

МІНІСТЕРСТВО ОСВІТИ І НАУКИ УКРАЇНИ
МІНІСТЕРСТВО ОХОРОНИ ЗДОРОВ'Я УКРАЇНИ
БУКОВИНСЬКИЙ ДЕРЖАВНИЙ МЕДИЧНИЙ УНІВЕРСИТЕТ

МАТЕРІАЛИ

II науково-практичної інтернет-конференції
**РОЗВИТОК ПРИРОДНИЧИХ НАУК
ЯК ОСНОВА НОВІТНІХ
ДОСЯГНЕНЬ У МЕДИЦИНІ**



м. Чернівці
22 червня 2022 року

MINISTRY OF EDUCATION AND SCIENCE OF UKRAINE
MINISTRY OF HEALTH OF UKRAINE
BUKOVINIAN STATE MEDICAL UNIVERSITY

CONFERENCE PROCEEDINGS

II Scientific and Practical Internet Conference **DEVELOPMENT OF NATURAL SCIENCES AS A BASIS OF NEW ACHIEVEMENTS IN MEDICINE**



Chernivtsi, Ukraine
June 22, 2022

УДК 5-027.1:61(063)

Р 64

Медицина є прикладом інтеграції багатьох наук. Наукові дослідження у сучасній медицині на основі досягнень фізики, хімії, біології, інформатики та інших наук відкривають нові можливості для вивчення процесів, які відбуваються в живих організмах, та вимагають якісних змін у підготовці медиків. Науково-практична інтернет-конференція «**Розвиток природничих наук як основа новітніх досягнень у медицині**» покликана змінювати свідомість людей, характер їхньої діяльності та стимулювати зміни у підготовці медичних кадрів. Вміле застосування сучасних природничо-наукових досягнень є запорукою подальшого розвитку медицини як галузі знань.

Конференція присвячена висвітленню нових теоретичних і прикладних результатів у галузі природничих наук та інформаційних технологій, що є важливими для розвитку медицини та стимулювання взаємодії між науковцями природничих та медичних наук.

Голова науково-організаційного комітету

Володимир ФЕДІВ професор, д.фіз.-мат.н., завідувач кафедри біологічної фізики та медичної інформатики Буковинського державного медичного університету

Члени науково-організаційного комітету

Тетяна БІРЮКОВА к.тех.н., доцент кафедри біологічної фізики та медичної інформатики Буковинського державного медичного університету

Оксана ГУЦУЛ к.фіз.мат.н., доцент кафедри біологічної фізики та медичної інформатики Буковинського державного медичного університету

Марія ІВАНЧУК к.фіз.мат.н., доцент кафедри біологічної фізики та медичної інформатики Буковинського державного медичного університету

Олена ОЛАР к.фіз.мат.н., доцент кафедри біологічної фізики та медичної інформатики Буковинського державного медичного університету

Почесний гість

Prof. Dr. Anton FOJTIK Факультет біомедичної інженерії, Чеський технічний університет, м.Прага, Чеська республіка

Комп'ютерна верстка:

Марія ІВАНЧУК

Розвиток природничих наук як основа новітніх досягнень у медицині: матеріали II науково-практичної інтернет-конференції, м. Чернівці, 22 червня 2022 р. / за ред. В. І. Федіва – Чернівці: БДМУ, 2022. – 489 с.

У збірнику подані матеріали науково-практичної інтернет-конференції «Розвиток природничих наук як основа новітніх досягнень у медицині». У статтях та тезах представлені результати теоретичних і експериментальних досліджень.

Матеріали подаються в авторській редакції. Відповідальність за достовірність інформації, правильність фактів, цитат та посилань несуть автори.

Для наукових та науково-педагогічних співробітників, викладачів закладів вищої освіти, аспірантів та студентів.

Рекомендовано до друку Вченою Радою Буковинського державного медичного університету (Протокол №11 від 22.06.2022 р.)

ISBN 978-966-697-983-7

Ivanchuk M.A., Biryukova T.V.

