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Capabilities of the Canva web service for creating educational videos to improve the effectiveness of the educational process in flipped learning

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Abstract. This paper examines the capabilities of the Canva web service for creating educational videos to enhance the effectiveness of flipped learning in higher education. The research addresses the challenges faced by Ukrainian educational institutions during times of crisis, including quarantine, war, and power outages, which have necessitated innovative approaches to education. Flipped learning, where students engage with instructional content independently before participating in interactive classroom activities, represents an increasingly significant pedagogical approach. The paper provides a comprehensive analysis of Canva's features for educational video creation, compares it with alternative tools, and offers step-by-step guidance for implementing Canva videos in Ukrainian educational contexts. Through detailed examination of technical integration with learning management systems, particularly Moodle, and consideration of best practices from international research, this paper presents practical strategies for educators. The findings suggest that Canva offers an accessible, versatile platform for creating engaging educational videos that can significantly enhance student engagement and learning outcomes in flipped learning environments, while addressing the specific challenges of the Ukrainian educational landscape.

Keywords: flipped learning, Canva, educational videos, e-learning, information and communication technologies, blended learning, Ukrainian education

1. Introduction

The landscape of education has been dramatically transformed by global and local challenges in recent years. In Ukraine, these challenges have been particularly acute, with educational institutions facing disruptions due to quarantine restrictions during the COVID-19 pandemic, the ongoing war, and frequent power outages. These circumstances have compelled educators to seek innovative approaches that ensure the continuity and quality of education despite unpredictable conditions [52].

State policies in education increasingly focus on the adoption of innovations and information technologies (IT). Educational institutions are encouraged to implement pedagogical innovations based on IT and modern communication tools. Among these innovations, the "flipped classroom" approach has emerged as one of the most prominent models of blended learning.

The implementation of flipped learning has gained particular significance in the current Ukrainian context [22]. The necessity of ensuring blended learning, providing

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access to education for all students regardless of their location, and improving the efficiency of the educational process have become critical priorities. Flipped learning enables students to engage with educational content at home, where they have access to computers and other resources, thereby providing flexibility in the face of challenging circumstances.

As Nikitova et al. [42] note, the flipped classroom model involves students independently studying theoretical material before class, allowing classroom time to be dedicated to discussions, practical applications, and problem-solving activities. This approach not only accommodates the logistical challenges faced by Ukrainian educational institutions but also promotes active learning and student engagement.

The creation of quality educational videos represents a crucial element in implementing effective flipped learning. Among the various tools available for this purpose, the Canva web service has emerged as a particularly promising option. Canva offers an accessible platform for creating visually appealing educational content, with features that support the development of engaging and informative videos.

This paper aims to examine the capabilities of the Canva web service for creating educational videos to enhance flipped learning, with particular attention to the Ukrainian educational context. Through a comprehensive analysis of Canva's features, comparison with alternative tools, and consideration of implementation strategies, this research seeks to provide valuable insights for educators navigating the complexities of contemporary education in Ukraine.

2. Theoretical framework

Flipped learning represents a pedagogical approach that inverts the traditional educational model, moving direct instruction from the group learning space to the individual learning space, and transforming the group space into a dynamic, interactive environment [35]. This concept has evolved significantly since its introduction, with early proponents such as Alison King, Eric Mazur, Maureen J. Lage, Glenn J. Platt, and Michael Treglia advocating for student-centered approaches that prioritize active engagement with course material [27].

The theoretical foundations of flipped learning draw from constructivist learning theory, which emphasizes the active construction of knowledge by learners, and social learning theory, which highlights the importance of interaction and collaboration in the learning process. As Abeysekera and Dawson [1] argue, flipped learning seeks to optimize the use of class time by shifting content delivery outside the classroom, thereby creating opportunities for deeper learning through application, analysis, and synthesis of knowledge.

The evolution of flipped learning has been closely tied to technological developments that have facilitated the creation and distribution of educational content. Significant milestones include the establishment of Khan Academy in 2004, which popularized the use of instructional videos; the adoption of flipped teaching approaches by MEF University in 2011; and the founding of the Flipped Learning Network in 2016 [27]. The COVID-19 pandemic further accelerated the adoption of flipped learning approaches as educational institutions worldwide sought remote and flexible learning solutions.

In the Ukrainian context, the theoretical framework of flipped learning has been adapted to address specific challenges related to accessibility, technological infrastructure, and pedagogical traditions. Ukrainian scholars have examined the integration of flipped learning with existing educational practices, considering both the potential benefits and the challenges of implementation [33, 42].

Research on flipped learning implementation spans various disciplinary contexts, educational levels, and geographical settings. A comprehensive review of the literature

reveals several key themes regarding the effectiveness, challenges, and best practices of flipped learning.

Studies have consistently demonstrated positive effects of flipped learning on student engagement, motivation, and learning outcomes. Deng, Feng and Shen [12] found that flipped classrooms with question-embedded pre-class videos significantly strengthened learning performance, while Oya et al. [43] observed improvements in enjoyment, engagement, motivation, and behavioral intentions among students experiencing flipped learning.

In the Ukrainian context, scholars have examined the implementation of flipped learning across various disciplines. Kuzminska, Morze and Smyrnova-Trybulska [33] investigated the use of flipped learning in the training of future teachers-philologists, highlighting the role of cloud technologies in supporting this approach. Similarly, Nikitova et al. [42] explored the application of flipped learning methodology in the professional training of future language teachers, demonstrating its effectiveness in enhancing language proficiency and developing lifelong learning skills.

The literature also identifies challenges in implementing flipped learning, particularly in contexts with limited technological infrastructure or traditional educational cultures. Al-Said et al. [2] note that the success of flipped learning requires adequate technological support, modifications to existing teaching workload allocation systems, and comprehensive training for educators.

Flipped learning offers numerous benefits for higher education, particularly in contexts facing logistical and resource constraints. Key advantages include increased flexibility for students, enhanced opportunities for active learning, and improved student engagement [47].

One significant benefit is the ability to accommodate diverse learning styles and paces. By providing instructional content for independent study, flipped learning allows students to engage with material at their own speed, revisiting complex concepts as needed. This approach particularly benefits students who may struggle to keep pace in traditional lecture formats.

Additionally, flipped learning optimizes classroom time for interactive activities that promote deeper learning. As Aldalur et al. [3] observe, this approach transforms the role of the educator from a transmitter of information to a facilitator of learning, creating opportunities for meaningful student-teacher interaction and peer collaboration.

