Principles of creating and designing video content for asynchronous learning

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Abstract — **A key stage of professional training is to prepare them for the use of ICTs and modern innovative solutions that would not only improve the quality of presentation of educational content, but also minimise the time spent on learning new material and repeating material that has already been covered. Therefore, a relevant aspect of preparing teachers and future professionals in general for self-presentation or presentation of their own projects should be preparation for the use of video editors and online platforms to create short videos that both students and teachers can use to save time during teaching or to support projects that are offered to a wide audience.**

For this reason, in our review, we focus on the theoretical aspects of introducing video content into the educational process; high-quality video editing software that students and teachers can use from any device; analyse the quality of the projects prepared by students; review teaching approaches for asynchronous learning.

But, with the main objective of our research being to argue for the principles of creating and designing video content for asynchronous learning. We present not only the above results of our review and practical implementation of the relevant project activities, but also the theoretical aspects of the issue necessary for teachers' understanding and personal improvement.

This complex approach allows us to develop the simplest and most flexible algorithm for working with video content, depending on the needs of the teacher, their psychological characteristics and technical skills, as well as the purpose of the subject being taught. After all, for some subjects and the teachers who teach them, the thesis "why should we reinvent the wheel" will be appropriate. While for the other part, this process will always be a personal challenge, an innovation and a requirement of modern education. That is why, in our opinion, the proposed flexible algorithm will be useful for both future teachers and professionals who already have teaching experience.

Keywords — asynchronous learning, flexible content creation algorithm, principles of creation, teacher training, video content.

I. INTRODUCTION

We are not the first researchers to deal with the issues of distance education, the problems of introducing and using ICT and innovative solutions, but this topic is also quite relevant for us. The reasons for its relevance remain the same:

- a sharp increase in demand and supply in the field of online learning, particularly since 2019;

- saturation of the education market and other areas of life with affordable and easy-to-use technologies;

- the existence of contradictory facts about the effectiveness of the traditional educational system.

Therefore, there are ongoing discussions among educators and scientists, as well as in public administration, to find the best solutions for the implementation of

educational services that lay the foundation for the functioning of society and strategies for changing educational policy in line with the challenges posed by the fourth scientific and technological revolution.

In order to achieve the goal of education and to be guided by the technical capabilities of the modern world, teachers must be ready to work with technology, i.e. have the appropriate ICT competencies that are currently defined and recognised in the world. For example, the ICT competence framework includes 18 competences grouped into six areas of pedagogical practice (understanding ICT in education, curriculum and assessment, pedagogy, application of digital skills, organisation and administration, and teacher training), as well as three levels of pedagogical use of ICT by teachers (knowledge acquisition, knowledge deepening, and knowledge creation) [1].

But on the other hand, we should not forget that the responsibility for acquiring the relevant competencies lies not only with teachers, this is a joint project where educational institutions should provide the technical component of the educational process (ICT, gadgets if necessary, Internet access, availability of relevant resources and databases) and promote teacher self-development in this direction, and higher education institutions should provide an appropriate level of teacher training and retraining.

Turning to the simplest and most acceptable way of interaction in distance learning, we should consider working with video materials. According to scientists, video is an excellent technology for online learning, especially as an asynchronous replacement or supplement to face-to-face learning, which can make learning time more productive for both teachers and students and become an adequate substitute for face-to-face lectures, as evidenced by various studies on the general benefits of using such tools for learning [2] – [4]. It is worth noting that today there are two main ways to create video clips: with a camera or with the help of a unique technology called screencast [3]. While we are all familiar with recording with a video camera and understand its features without further explanation, the issue of screencasts, in our opinion, requires clarification.

Thus, Ghilay defines a screencast as a digital recording of an image on a computer screen, usually containing audio narration and captions, and differs from a screenshot in that it creates a film of changes that the user sees on the computer screen over time in accordance with the purpose and topic related to the subject area of teaching [2], [3]. In addition, combined animation and audio presentations (essentially moving images and sound) provide a more effective learning experience than still images accompanied by text [3] , [5].

In addition, some studies confirm that Video-Based Learning (VBL), in which the course curriculum is fully covered by video clips that replace or supplement live lectures, has significant advantages for learning subjects in higher education due to the flexibility of the process and high levels of student satisfaction [3]. In addition, video instruction brings courses to life by allowing online learners to use their visual and auditory senses to learn complex concepts and complicated procedures [4]. The use of video for learning has significant advantages due to the

growing use of smartphones and tablets, which allows students to watch useful videos while overcoming time and geographical constraints [5].