Overview of Video Creation Software for Application in the Educational Process

Bukovinian State Medical University, Cherivtsy, Ukraine

ivanchuk.m@bsmu.edu.ua, biryukova@bsmu.edu.ua

Abstract. The paper is dedicated to overview of video creation software which can be helpful for online learning process. The last few years the world lives, works and studies online. During this time teachers were searching to the best ways for present the new material to their students online. Educational video is a useful element of e-learning courses, that's why teachers need video editors with sufficient functionality and a user-friendly interface. The best video creating software should be easy to use, has maximum features in the free version, the ability to simultaneously record the screen and webcam and the ability to add interesting elements to encourage students to study the topic. The most popular video creation programs, that meet these criteria, such as Windows Live Movie Maker, Screencastify, Screenity, Loom, Zoom meeting, Prezi, Canva, Powtoon, Flipgrid are considered in the paper.

Keywords: e-learning, educational video, movie making, screen recording, video lectures

Introduction. The last few years the world lives, works and studies online. During this time teachers were searching to the best ways for present the new material to their students online. They have mastered Zoom meeting, Google meeting, Google classroom and many other useful applications. Even now, when schools and universities gradually return to offline studying, teachers need high-quality, but easy to use applications to improve their teaching skills. One of the ways of online studying, which can be used also for more familiar to us offline classes, is educational video recording.

Related works. Today's students are the younger generation who actively use a variety of mobile devices in their lives, visit websites, blogs, chats, watch videos, etc. Distance learning is widely included in our lives and requires for a better understanding and clarity of processes, phenomena of the usage of modern interactive technologies. Electronic educational resources are being developed and actively implemented, and video content is increasingly being used by teachers to record lectures, practical and laboratory works. Educational video can be used not only to demonstrate phenomena, but also to control the knowledge gained. The video can also contain problematic questions, during which students conduct a variety of researches, educational projects,

get an incentive to improve their skills of continuous self-development and self-improvement. Involvement of video materials in the educational process promotes the involvement of visual, auditory and tactile channels of information perception, which allows to increase the level of perception and assimilation of information. The usage of Internet resources in terms of interactive learning environment is not fully understood and has no limits. Due to the development of modern technologies, almost everyone can become the author of any information platform on the Internet. The development of technology contributes to the growth of educational multimedia content every year and its constant increase, which is also due to the use of cloud services and free programs.

The problem of using audio and video technologies in the educational process is highlighted by the wide quantity of scientists [1-17]. It is noted that using of the audio and video technologies increases the motivation to study the material, promote communicative competence, provide the effect of presence, etc. Edgar Dale collected the results of his research in "Cone" learning "and showed that the human brain is more receptive to audio and visual aspects, it is better deposited fragments of cinema [9]. The US National Training Laboratory has developed a new graphical version of the impact of teaching methods on the degree of learning, based on the "Learning Cone", called the "Learning Pyramid". It shows that the more actively a person participates in learning (discusses, does, teaches others), the better he/she learns the material. Ukrainian scientists also analysed the organizational aspects of the educational process and its course with the use of information technology, creation and use of video presentations, etc. In the works of Sinitsa M.O. it is noted that the theoretical material can be structured through the use of multimedia tools in such a way that students can choose a convenient optimal pace of learning the material [15]. Tsarenko O.M. points out that multimedia is one of the promising technologies and areas of learning informatization. [16].

There is a different classification of types of educational videos in modern pedagogy [17]. They are

- classification by the aim of creation (movie, cartoon, video),
- classification by genre (video advertising, cartoon, feature film, video),
- classification by method of production (assembly, shooting),
- classification by didactic purpose (illustrative, instructive, instructive-illustrative),
- classification by structure (integral, fragmentary),
- classification by the conditions of use (for work under the guidance of a teacher, for independent work).