However, flipped learning also presents challenges, particularly in the Ukrainian higher education context. These include:

1. Limited access to reliable internet connections and appropriate devices can hinder student engagement with online content [56].
2. Students accustomed to traditional educational approaches may initially resist the increased responsibility for independent learning required by flipped approaches [24].
3. Developing quality video content and redesigning classroom activities requires significant time and expertise from educators [42].
4. Successful implementation often requires institutional investment in technology, training, and pedagogical support [33].

Despite these challenges, the literature suggests that well-designed flipped learning approaches can significantly enhance the educational experience in higher education, particularly when adapted to address the specific needs and constraints of the local context.

Effective flipped learning environments typically incorporate a variety of tools and approaches to support both independent content engagement and interactive classroom activities. These include educational videos, digital presentations, online courses, blogs, and social networks.

Educational videos represent one of the most widely used tools in flipped learning, offering an effective medium for conveying complex information in an accessible format. Purwanti, Suryawati and Eliwarti [45] found that video lectures in online EFL flipped classrooms not only improved learning outcomes but also received positive evaluations from students regarding their effectiveness and accessibility.

Digital presentations, created with tools such as PowerPoint, Canva, VistaCreate, Genially, and Prezi, provide another valuable resource for flipped learning. These presentations can explain complex concepts or provide supplementary information, often incorporating multimedia elements to enhance engagement [23].

Online courses represent a more comprehensive approach to content delivery in flipped learning environments. Platforms such as Coursera, edX, and Udacity offer structured learning experiences that can be integrated into flipped learning designs, providing students with access to high-quality instructional materials from diverse sources [9].

Blogs and websites serve as repositories for learning content, including articles, videos, and presentations. These platforms allow educators to create centralized knowledge hubs where students can access all necessary information for their independent study [17].

Social networks facilitate communication between educators and students, supporting the sharing of learning content and the creation of communities where students can support each other and seek guidance from educators [39].

The selection of appropriate tools and approaches depends on specific educational goals, student needs, and available resources. In some contexts, a limited number of tools may suffice, while in others, a combination of various tools may be necessary to achieve desired learning outcomes.

3. Educational video in flipped learning

3.1. The role of video content in effective flipped learning

Educational videos serve as a cornerstone of effective flipped learning environments, providing a flexible and engaging medium for content delivery outside the traditional classroom. The strategic integration of video content into flipped learning designs offers multiple advantages that enhance the educational experience and support diverse learning needs.

First, video content enables asynchronous access to instructional materials, allowing students to engage with content at times and places that suit their individual circumstances. This flexibility is particularly valuable in the Ukrainian context, where students may face constraints related to location, power availability, or internet access. As Sela, Pawestri and Luke [51] note, the asynchronous nature of video-based learning provides a solution to challenges resulting from distance education implementation.

Second, well-designed educational videos can effectively convey complex concepts through the integration of visual, auditory, and textual elements. This multimodal approach supports comprehension and retention, particularly for abstract or procedural knowledge. According to Thompson et al. [57], educational videos can be especially effective when they incorporate interactive elements that promote active engagement with the content.

Third, video content supports personalized learning by allowing students to control the pace of instruction. Students can pause, rewind, or rewatch video segments as

needed, ensuring thorough understanding before proceeding to new material. Lu [37] emphasizes that this aspect of video learning is particularly beneficial for challenging concepts or processes that require repeated exposure for mastery.

The effectiveness of video content in flipped learning is not merely theoretical; empirical research has demonstrated tangible benefits. Shen [53] found that instructional videos in flipped classrooms enhanced student engagement in the learning process and improved learning outcomes, including knowledge retention and transfer skills. Similarly, Fonseca, Da Silva and Sá [19] observed that interactive videos boosted student engagement and facilitated communication between students and teachers.

However, the mere inclusion of video content does not guarantee effective flipped learning. The design, quality, and integration of videos into the broader educational experience significantly influence their impact. As Samaila and Al-Samarraie [48] demonstrate, embedding quiz questions into pre-class recorded videos can increase the completion of pre-class activities, student engagement, and learning success, highlighting the importance of thoughtful design in maximizing the educational value of video content.

3.2. Types of educational videos and their pedagogical purposes

Educational videos encompass a diverse range of formats, each suited to particular pedagogical objectives and learning contexts. Understanding these different types and their intended purposes enables educators to make informed decisions about video creation and implementation in flipped learning environments.

Table 1
Types of educational videos and their pedagogical purposes.

Video type	Characteristics	Pedagogical ourpose
Lecture capture	Recording of traditional classroom lectures, often including slides and instructor presentation	Provides comprehensive coverage of course content; serves as reference material for review
Micro-lectures	Brief, focused videos (typically 3-7 minutes) addressing specific concepts or skills	Delivers targeted instruction on discrete topics; maintains student attention through concise presentation
Tutorial videos	Step-by-step demonstrations of processes or procedures	Develops procedural knowledge; supports skill acquisition through observation and guided practice
Interactive videos	Videos with embedded questions, prompts, or branching scenarios	Promotes active engagement; assesses comprehension; provides immediate feedback
Conceptual videos	Explanations of abstract ideas or theories, often using animations or visualizations	Supports conceptual understanding; makes abstract concepts concrete through visual representation
Problem-solving videos	Demonstrations of problem-solving processes with explicit reasoning	Models expert thinking; develops analytical skills; demonstrates application of concepts
Case study videos	Presentation of real-world scenarios illustrating theoretical principles	Connects theory to practice; develops analytical and critical thinking skills
Student-created videos	Content developed by students as part of the learning process	Promotes deeper engagement with material; develops communication and collaborative skills

Research indicates that different video types may be more effective for particular learning objectives or student populations. For example, Das et al. [11] found that micro-lectures were particularly effective for maintaining student engagement and facilitating initial exposure to new concepts. Similarly, Wong et al. [61] demonstrated that student-created videos increased classroom participation and peer engagement, suggesting the value of this approach for collaborative learning environments.

In the Ukrainian educational context, the selection of appropriate video types should consider not only pedagogical objectives but also practical constraints related to technology access and student circumstances. For instance, shorter, downloadable videos may be preferable in situations where internet connectivity is inconsistent or where students may need to conserve data usage.

The effective use of various video types often involves combining approaches to address different aspects of the learning process. For example, an educator might use a conceptual video to introduce a new theory, followed by a tutorial video demonstrating its application, and then an interactive video to assess student understanding. This integrated approach leverages the strengths of each video type to create a comprehensive learning experience.

