acts as an instructor who seeks and creates educational material, chooses forms and methods of teaching using video information and audio;

"Production", where producers are students and motivators are teachers who are encouraged to reproduce audiovisual materials [8: 231].

A prime example of using video services is the Inverted Class Learning Model [6], which suggests that pupils do their homework in an online environment, such as working with educational videos or online resources to gain new knowledge or build on existing knowledge. During the lesson, pupils are already completing assignments on this topic, which they have considered independently, under the guidance or with the help of a teacher. Thus, the role of the teacher in

the lesson from the "master translator of knowledge" [6] to "assistant-consultant and coordinator" [6]. There

are the following types of "inverted classes" [6] (Tab. 2).

Table 2

The types of "inverted classes" [6]

Type	Description
typical inverted class	pupils do homework using video information to familiarize themselves with the material of the next lesson, and in the next lesson, pupils apply the knowledge they have learned, with the teacher doing individual work with each pupil
discussion-oriented inverted class	pupils complete the task of viewing videos or online resources on a specific topic, and the teacher arranges a discussion of the revised information
the inverted class is focused on demonstrations	demonstration of educational material, conducting of visual experiments; after the demonstration by the teacher, the pupils perform them independently
pseudo-inverted class	pupils are offered a task, but some pupils may not be able to complete a task, so pupils are encouraged to review videos and complete the task
group inverted class	pupils join groups before the class, get acquainted with the educational material, and already in the class perform tasks together
virtual inverted class	pupils watch the video, the teacher proposes tasks and advises pupils, conducts tests, evaluates pupils' work, all online
"inverted" teacher	pupils perform the functions of teacher: search and prepare videos, develop tasks, provide advice, check the work of other pupils

Using learning models "Inverted class" has advantages and disadvantages for the implementation in the educational process. Thus, the advantages are: independent work of pupils; individual work of the teacher with the pupils; team work; better perception of visual information by pupils; conducting experiments and experiments in the absence of necessary equipment, devices, substances, etc. in the educational establishment; implementation of distance learning; development of pupils' abilities, etc. The disadvantages of using the "Inverted class" learning model are: pupils the faccoluing may not do their homework at home, and

therefore may not be ready to work in the classroom; loads on the organs of vision due to computer work; constant review by the teacher of the content he proposes to use; constant access to high-speed Internet; the presence of advertising on video service and more.

The question is "How can video services be used in computer science lessons?" We believe that video services can be used as follows:

1) To familiarize pupils with new teaching material (description of basic concepts and examples). For example, what are graphs, what kind of graphics are there, examples of vector and bitmap graphics, 2D graphics and 3D graphics where graphics are used, etc.

2) To consolidate previously acquired knowledge. After the pupils are introduced to the new material, we review the videos with additional material or watch the video and answer the questions.

3) For practical application. Pupils are encouraged to watch the video and then complete the task.

4) For independent work. Invite pupils to create their own video after learning a topic to develop pupils' creativity, to increase interest in teaching material.

5) To implement the model of "Inverted class".

The disadvantage of this is the amount of time it takes to watch a video that goes into the pupils' computer work experience.

We believe that it will be expedient to use video services in the study of topics of the subject "Informatics", such as: "Computer Architecture", "History of Computer Science", "First electronic computers", "Types of computers", "Modern computers", Graphics Editor,

Word Processor, Table Processor, Presentation Editor, Programming Language, etc.

In our opinion, the need to use video services is to present or explain complex educational material in computer science, deepening pupils' knowledge, for independent study and development of educational material, for the development of pupils' creativity.

The best way is to use video services to deepen your knowledge, for example, pupils can be at home and view interesting information. In the lesson, you can use video services as follows: watch a video and answer questions. After learning the topic, pupils create videos and present them, presentations are discussed by all pupils.

Here are examples of assignments for 8th grade computer science using the YT video service.

Task 1. Computer architecture.

1. Watch the video at:

<https://www.youtube.com/watch?v=6ZdR6tR2auM>.

2. Answer the questions (Tab. 3).

Table 3

The questions

№	Question
1	Name the input devices.
2	What is a "controller"?
3	Name the storage devices.
4	Why do need RAM?
5	Name the output devices.
6	What is "computer architecture"?
7	What is a "CPU"?
8	What is called a "chipset"?
9	Why do you need ports, slots, sockets?
10	What is a "motherboard"?
11	What does the processor do?
12	Name the properties and possible values of the processor properties.
13	What about internal computer memory?
14	What is related to external storage?

3. Find the section of the system block in section on the Internet and sign the components of the system block.

Task 2. Programming in the Lazarus programming environment.

1. Watch the video at:
https://www.youtube.com/watch?v=_oCBtmhTmPk.

2. Answer the questions (Tab. 4).

Table 4

The questions

№	Question
1	How do place components on a form?
2	What are the components of TEdit, TButton, TLabel used for?
3	What are the properties of the TEdit, TButton, TLabel components you know?
4	How to place TEdit, TButton, TLabel components on a form?
5	How to create events?
6	How to declare variables?
7	How is the assignment team designated?
8	How is the condition recorded?
9	What is the meaning of such a record: if x = StrToInt (Edit1.Text) then Label1.Caption: = 'You guessed the number' else if x> StrToInt (Edit1.Text) then Label1.Caption: = 'Number More' else Label1.Caption: = 'Number is less'; ?
10	What is the meaning of such a record: randomize; x: = random (10); ?
11	How to start a project?
12	How to rename a button?
13	How to make the button inactive?
14	How to calculate the number of attempts to guess the number?
15	How to create a menu in the program?
16	What does the Enabled property mean?

3. Create your own game program.
Task 3. Create a video clip in Windows Movie Maker.

1. Watch the video at:

<https://www.youtube.com/watch?v=Gsozdey4z8Y>.

2. Answer the questions (Tab. 5).

Table 5

The questions

№	Question
1	How to create a title?
2	How to format text?
3	How to add effect?
4	How do add a graphic object?
5	How do specify how long the text is displayed?
6	How to adjust the frame duration?
7	How do create a video soundtrack?
8	How to add captions?
9	How to change the background color of a frame?
10	How do add a video snippet?
11	How do save a video?

3. Create your own video.

Using video services has its advantages and disadvantages in the educational process. The advantages of this use are: access to video services at any time, visual presentation of information, quick search for videos, watching videos in any format, commenting on them, adding your own videos, being able to subscribe to a channel, download videos, etc. The disadvantages of using video services are: the need to access the Internet, the availability of video services, the availability of advertising.

Conclusions and research perspectives. Therefore, video service is a service of the Internet, which provides the ability to view videos, comment, download, publish your own videos. The use of video services in the educational process will ensure the interest of pupils in solving educational problems, interest in the educational process, increase the independence of pupils, will make a hobby to "watch videos" educational hobby "learning with video services". We see further development prospects in the development of educational videos.

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