Purpose. The aim of the research is to study different applications for video creation and to select the best of them which teachers may use for educational videos creating. The parameters for

selecting the applications were easy to use, maximum features in the free version, the ability to simultaneously record the screen and webcam, the ability to add interesting elements to encourage students to study the topic

Results

Video creation programs for application in the educational process

Educational video is a useful element of e-learning courses. It helps the individuals or students to understand new topics. Until recently, video creation was available only to professionals, as it required expensive and difficult to use hardware and software. Now every student and teacher has at least a mobile phone with video recording ability. There are many free software tools that allow teachers to perform the necessary processing or recorded by the teacher, or borrowed from available sources of video in the process of preparing it for use in the e-course.

For the best result teachers should follow the basic recommendation for video production [18]:

- Shorter videos are much more engaging, segment videos into chunks shorter than 6 minutes.
- Videos that intersperse an instructor's talking head with slides are more engaging than slides alone.
- Videos produced with a more personal feel could be more engaging than high-fidelity studio recordings.
- The videos which display a recording of drawings on an electronic blackboard similar to the style of a teacher giving a lecture (Khan Academy style video [19]) are more engaging than PowerPoint slides or code screencasts.
- Videos where instructors speak fairly fast and with high enthusiasm are more engaging.
- Students engage differently with lecture and tutorial videos. For lectures, focus more on the first-watch experience; for tutorials, add support for rewatching and skimming.

It is important for the teacher from the very beginning to choose the best video editor that has sufficient functionality and a user-friendly interface. Here's a look at some of the most common video editors that can be used to create instructional videos.

Windows Live Movie Maker is a functional software for working with multimedia files such as AVI, WMV, MPEG, MP3, WMA and others. Windows Live Movie Maker provides the tools the teacher needs to create quality videos, slideshows, and presentations, allows to use many different effects, add music and embed behind-the-scenes text, automatically assemble a video file from media content. Its key features are creating slide shows and presentations, applying audio and video effects, the presence of the Ribbon interface, ability to record high definition video and publication of them

on the Internet. The application also has a preview function that allows to instantly evaluate the effect of superimposed special effects and animation transitions.

Screencastify [20]. Teachers who like to work with GoogleSlides, should pay attention to the Screencastify extension for Google Chrome, a free feature that allows to record short videos and upload them to YouTube, GoogleDrive or local drive. Teachers can record the screen, web camera or both in one time. Screencastify contains annotation tools to keep audience focused on what's important. After sharing video, teacher can track students who viewed it. It is also possible to check understanding of the topic by adding interactive questions to check viewer comprehension and seeing the responses in real time.

Screenity [21] is the most powerful screen recorder for Chrome. With Screenity teacher can record and annotate screen, making educational recordings of the tab, desktop, any application, and camera. It is possible to annotate by drawing on the screen, adding text, and creating arrows as well as highlight clicks, focus on the mouse, or hide it from the recording. Screenity recordings can be edited by trimming or sections removing, and be exported as mp4, gif, and webm, or saved directly to Google Drive.

Loom [22] is the industry leading screen recording tool. Loom allows teachers to record screen, web camera, microphone, and internal audio without time limit. It automatically saves videos to the cloud for sharing them instantly with a link and notifies user about views, reacts, or comments on video.

Zoom meeting [23] is a proprietary videotelephony software program. Although the free plan allows up to 40-minute time restriction, teacher can record video in Zoom without time limit, if he/she is the only one participant of the meeting and just imitates the lesson. There is no possibility to edit video in Zoom, so teacher should consider the plan of the lecture before recording and, if necessary, use pausing during video recording.

Prezi [24] is the service for creating interactive multimedia presentations with nonlinear structure or long grids. Allows teachers to import videos, graphics, photos, and other presentation visualization tools. The interactive format is created using zoom technology (zooming in and out). The peculiarity of Prezi is that in contrast to the "classic" presentation, where slides change, here the transitions between images occur with the increase of individual parts of one slide.

Canva [25] is also can be used for educational video recording. For a number of years, Canva has been known as a service for creating infographics, video covers, postcards, and online presentations. A large number of templates allows users to quickly create very attractive slide shows. More recently, Canva has a new feature that allows to record a video presentation or video tutorial.