3.3. Key elements of effective educational videos

The effectiveness of educational videos in flipped learning environments depends significantly on their design and implementation. Research has identified several key elements that contribute to the creation of engaging and pedagogically sound video content.

Duration represents a critical consideration in video design. While optimal video length varies depending on context and purpose, research generally suggests that shorter videos promote better engagement. Thompson et al. [57] found that videos between 5-10 minutes were most effective for maintaining student attention, though their focus group participants expressed a preference for videos approximately 20 minutes in length for more complex topics. This apparent contradiction suggests that video duration should be guided by content complexity and learning objectives rather than arbitrary time limits.

Visual design significantly influences student engagement with video content. Artman [5], applying the cognitive theory of multimedia learning, emphasizes the importance of deliberate visual choices that support rather than detract from learning objectives. This includes considerations of color schemes, font selection, slide composition, and the integration of relevant graphics or animations. Ilyas, Syarif and Refnaldi [25] specifically notes that Canva's design capabilities facilitate the creation of visually appealing educational videos that enhance student engagement with English language learning materials.

Clear structure and signposting help students navigate video content and identify key concepts. According to Wang, Stern and Waite [60], effective educational videos incorporate explicit organizational frameworks, transitions between topics, and summary elements that highlight essential information. These structural elements reduce cognitive load and support information processing and retention.

Interactive elements transform passive video viewing into active learning experiences. Samaila and Al-Samarraie [48] demonstrated that quiz-enhanced videos improved learning outcomes and student engagement compared to conventional video formats. Similarly, Bayazit and Akçapinar [8] developed an interactive video player that embedded formative assessment opportunities within educational videos, finding that this approach enhanced student learning in online environments.

Production quality influences both student perception of video credibility and their willingness to engage with the content. However, Di Paolo et al. [14] note that while

basic production standards are important, extremely high production values may not significantly enhance learning outcomes compared to well-designed videos with moderate production quality. This finding is particularly relevant for resource-constrained educational contexts, suggesting that educators should prioritize pedagogical design over elaborate production techniques.

Accessibility features ensure that educational videos benefit all students, including those with disabilities or learning differences. These features include closed captions, transcripts, descriptive audio, and compatibility with screen readers. Khomenko [32] emphasizes the importance of these considerations in creating inclusive educational environments that support diverse learning needs.

3.4. Impact of educational videos on student engagement and learning outcomes

A growing body of empirical research demonstrates the positive impact of well-designed educational videos on student engagement and learning outcomes in flipped learning environments. These findings provide substantial support for the integration of video content into educational practice, particularly in challenging contexts like contemporary Ukrainian higher education.

Student engagement represents a multidimensional construct encompassing behavioral, emotional, and cognitive components. Research indicates that educational videos can positively influence all these dimensions when thoughtfully implemented. Oya et al. [43] examined the impact of video-based flipped learning on student attitudes, finding significant positive effects on enjoyment, engagement, motivation, and behavioral intentions. Similarly, Purwanti, Suryawati and Eliwarti [45] observed that students in online EFL flipped classrooms reported high levels of satisfaction and engagement with video lecture content.

The relationship between engagement and learning outcomes is well-established, with higher levels of engagement generally associated with improved academic performance. Shen [53] provided empirical evidence that instructional videos in flipped classrooms enhanced both student engagement and learning outcomes, with participants in flipped classes outperforming their counterparts in terms of knowledge retention and transfer skills. This finding suggests that the engagement fostered by educational videos translates into tangible learning benefits.

Interactive elements within videos appear to particularly enhance engagement and learning. Deng, Feng and Shen [12] demonstrated that question-embedded pre-class videos, combined with in-class review of these questions, significantly strengthened learning performance in flipped classrooms. This approach exemplifies how strategic design choices can maximize the educational impact of video content.

The effectiveness of educational videos extends across various disciplinary contexts. In mathematics education, Sari et al. [49] found that the flipped classroom model using learning videos improved students' ability to understand mathematical concepts compared to conventional teaching methods. In language learning, Purwanti, Suryawati and Eliwarti [45] observed superior outcomes for students engaging with video lectures in online EFL flipped classrooms. These diverse applications highlight the versatility of educational videos as pedagogical tools.

However, it is important to acknowledge that the impact of educational videos depends on various factors beyond the videos themselves. Al-Said et al. [2] note that student motivation, technical constraints, and institutional support all influence the effectiveness of video-based flipped learning. Similarly, Nikitova et al. [42] emphasize the importance of careful implementation strategies that consider the specific needs and circumstances of students and educational institutions.

In the Ukrainian context, where students may face challenges related to internet

access, device availability, or study environments, these considerations are particularly relevant. The research suggests that while educational videos offer significant potential benefits, their effective implementation requires attention to contextual factors and student needs.

4. Canva as a tool for educational video creation

4.1. Overview of Canva's features and capabilities

Canva represents a versatile and accessible platform for creating educational videos, offering a range of features that support the development of engaging content for flipped learning environments. Understanding these capabilities enables educators to leverage Canva effectively in their instructional design processes.

At its core, Canva provides a user-friendly interface that significantly reduces the technical barriers associated with video creation. Unlike more complex video editing software, Canva employs an intuitive drag-and-drop approach that allows educators to focus on content rather than technical processes. Moro Ramos [41] highlights this accessibility as a key factor in Canva's effectiveness for promoting meaningful learning in educational contexts.

Canva's template library represents one of its most valuable features for educational video creation. The platform offers a diverse range of professionally designed templates specifically for educational content, providing structured frameworks that educators can easily customize to suit their instructional needs. These templates address various educational purposes, from concept explanations to procedural demonstrations, saving significant time in the design process while ensuring visual appeal.