II. Materials and methods

We don't look at big data like our academic colleagues. We rely on similar studies of the productivity of using video for educational purposes. In addition, in today's environment, when there is available information on already processed data sets on any research topic, we believe that analytical articles and reports are the best choice for theoretical issues. In addition, in practical matters, it is also possible to refer to the experience of practitioners and relevant analytical reports of official international bodies and individual researchers from around the world, with one condition – their experience should be considered taking into account the national and cultural traditions of the country to which the relevant practice is planned to be applied.

This allowed us to formulate the main goal of the study of the proposed topic as the development of an algorithm for creating and designing video content for asynchronous learning, considering modern principles of education. Based on this goal, we identified the following tasks, which consisted of analysing theoretical developments on the implementation of video content in the educational process; creating a list of affordable and high-quality video editing programs that students and teachers can use from any gadget; presenting the results of projects prepared by students and reviewing approaches to teaching with video content for asynchronous learning.

But, given the main goal of our study, which is to argue the principles of creating and designing video content for asynchronous learning. We present not only the above results of our review and practical implementation of the relevant project activities, but also the theoretical aspects of the issue necessary for understanding and personal improvement of teachers.

III. Results and discussion

Thus, after carrying out a preliminary analysis of materials on the use of video in the educational process, we concluded that this topic has been raised more than once and is sufficiently described in the scientific and pedagogical literature, and also has its share in international documents. However, from the information we received, we also saw that the main achievements and qualitative description of the experience of implementing education through video are best presented in the exact sciences. That is why we analyse the use of video since the examples offered, but not only because they are more qualitatively prescribed and strategically planned. We use them as a basis because in mathematics/computer science there are two precise values of zero or one, truth or error. This standard allows us to better plan and assess the outcomes of participation in a particular teacher-student interaction. Whereas the social sciences have a multifaceted structure based on various aspects of human interaction and require diversity in finding the best approaches to fulfilling the tasks of personality development and formation set for specialists in the relevant field.

In the exact sciences, we are interested in the score of knowledge acquisition, and the results of the Y. Ghilay

study prove the effectiveness of learning through video. However, in the humanities, such as social work, teaching, psychology, the main assessment should not be limited to the acquisition of theoretical knowledge. We must pay attention to the understanding of the topic, concepts and worldview of the student who will work with the individual, because the values, guidelines, as well as competencies and skills of the teacher, social worker or psychologist are a visible tool for others to follow, social interactions and emotional intelligence of a professional are his or her largest and best portfolio.

That is why it is important for us to study new principles of creating educational videos, as technological advances open up new opportunities for design, and educational videos are used in new educational contexts [6] that go beyond the traditional model of education.

Thus, among the principles that are currently proposed for education are the following:

- The principle of coherence. Learning is improved when additional words, sounds and images (noise) are removed;

- The principle of signalling Learning is enhanced when there are cues in the main material that emphasise its importance;

- The principle of redundancy Learning is enhanced when graphics and narration are used rather than graphics, narration and on-screen text;

- The principle of spatial contiguity Learning is enhanced when related words and pictures are presented next to each other;

- The principle of temporal continuity Learning is enhanced when related words and pictures are presented simultaneously rather than one after the other;

- Segmentation principle Learning is enhanced when material is presented in segments that match the user's pace, rather than as a single, continuous unit;

- Pre-preparation principle Learning is enhanced when students know the names and characteristics of key learning points or concepts;

- Modality principle The principle that learning is enhanced by graphics and narration compared to animation and on-screen text;

- Multimedia The principle that learning is enhanced through words and pictures rather than words alone;

- Personalisation Principle Learning is enhanced when teaching is done in a conversational rather than formal way;

- The principle of voice Learning is enhanced when the story is told in a human voice rather than a mechanical one;

- The image principle Learning is not necessarily improved when an image of the speaker is added to the screen [7].

Each of these principles complements the general pedagogical principles with the needs of scientific and

technological progress and allows us to rethink the role of the teacher, the importance of text, audio and video materials that are part of the educational process. For example, we have taken as a basis the advice of Harvard University's management on creating content for online learning. In particular, it is worth noting that the recommendations themselves state that this is a suggestion, but each teacher should be guided by their own point of view in preparing materials, as these materials are recommended with an emphasis on the possibility of independent implementation of the online course project, without the need to rely on additional resources [8].