More precisely, by creating an online presentation in Canva, user can voice it. This is similar to how teacher creates a video capture, a voice-over screencast of regular presentations, for example in PowerPoint. The difference is that user can do the entire record in Canva. Moreover, user can create comments to the video presentation in order to distribute the necessary voiceovers among the slides, but in the future these notes will not be visible in the video.

Powtoon [26] is a web-based animation software that allows users to create animated presentations by manipulating pre-created objects, imported images, provided music and user-created voice-overs. It offers a number of styles, such as cartoon, infographics, whiteboard. Due to the fact that the program is an online resource, teacher can work on the project from any computer connected to the Internet. With a media library, templates and a variety of options, Powtoon is a great tool for creating short training and marketing videos. Powtoon video can be played in the Powtoon online viewer, exported to YouTube or downloaded as an MP4 file.

Flipgrid [27] is the application for video communication between teacher and students. It can be downloaded as application for smartphone or used online on the laptop. This service will attract attention of teachers who are looking for new ways to remotely communicate with the class, want to warm up the curiosity in students and at the same time provide feedback to them. Flipgrid is an easy-to-use video announcement platform that allows students and teachers to record short video responses. At first teacher creates a topic for learning community. Topics are discussion prompts that students respond to with short videos. Flipgrid may be used for learning any subject for students from primary to high schools.

Let's consider the possibility of using flipgrid for teaching Math. For example, teacher has 18 students working on a math problem and they share their opinion on Flipgrid. By reviewing and analyzing each other's responses, they gain access to 18 different ways of thinking instead of having to learn them. Flipgrid automatically raises the academic level of a class by simply asking students to use their voice. In primary school students are developing number concepts that serve as the foundation of all mathematical concepts. Flipgrid allows students to explore and find math around them, making learning relevant and meaningful. Flipgrid helps learners to make their thinking visible as written communication is being introduced, helps to increase mathematical vocabulary, and encourages learners to communicate their ideas to others as they also learn from others. In high school teacher may ask students to explain geometric formulas and use them to solve problems; show how to extend the properties of exponents to rational exponents; prove formulas for sine, cosine, and tangent; demonstrate relationships between two- and three-dimensional objects etc.

Conclusions

In the modern world, where distance learning is widely included in our lives and students become more and more dependent from their mobile devices, educational video is a useful element of e-learning courses. The best applications for educational video creating should be easy to use, be able to simultaneously record the screen and webcam and to add interesting elements to encourage students to study the topic, have maximum features in the free version.