The media library within Canva provides access to an extensive collection of images, graphics, icons, and stock footage that can be incorporated into educational videos. This resource is particularly valuable for educators without specialized design skills or

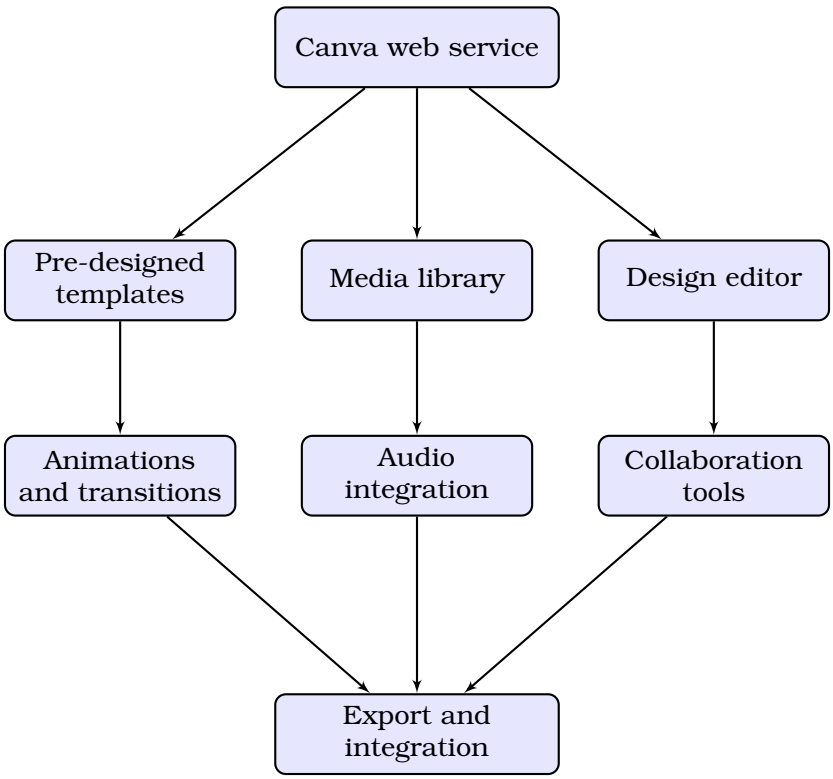

Figure 1: Key features and capabilities of canva for educational video creation.

access to custom visual assets. Additionally, Canva allows users to upload their own media files, enabling the integration of course-specific materials into video projects.

Animation and transition effects enhance the visual dynamics of educational videos, drawing attention to key concepts and maintaining student engagement. Canva offers a range of animation options that can be applied to text, images, and other elements, creating movement and visual interest without requiring advanced animation skills. Ardiyani et al. [4] notes that these features contribute to the effectiveness of Canva video-based lecture materials in helping students focus on content.

Audio integration capabilities allow for the addition of narration, music, and sound effects to educational videos. Canva enables users to record audio directly within the platform or upload pre-recorded audio files, facilitating the creation of comprehensive multimedia experiences. This feature supports the development of accessible content that addresses diverse learning preferences.

Collaboration tools within Canva enable multiple educators to work simultaneously on video projects, facilitating team-based approaches to content development. This feature is particularly valuable for interdisciplinary courses or departmental initiatives where content expertise may be distributed across multiple individuals. Dmitrenko et al. [16] highlights the potential of Canva's collaborative features for developing writing skills among prospective engineers in ESP classes.

Export and sharing options provide flexibility in how completed videos are distributed to students. Canva allows videos to be downloaded in various formats suitable for different platforms, as well as direct sharing to social media or integration with learning management systems. Jatmiko et al. [28] notes the feasibility and practicality of science learning videos created with the Canva application for socioscientific issues content.

These features collectively position Canva as a comprehensive platform for educational video creation, offering the technical capabilities necessary for developing engaging content while maintaining accessibility for educators with varying levels of technical expertise.

4.2. Comparative analysis of Canva versus other video creation tools

When selecting a platform for educational video creation, educators benefit from understanding the comparative advantages and limitations of available tools. This analysis examines Canva in relation to other popular video creation platforms: Powtoon, Prezi, Emaze, and Visme.

Canva's primary strengths in comparison to other platforms include its exceptionally intuitive interface, extensive template library, and robust free tier. As Maulana et al. [38] observe, Canva's design-centric approach resonates particularly well with students, who value aesthetics and creative tools. The platform excels in creating visually appealing content with moderate animation needs, making it well-suited for educational videos that emphasize clear visual communication.

Powtoon, by contrast, offers superior animation capabilities, particularly for character animation and storytelling. Its timeline-based editing approach provides more precise control over animation sequences than Canva's simpler animation tools. However, this comes at the cost of a steeper learning curve and more limited free tier options. Powtoon may be preferable for educational videos requiring character-based narratives or complex animation sequences.

Prezi's distinctive zoom-based navigation creates unique visual relationships between concepts, potentially enhancing student understanding of conceptual connections. However, this nonlinear approach can be disorienting for some viewers and requires more planning to execute effectively. Prezi's limited free tier and subscription emphasis also present potential barriers for resource-constrained educational settings.

Table 2
Comparative analysis of educational video creation tools.

Feature	Canva	Powtoon	Prezi	Visme
User interface	Highly intuitive drag-and-drop interface with minimal learning curve	User-friendly but requires more time to master animation features	Moderate learning curve; zoom-based navigation can be challenging for beginners	Clean interface with moderate learning curve
Design capabilities	Extensive templates with high customization; strong static design features	Animation-focused with character libraries and motion graphics	Unique zoom navigation; strong spatial relationships between elements	Comprehensive design tools with emphasis on data visualization
Animation options	Basic to intermediate animations; simple transition effects	Advanced animation capabilities; character animation; timeline-based editing	Dynamic zoom transitions; motion path animations	Moderate animation capabilities with good transition effects
Collaboration	Real-time collaboration; team libraries; commenting features	Basic collaboration in paid tiers; limited real-time capabilities	Real-time collaboration in higher tiers; presentation co-editing	Team collaboration features in business plans
Educational templates	Extensive education-specific templates; diverse disciplinary options	Good selection of education templates; strong for storytelling	Limited education-specific templates; concept-mapping strength	Moderate education templates; strong infographic options
Accessibility	Good accessibility features; easy export to various formats	Moderate accessibility; limited caption options	Moderate accessibility; nonlinear format may present challenges	Good accessibility with caption support
Integration with LMS	Direct integration limited; easy embedding via links or exported files	Direct integration with some LMS; requires export for others	Integration with major LMS platforms; presentation embeds	Limited direct integration; exports for embedding
Free version capabilities	Robust free tier with numerous features; watermarked exports	Limited free tier; watermarked exports; time restrictions	Very limited free version; emphasis on paid subscriptions	Limited free tier; watermarked exports
Typical use case	Visual-focused educational content with moderate animation needs	Animated storytelling; character-based explanations	Conceptual relationships; nonlinear presentations	Data visualization; infographic-style presentations

Visme offers stronger data visualization capabilities than Canva, making it particularly suitable for educational videos focused on statistical information or research findings. Its animation capabilities fall between Canva's basic options and Powtoon's advanced features, offering a moderate middle ground. However, its educational template library is less extensive than Canva's, requiring more customization for educational purposes.