Among the recommendations for online courses, it is suggested to adhere to

- content [8] as a basic component of the course and a separate video designed to complete certain tasks intended for study;

- pedagogy. That is, ensuring the selection of adequate and effective forms and methods of work, with a clear proposal for processing materials before the class (asynchronously), during the class (synchronously), or after the class (asynchronously) [8], which also applies to cases of using video materials;

- qualitative assessment, which will facilitate the effective evaluation of the material [8], as well as reviewing its value for the course offered and the formation of competences that are relevant to the course aims and objectives.

Based on the above-mentioned general recommendations, the Harvard University management proposed a detailed algorithm for developing and implementing an online course, but we have identified elements of step-by-step work with video to implement the goals and objectives of humanities disciplines in a distance format.

Thus, as *the first step* in working with video material, we take the entire course offered to students in the discipline as a basis and review its structure for the ratio of asynchronous and synchronous elements. After all, as a result of teaching in a distance format for five years, we have been able to accumulate enough video material to further explain the topics of the subject. In this way, we determine the quantitative and temporal indicators of the use of video content in our course.

The *next step* concerns the audience we are working with, the need to create a community to discuss the videos we have watched, because target groups can develop through learning processes, which ensures the change of focus that scholars talk about, which refers to the transition from a content-oriented to a user-centred position [9]. This certainly does not mean that this position is limited to working in one of the messengers or at the level of discussion groups, but rather that it should be provided through study groups, project work, office hours, sections or casual conversations in the corridor, or comments on videos, which requires trust, familiarity and a social community of peers [8]. The teacher should keep this format of interaction in mind and accompany and guide students to communicate on Canvas discussion boards or through the Slack channel, or using interactive online boards JamBoard, Pinterest, and for direct communication

software such as Microsoft Teams, Discord, chats on the social network Facebook or in messengers that are most often used within the educational institution (Viber). In other words, this step concerns the direct interaction of the discipline's video content with the student audience.

The ***third step*** should include interactivity and peer-to-peer learning, as the use of video in a course from open sources of information can reach a large audience, create prerequisites for interaction not only among participants in the educational process, and be filled with elements of emotional communication through emoticons and chat. What determines the specifics of the step for borrowed video is the filtering of inappropriate emotional reactions and planning interaction within unforeseen situations to avoid the formation of negative experience within a particular course topic. Of course, it is impossible to predict all the options for negative developments, but pre-thinking through the reaction and further interaction with students based on frequently occurring situations is a fairly effective way (a video that is too emotionally intense and requires a discussion or an art therapy minute; an inadequate comment on the video that was picked up by a student/students and used in the interaction, etc.)

The ***fourth step*** involves creating a video based on the principles of effective pedagogy, rather than focusing on a specific method of work (although in some cases this may be justified by the need to explain the effectiveness of such a method in different conditions and for different age groups of participants in the educational process). In addition, it is worth paying attention to the ready-made video work of other teachers, which can be used and be more accurate than the video that we will edit separately.

As a ***fifth step***, we propose to raise the question of the workload, which implies

- first, the need and expediency of using new technologies other than those you already use, because each new technology creates an additional workload for both teachers and students;

- secondly, whether the same functions can be performed with the help of the software you have already studied.

If we take video materials, we have to understand and distinguish between several aspects.

- To work in asynchronous or synchronous format, you should use video presentations from video hosting sites and platforms or social networks that are familiar to students. These are often YouTube and Canva. Today, we also use videos from Instagram and TikTok, and occasionally from open online course materials. But here it is important for the teacher to investigate the origin of the content to pay attention to the channel on which the video is posted, the personality of the channel manager or blogger (experience, in our case, in pedagogy and teaching, including research and scientific activities). When using a video that aims to present a technique, method, technology or to achieve the goal of developing students' emotional or social intelligence, we should pay attention to the quality of the video, the country of origin of the video (the difference in use and effectiveness of the content offered depends on the mentality, traditions and culture), the music or

background audio accompanying the video, comments and reactions to the content offered and, in particular, the age of the account and changes in the content presented on the channel or personal page. These are essential factors that can help avoid the difficulties we described in step two.