References

1. Fedorenko Yu.P. Expediency and features of using audio and video materials in foreign language lessons [Electronic resource] - Access mode: http://www.nauka.com/10_NPE_2008/Philologia/29839.doc.htm.
2. Kapterev A.I. *Multimedia as a sociocultural phenomenon*. Moscow, 2002, 224 p.
3. Fedorenko Yu. P. Formation of communicative competence in high school students in the process of learning a foreign language (PhD dissertation). Poltava, 2005. 212 p.
4. Verisokin Y.I. Video film as a means of increasing student motivation. *Foreign language at school*. 2003. 003. 5–6. p. 31–34.
5. Yakhunov T.O., Verisokin Y.I. Typology of film information and its use for teaching vocabulary socio-cultural component. *Foreign languages*. 2000. 3. p. 33–36.
6. Klimova O.V. English languages: method. instructions for using the video "My Fair Lady". NUHT, 2005. 47 p.
7. Sidorchuk NG Scribing: innovations and traditions of audiovisual support of the educational process. Creative pedagogy. "Polissya". - Zhytomyr, 2016. 11. P. 57-64.
8. Bent B. Andresen, Katya van den Brink *Multimedia in education*. Moscow. 2007. 223 p.
9. Wagner, Robert W. Edgar Dale *Professional. Theory in practice*. 1970 P. 89-95
10. Richard Edward Clark, David Frank Feldon *Five common but questionable principles of multimedia learning*. [Electronic resource] - Access mode: https://www.researchgate.net/publication/281023153_Five_common_but_questionable_principles_of_multimedia_Learning
11. Myrna Elyse Diamond, *The Role of Narrative in Multimedia Learning*. 2011. 387 p. [Electronic resource] - Access mode: <https://digitalscholarship.unlv.edu/cgi/viewcontent.cgi?article=2224&context=thesesdissertations>.
12. Deschamps-Potter C. Moving toward multimedia content. *Multilingual computing & technology*. 2010. №22. P. 36.
13. Hernández-Ramos P. If not here, where? Understanding teachers' use of technology in Silicon Valley schools. *Journal of Research on Technology in education*. 2005. 38. pp. 39–64.
14. Gurziy A.M., Gurevich R.S., Konoshevsky L.L., Konoshevsky O.L. *Multimedia technologies and teaching aids: a textbook*. Vinnytsia: Nilan-LTD, 2017. 556 p.
15. Sinitsa M.O. The usage of multimedia technologies in the educational process of higher education as a means of forming pedagogical knowledge. *Professional pedagogical education: formation and development of pedagogical knowledge*: monograph, ed. prof. OA Dubasenyuk. Zhytomyr, 2014. pp. 418-438.
16. Tsarenko O.M. Methodological aspects of using multimedia tools in the educational process. *Scientific Bulletin of the Flight Academy*. Series: Pedagogical Sciences, 2017. 1. p. 213-218.
17. Hlynsky, Y. M., Fedasiuk, D. V., & Riazhska, V. A. (2017). Development and usage of the electronic video resources for educational purposes. *Information Technologies and Learning Tools*, 58(2), 67–78.

<https://doi.org/10.33407/itlt.v58i2.1580>Khan Academy [Electronic resource] - Access mode: <https://uk.khanacademy.org/>

18. Philip J. Guo, Juho Kim, Rob Rubin How Video Production Affects Student Engagement: An Empirical Study of MOOC Videos. *In Proceedings of the first ACM conference on Learning@ scale conference*. ACM, 2014, p.41–50, <https://doi.org/10.1145/2556325.2566239>

19. Khan Academy [Electronic resource] - Access mode: <https://www.khanacademy.org/>

20. Screencastify [Electronic resource] - Access mode: <https://app.screencastify.com/>

21. Screenity [Electronic resource] - Access mode: <https://chrome.google.com/webstore/detail/screenity-screen-recorder/kbbdabhdfibnanepjfhkxhafgdilcnji>

22. Loom [Electronic resource] - Access mode: <https://www.loom.com/>

23. Zoom [Electronic resource] - Access mode: <https://zoom.us/>

24. Prezi [Electronic resource] - Access mode: <https://prezi.com/>

25. Canva [Electronic resource] - Access mode: <https://www.canva.com/>

26. Powtoon [Electronic resource] - Access mode: <https://www.powtoon.com/>

27. Flipgrid [Electronic resource] - Access mode: <https://flipgrid.com/>

Lukan Y.R.

3D Graphics as One of the Latest Technologies for Effective Training of Competitive Medical Specialists

Professional College of Bukovynian State Medical University, Chernivtsi, Ukraine

y.lukan@bsmu.edu.ua

3D graphics is one of the sections of computer graphics, which operates techniques and tools for depicting three-dimensional objects and managing them in three-dimensional space. As a result of using 3D graphics, the object can be represented as a "flat" image - a projection of the object, or as a 3D animation.

The advantages are due to the fact that three-dimensional modeling gives a very accurate model, as close as possible to reality, and modern programs help to achieve high detail. Moreover, showing a three-dimensional object in a two-dimensional plane is not easy, while 3D visualization allows you to carefully process and, most importantly, view all the details.

Due to the fact that computer and 3D technologies are gaining momentum, three-dimensional graphics has found active application in medicine, as it provides a significant increase in efficiency in many areas of application. For example, atlases of three-dimensional models of human organs have been created, which makes it possible to demonstrate various anatomical structures and physiological