For Ukrainian educators facing resource constraints and varied technical expertise levels, Canva's combination of accessibility, robust free tier, and visual quality presents significant advantages. As Ardiyani et al. [4] demonstrated, Canva video-based lecture materials help students focus more effectively on content, suggesting that the platform's design approach supports rather than detracts from learning objectives.

However, the optimal tool selection ultimately depends on specific educational goals, content types, and institutional contexts. Educators may benefit from employing multiple platforms based on the particular requirements of different video projects, or even combining tools to leverage their respective strengths.

4.3. Unique advantages of Canva for educational content

Beyond the general comparison with other video creation tools, Canva offers several distinctive advantages specifically relevant to educational content development. These unique benefits position Canva as a particularly valuable resource for educators in Ukrainian higher education contexts.

Canva's approach to design democratization represents a fundamental advantage for educational applications. The platform significantly lowers technical barriers to creating professional-quality visual content, enabling educators without specialized design training to develop visually appealing educational materials. Moro Ramos [41] emphasizes this aspect of Canva, noting that it promotes meaningful learning by facilitating the creation of attractive and personalized educational materials that enhance information retention.

The platform's template-based approach provides educational scaffolding that aligns with pedagogical best practices. Templates offer structural frameworks that guide content organization while maintaining visual coherence, addressing a common challenge in educational video creation. For Ukrainian educators with limited time for material development due to crisis-related responsibilities, these templates represent valuable efficiency tools that maintain quality standards while reducing production time.

Canva's offline capabilities represent a particularly significant advantage in the Ukrainian context, where internet connectivity may be inconsistent due to infrastructure challenges or power outages. As Ardiyani et al. [4] note, Canva video-based materials can be used offline after downloading, allowing students to access videos at any time and focus on the materials without connectivity concerns. This feature directly addresses one of the primary challenges of educational technology implementation in Ukraine.

The platform's visual focus aligns well with cognitive theories of multimedia learning, which emphasize the value of integrating visual and verbal information to enhance comprehension and retention. Artman [5] applies this theoretical framework to educational video design, noting that appropriately designed visual elements reduce cognitive load and support learning. Canva's design-centric approach facilitates the creation of visually coherent educational content that supports rather than hinders cognitive processing.

Canva's international language support, including Ukrainian language options, enhances its accessibility for both educators and students. This feature reduces linguistic barriers to platform adoption and enables the creation of videos with Ukrainian interface elements, supporting instructional continuity with classroom experiences. As Petrovych et al. [44] observe, such linguistic adaptation represents an important consideration in the implementation of cloud technologies for educational purposes in Ukrainian contexts.

The platform's brand consistency features support institutional identity integration, allowing universities and departments to maintain visual coherence across educational materials. This capability facilitates the development of recognizable educational con-

tent that reinforces institutional affiliations and academic credibility. For Ukrainian institutions navigating complex transitions in educational delivery, this visual consistency can provide valuable continuity for students experiencing disruption in other aspects of their educational experience.

Canva's cross-platform compatibility ensures that educational videos remain accessible across various devices and operating systems. This flexibility is particularly valuable in diverse technological environments where students may access content using a range of devices based on availability rather than preference. Ilyas, Syarif and Refnaldi [25] notes that this accessibility enhances student perception of educational videos created with Canva, facilitating engagement regardless of the specific technology used for access.

Finally, Canva's regular updates and evolving feature set demonstrate ongoing commitment to platform development, suggesting sustainability for long-term educational implementation. This aspect addresses concerns about investing time in learning platforms that may become obsolete or unsupported. For Ukrainian educational institutions developing digital transformation strategies, this sustainability represents an important consideration in platform selection.

4.4. Accessibility and usability considerations for educators

While Canva offers significant advantages for educational video creation, successful implementation requires attention to accessibility and usability considerations that influence both educator adoption and student engagement. These factors become particularly important in the challenging circumstances facing Ukrainian higher education.

Digital literacy requirements represent a primary consideration for Canva implementation. Although the platform is designed for user-friendly operation, educators still require basic digital skills to navigate its interface effectively. Babakina, Otroshko and Shcherbak [6] highlight the importance of digital competence development for Ukrainian educators implementing multimedia technologies in the educational process. Institutions adopting Canva for educational video creation should therefore consider providing professional development opportunities that address both technical and pedagogical aspects of the platform.

Technical infrastructure requirements must also be evaluated when implementing Canva in Ukrainian educational contexts. While the platform functions on standard computing equipment, video creation and editing benefit from adequate processing power, storage capacity, and display quality. Veglianti et al. [59] note that supporting digital transformation plans requires effective activities and customized online services, including appropriate technological infrastructure. Educational institutions should assess and potentially upgrade their technical resources to support effective Canva implementation.

Accessibility for students with disabilities requires particular attention in educational video design. Canva provides features that support the creation of accessible content, including text alternatives for images, legible typography options, and color contrast capabilities. However, educators must intentionally employ these features to ensure that educational videos are accessible to all students. Zavaruieva et al. [62] emphasize the importance of inclusive approaches in Ukrainian language instruction, highlighting the need for educational materials that accommodate diverse learning needs.

Linguistic accessibility presents another important consideration, particularly in multilingual educational environments. While Canva offers Ukrainian language support, educators creating content for international students or specialized courses may need to develop multilingual materials or implement translation strategies. Badan et al. [7] discuss the challenges of online communication in foreign language learning

for Ukrainian students, emphasizing the importance of linguistic accessibility in digital educational resources.

Time requirements for video creation may present challenges for educators managing multiple responsibilities in crisis contexts. While Canva's templates reduce design time compared to starting from scratch, video production still requires significant investment in planning, content development, recording, and editing. Braun [9] note that producing learning videos for flipped classrooms is traditionally a time-consuming and manual task, suggesting the value of streamlined production processes. Educational institutions should consider workload implications when implementing Canva for educational video creation, potentially providing dedicated time allocations or support staff for content development.