- If we create our own video, it should also be available both for scrolling in the classroom by the teacher and for self-translation, should be of high-resolution quality and, at the same time, should be lightweight so that even in case of slow network speeds, students can join and view the content. In this case, we can, of course, use the available, partially free software (Adobe Premier or Clipchamp for Windows-based PCs, Inshot for Android, Moviemaker for MacOS, etc.), built-in conference recording functions from Google Meet, Zoom, Go to meet, etc. But we can also use modern tools for quick video sharing on YouTube, Instagram and TikTok. Of course, after planning the content and assessing all the risks and benefits of posting it. But this is where the question of the teacher's ICT competencies and, no less importantly, his or her psychological stability and readiness to reach the public comes into play.

Based on our experience of interacting with students, during our first leap into distance education, we created a series of video instructions as part of podcast episodes (available here), which covered the technical aspects of organising online exams and practical tips on how to fill out the documentation of an inclusive classroom teacher.

This experience of working with your own or borrowed video can bring a new wave of motivation and interest in studying the materials of the discipline, because as we know, long lectures do not work as well in online teaching as in the traditional education system.

The sixth step is the so-called "Expert at a click away" [8]. Part of this is interaction with other people's video content, which we use to demonstrate certain topics and which we have written about before. On the other hand, it is guest lectures, meetings, and interviews with experts in the field that allow us to present and expand the scope of the discipline. Such materials include the playlists on our YouTube channel "Specialists About..." (available at https://www.youtube.com/playlist?list=PLJP7ziatOaS_iB quR2pA3c70cJynJ4Q40) and "Conferences" (available at https://www.youtube.com/playlist?list=PLJP7ziatOaS-1GtcowJAgiXT03zjdipzM).

And the last ***seventh step*** in the Harvard framework is evaluation.

All of these steps individually and together answer the questions that Harvard suggests you ask of your online developments:

- how can you provoke students to start working on a particular topic?

- how you can encourage your students to search for key ideas and concepts on their own through active learning rather than passive listening or "show and tell";

- how to help students appreciate the bigger picture of why and how a particular learning concept generalises beyond a specific application,

because these simple considerations - how to provoke, discover and generalise - can go a long way towards creating interactive and engaging asynchronous materials [8].

Such an algorithm for creating and using existing videos in the study of our disciplines is incomplete, as we need to add two steps when referring to the concepts of inclusive education.

The first of them (*the eighth* in the general list) is the step of analysing the results of viewing a teacher-created or publicly available video from another producer to achieve the purpose of using video. This is achieved through synchronous discussion during online meetings, or as a result of asynchronous tasks related to questionnaires, writing comments of a given length, writing feedback and suggestions based on the results of viewing or searching for their own video options for the proposed topic. In addition, at this stage, students also could complete a more complex creative task of feedback with the creation of their own video fragment on the topic based on the materials they have watched.

In addition, this step can be more extensive with the involvement of students. They can present their thoughts or developments during the course in a video format. Thus, since 2020, we have gradually offered students to create their own video materials based on the results of the materials they have studied. The sequence of the introduction of this form of work can be traced on the pages of our Inclusive Education Facebook group, and some of the educational hackathon materials can also be found on YouTube. In 2021-2022, students continued to create video content on the subjects they were studying in accordance with the assignments, and some of them posted materials on their own YouTube channels. However, most of them restricted access by turning on the "private video" function. Since 2023, there has been a trend towards open coverage of videos on Instagram and TikTok. Some of the videos of their work in 2022 and 2023 were most often posted on the Kanva platform.

The second step (*the ninth* in the overall list) is to analyse the feasibility of reusing the video in the course we are teaching at the beginning of the next group of students. This step is necessary because, following the concept of inclusion, we refer to the personal experience of students, their familiarity with the course topic and, according to their level of awareness, interest, emotional involvement, and level of socialisation, we decide on the inclusion or replacement (editing) of the proposed content.

IV. Conclusions

This comprehensive approach allows us to develop the simplest and most flexible algorithm for working with video content, depending on the needs of the teacher, their

psychological characteristics and technical skills, as well as the purpose of the subject being taught. After all, for some subjects and the teachers who teach them, the thesis "why reinvent the wheel" will be apt. While for the other part, this process will always be a personal challenge, an innovation and a necessity of modern education. That is why, in our opinion, the proposed flexible algorithm will be useful for both future teachers and practitioners who already have teaching experience.

We have also partially presented our own experience of interacting with video in the context of teaching and the results of our work over four years of student teaching. This may indicate a gradual change in the emphasis in teaching and the perception of information by students. They drew attention to the principles of creating and designing video content for asynchronous learning, considering a step-by-step proposal for the implementation of the goals and objectives of disciplines in higher education.

V. Acknowledgments

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