Cost considerations also influence Canva implementation decisions. While the platform offers a robust free tier suitable for many educational applications, premium features require subscription payments that may strain limited educational budgets. Fonseca, Da Silva and Sá [19] identify cost as a potential inhibitor for video interactivity technologies in educational settings. Institutions should evaluate whether free tier capabilities meet their educational requirements or if premium subscriptions provide sufficient additional value to justify the investment.

By addressing these accessibility and usability considerations proactively, Ukrainian educational institutions can maximize the benefits of Canva for educational video creation while minimizing potential barriers to effective implementation.

5. Step-by-step guide for creating educational videos with Canva

5.1. Planning educational video content

Effective educational videos begin with thoughtful planning that aligns content with learning objectives and student needs. This critical initial phase establishes the foundation for subsequent design and development processes, determining the ultimate effectiveness of the video as an educational tool.

Learning objective identification represents the first step in planning educational video content. Clear, specific objectives guide all subsequent decisions about content selection, presentation approach, and assessment alignment. Di Paolo et al. [14] emphasize the importance of purpose-driven video design that begins with explicit learning goals. These objectives should specify what students will know or be able to do after engaging with the video, providing both direction for content development and criteria for evaluating video effectiveness.

Audience analysis helps tailor videos to specific student characteristics, including prior knowledge, technical access, and learning preferences. In the Ukrainian higher education context, this analysis should consider factors such as language proficiency, technical resources, and potential learning environment constraints due to crisis conditions. Wang, Stern and Waite [60] highlight the importance of audience-centered design in educational video development, noting that content must be adapted to the specific needs and circumstances of the intended viewers.

Content selection and sequencing decisions flow from learning objectives and audience analysis, identifying the essential concepts, examples, and explanations required to achieve educational goals. Effective educational videos maintain focused scope, addressing a limited number of key points rather than attempting comprehensive coverage. Artman [5] notes that cognitive load theory suggests organizing content into manageable segments that avoid overwhelming students' cognitive processing capacity.

The selection of appropriate video format – such as lecture capture, tutorial, demonstration, or animation – should align with both content requirements and learning

objectives. Different formats serve different pedagogical purposes, and the optimal choice depends on specific educational goals. For example, Thompson et al. [57] found that procedural knowledge is often effectively conveyed through demonstration videos, while conceptual understanding may benefit from animated explanations with visual metaphors.

Storyboarding provides a visual outline of the video's structure, identifying key scenes, transitions, and visual elements. This planning tool helps coordinate visual and verbal components while ensuring logical flow and appropriate pacing. Di Paolo et al. [14] recommend developing detailed storyboards that specify both visual content and accompanying narration, creating a comprehensive blueprint for video production.

Script development transforms the storyboard into specific language, examples, and explanations that will guide narration or on-screen text. Effective educational video scripts employ clear, concise language appropriate to the audience's level of understanding. Lu [37] emphasizes the importance of conversational rather than formal language in educational videos, noting that a more personal tone typically enhances engagement and comprehension.

Assessment integration planning identifies opportunities to incorporate questions, prompts, or activities that reinforce learning and provide feedback on student understanding. Deng, Feng and Shen [12] demonstrated that question-embedded pre-class videos significantly strengthened learning performance in flipped classrooms, highlighting the value of integrated assessment elements in educational video design.

This planning phase requires investment of time and thought, but this initial effort yields significant benefits in streamlined production and enhanced educational effectiveness. For Ukrainian educators creating videos under challenging circumstances, thorough planning helps maximize the impact of limited production time and resources.

5.2. Selecting appropriate templates and design elements

Once the planning phase establishes clear educational objectives and content structures, the selection of appropriate templates and design elements in Canva provides the visual framework for effective video communication. This process involves thoughtful consideration of both aesthetic and pedagogical factors to create visually engaging content that supports rather than distracts from learning.

Template selection in Canva begins with browsing the platform's extensive library of video templates, using the search and filter functions to identify options aligned with specific educational purposes. When evaluating potential templates, educators should consider how the visual structure supports content organization, whether the pacing and transitions complement the intended delivery, and if the overall aesthetic creates an appropriate tone for the subject matter. Howell, Morgan and Jackson [23] note that Canva's advantages over Adobe Suite products include a shorter learning curve and built-in compatibility with social media products, making template-based design particularly accessible for educators.

Color scheme customization represents a critical design decision that influences both aesthetic appeal and learning effectiveness. Research in educational psychology suggests that strategic use of color can direct attention, enhance recall, and establish visual hierarchies that support information processing. Zavaruieva et al. [62] specifically notes the effectiveness of color schemes in Ukrainian language education, describing how color associations helped students understand grammatical cases and other language features. When customizing Canva templates, educators should consider establishing consistent color codes for different types of information (e.g., definitions, examples, key points) and ensure sufficient contrast for readability.

Typography selection impacts both readability and emotional tone, requiring careful

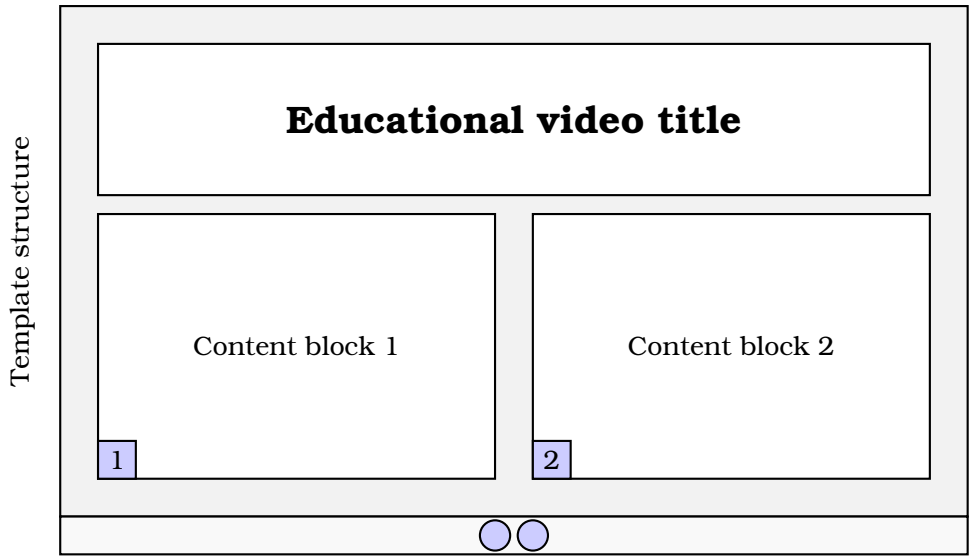

Figure 2: Schematic representation of an educational video template in Canva.

consideration of font styles, sizes, and weights. Effective educational videos typically employ a limited number of font families (typically no more than two) with clear hierarchical relationships between headings, subheadings, and body text. Moro Ramos [41] emphasizes that Canva's capacity to create visually appealing materials includes typography options that enhance information retention and engagement. Text should be large enough to read on various devices, including smartphones, with adequate contrast against backgrounds.

Image and graphic selection should prioritize relevance to learning objectives rather than decorative appeal alone. Visual elements should clarify, illustrate, or extend textual information rather than simply accompanying it. Wang, Stern and Waite [60] recommends selecting visuals that reduce cognitive load by making abstract concepts concrete or illustrating relationships between ideas. Canva's extensive media library provides access to diverse visual resources, while also allowing educators to upload custom images specific to their disciplinary contexts.

Animation and transition effects require judicious application to enhance rather than distract from learning. Ardiyani et al. [4] notes that Canva's animation features can help focus student attention on important content elements when used strategically. Simple entrance animations can signal new information, while subtle transitions maintain continuity between sections. However, excessive or decorative animations may increase cognitive load without educational benefit, suggesting the value of restraint in animation application.

Branding elements such as institutional logos, department names, or course identifiers help establish context and credibility for educational videos. Maulana et al. [38] found that consistent branding elements contributed to student perceptions of professionalism and reliability in educational materials. Canva's ability to save brand kits with consistent colors, fonts, and logos facilitates the creation of visually coherent video collections that reinforce institutional identity.

Template customization ultimately involves balancing fidelity to effective design principles with adaptation to specific educational needs. While templates provide valuable starting points, the most effective educational videos reflect thoughtful modification based on content requirements, audience characteristics, and learning objectives. This customization process transforms generic templates into tailored educational tools that effectively support student learning in specific contexts.

5.3. Adding animations, transitions, and interactive elements

The thoughtful incorporation of animations, transitions, and interactive elements can transform static content into dynamic educational experiences that enhance student engagement and support learning objectives. When implemented with pedagogical purpose rather than decorative intent, these features reinforce key concepts, guide attention, and facilitate information processing.

Animation in educational videos serves several distinct pedagogical functions. First, entrance and exit animations can signal the introduction of new information or the completion of a topic, creating clear visual delineation between content sections. Second, emphasis animations can highlight key terms, critical relationships, or essential principles, directing student attention to particularly important elements. Third, explanatory animations can illustrate processes, demonstrate procedures, or visualize abstract concepts, making complex information more accessible through visual representation.

Canva provides a range of animation options accessible through its animation panel, allowing educators to apply motion effects to text, images, and graphical elements. Ardiyani et al. [4] notes that these animation capabilities help students focus more effectively on educational content when appropriately applied. However, research in cognitive load theory suggests that animations should be implemented judiciously, as excessive or purely decorative motion can distract from learning objectives [5].

Transitions between slides or sections serve to maintain continuity and signal organizational relationships within educational videos. These elements help students understand the structure of the content and anticipate upcoming information. Canva offers various transition effects, including fades, slides, and wipes, that can be applied consistently throughout a video or varied to signal different types of relationships between content segments.

Effective transition design considers both aesthetic and cognitive factors. Wang, Stern and Waite [60] recommends selecting transitions that reflect the logical relationships between content sections – for example, using subtle transitions between closely related points and more distinct transitions between major topics. This approach helps students construct accurate mental models of the content organization, facilitating comprehension and retention.

Interactive elements transform passive viewing into active learning experiences by requiring student engagement with the content. While Canva itself has limited built-in interactivity features for videos, educators can design pseudo-interactive elements such as question slides with pause prompts, reflection moments, or guided note-taking frames. These elements can be enhanced through integration with learning management systems or dedicated interactive video platforms after export from Canva.

Deng, Feng and Shen [12] demonstrated that question-embedded pre-class videos significantly strengthened learning performance in flipped classrooms, highlighting the value of interactive elements in educational videos. Similarly, Samaila and Al-Samarraie [48] found that quiz-enhanced videos improved student engagement and learning outcomes compared to conventional video formats. These findings suggest the importance of thoughtfully incorporating interactive elements either within videos or as complementary components in the broader learning environment.

Implementation of animations, transitions, and interactive elements in Canva involves accessing the animation panel for individual elements, the transition menu for slide changes, and designing structured pauses or question frames for interactivity. Throughout this process, educators should maintain focus on the pedagogical purpose of each feature, ensuring that dynamic elements enhance rather than distract from learning objectives.

For Ukrainian educators creating videos for crisis-affected educational contexts, judicious use of these features can help maintain student engagement despite challenging learning circumstances. However, consideration should also be given to technical constraints such as file size and playback requirements, particularly in situations where internet bandwidth or device capabilities may be limited.

5.4. Recording and editing audio components

The audio dimension of educational videos significantly influences their effectiveness, with clear narration, appropriate music, and strategic sound effects contributing to student engagement and comprehension. Creating professional-quality audio components requires attention to both technical and pedagogical considerations throughout the recording and editing process.

Voice recording represents a central element of many educational videos, providing explanations, examples, and contextual information to complement visual content. Canva offers built-in voice recording functionality that allows educators to add narration directly to specific slides or sections within the platform. Alternatively, educators may record audio separately using dedicated recording software and then import the files into Canva, which may offer greater control over audio quality and editing options.

Regardless of the recording approach, several best practices enhance voice recording quality. First, script preparation ensures clear, concise language and appropriate pacing, reducing the need for extensive editing. Second, appropriate equipment – ideally a dedicated microphone rather than built-in computer audio – improves sound clarity and reduces background noise. Third, recording environment selection minimizes echo and ambient sounds that can detract from voice clarity. Finally, consistent speaking distance from the microphone and moderate, steady speaking pace enhance audio intelligibility.

Di Paolo et al. [14] emphasize the importance of conversational rather than formal tone in educational narration, noting that students typically respond more positively to natural speech patterns that create a sense of interpersonal connection. This approach aligns with research on social presence in educational media, which suggests that personalized communication enhances engagement and motivation.

Background music can establish emotional tone, maintain engagement during visual-only segments, and signal transitions between content sections. Canva provides a library of royalty-free music options that can be incorporated into educational videos, with volume controls allowing for balance between music and narration. When selecting background music, educators should consider emotional congruence with content, potential cultural associations, and ensuring music remains subtle enough to avoid competing with narration for attention.

Lu [37] notes that appropriate music selection can enhance the affective dimension of educational videos, creating positive emotional associations that support engagement and retention. However, music should typically fade or reduce in volume during narration to maintain speech intelligibility, with full volume reserved for introductions, transitions, or conclusion segments without spoken content.

Sound effects can signal interactions, emphasize key points, or create auditory representations of processes or events. These elements should be used selectively and purposefully, enhancing rather than distracting from learning objectives. Canva's audio library includes various sound effects that can be positioned at specific points in the video timeline, aligned with visual elements or narration for maximum impact.

Audio editing within Canva involves adjusting volume levels, trimming unwanted sections, and synchronizing audio with visual elements. The platform provides basic editing functions suitable for most educational purposes, including volume adjustment, trimming, and repositioning. For more complex audio editing requirements, educators

may need to perform initial editing in dedicated audio software before importing the refined files to Canva.

Technical considerations for audio in educational videos include ensuring appropriate file formats, maintaining consistent volume levels throughout the video, and confirming audio quality on various playback devices. Khilya [31] emphasizes the importance of technical quality in educational video projects, noting that audio intelligibility directly impacts learning effectiveness.

For Ukrainian educators creating videos in challenging circumstances, pragmatic approaches to audio recording may be necessary. This might include recording in improvised spaces with blankets or soft furnishings to reduce echo, using smartphone recording applications when dedicated equipment is unavailable, or creating transcripts or captions to supplement audio content for students in noisy environments or with unreliable audio playback capabilities.

5.5. Finalizing and exporting videos in appropriate formats

The finalization and export phase transforms carefully designed Canva projects into accessible, functional educational videos ready for student use. This process involves comprehensive review, technical optimization, and format selection aligned with distribution channels and student access considerations.

Comprehensive review before export ensures that the educational video meets both pedagogical and technical quality standards. This review should examine content accuracy, visual clarity, audio intelligibility, timing and pacing, and overall alignment with learning objectives. Di Paolo et al. [14] recommend a structured review process using a checklist that addresses both content and technical elements, potentially involving peer feedback to identify issues that the creator might overlook.

Particular attention should be given to text proofreading, timing of animations and transitions, synchronization between audio and visual elements, and consistency in design elements throughout the video. This review process may reveal needs for final adjustments to enhance clarity, correct errors, or improve the viewing experience before moving to export.

Format selection depends on both technical requirements and distribution considerations. Canva offers several export options, including MP4 video in various quality settings, animated GIF for short sequences, or individual slide images. For most educational purposes, MP4 video represents the most versatile format, offering compatibility with diverse platforms and devices while maintaining reasonable file sizes.

Resolution selection balances video quality with file size considerations. Higher resolutions (1080p or above) provide enhanced visual clarity but generate larger files that may present challenges for students with limited bandwidth or storage capacity. For most educational videos, 720p resolution offers a reasonable compromise between quality and accessibility, particularly when text legibility and visual details are essential for learning objectives.

Compression settings further influence both quality and file size, with higher compression reducing file size at the potential cost of visual or audio quality. When exporting from Canva, educators should consider student access circumstances – particularly in the Ukrainian context where internet connectivity may be limited or intermittent – when selecting compression levels, potentially creating multiple versions for different access scenarios.

File naming and metadata attachment establish important contextual information that supports organization and searchability. Consistent naming conventions that incorporate course identifiers, topic information, and sequence indicators help students locate specific content and understand its relationship to broader course structures.

While Canva's export options for metadata are limited, educators can add these elements after export using video management platforms or learning management systems.

Accessibility enhancements such as closed captions or transcripts ensure that educational videos remain accessible to all students, including those with hearing impairments or those studying in environments where audio playback is impractical. Zavaruieva et al. [62] emphasizes the importance of inclusive approaches in Ukrainian language instruction, highlighting the need for multi-modal content access options. While Canva does not directly support caption embedding, educators can add captions using video platforms like YouTube or dedicated captioning tools before final distribution.

Storage and backup processes protect against data loss and ensure ongoing availability of educational videos. Jersic, Juvan and Pecnik [29] recommends maintaining multiple copies of educational videos across different storage locations, particularly in contexts where infrastructure reliability may be compromised by crisis conditions. Cloud storage options provide accessibility from various locations, while local copies ensure availability during internet outages – a particularly important consideration in the Ukrainian context.

For Ukrainian educators navigating challenging circumstances, pragmatic export strategies might include creating lower-resolution versions for easier distribution via messaging applications when learning management systems are inaccessible, developing downloadable versions that students can access during periods of connectivity for later offline viewing, or exporting key content as image sequences when video distribution is impractical due to extreme bandwidth limitations.

6. Technical integration of Canva videos with learning management systems

6.1. Overview of common LMS platforms in Ukrainian higher education

Ukrainian higher education institutions employ various learning management systems (LMS) to facilitate educational content delivery, assessment, and student-instructor interaction. Understanding the LMS landscape provides important context for integrating Canva videos effectively into the broader technological ecosystem of Ukrainian education.

Moodle represents the most widely adopted LMS platform in Ukrainian higher education, with its open-source nature, extensive customization options, and multilingual support aligning well with institutional needs and resource constraints. Strutynska et al. [55] note that Moodle forms a central component of the digital educational environment for training university teachers in Ukraine, supporting blended and distance learning approaches. The platform's modular architecture allows for the integration of various content types, including videos, while its robust activity and assessment tools facilitate the development of comprehensive online learning experiences.

Google Classroom has gained significant adoption in Ukrainian educational institutions, particularly following the onset of the COVID-19 pandemic and subsequent war-related disruptions. Its integration with other Google services, cloud-based accessibility, and relatively low technical requirements have made it an attractive option for institutions seeking rapid deployment of distance learning capabilities. Tkachuk et al. [58] highlights the use of Google applications for online learning during COVID-19 lockdowns in Ukraine, noting their accessibility from various devices including mobile phones – an important consideration in crisis contexts.

Locally developed platforms also feature in the Ukrainian LMS landscape, with some institutions developing or adapting systems to address specific requirements or

resource limitations. These platforms often focus on particular pedagogical approaches or disciplinary needs, sometimes incorporating elements of Ukrainian educational traditions that may not be fully accommodated in international LMS designs. While potentially well-aligned with local needs, these systems may present greater technical challenges for video integration due to less standardized implementation or limited documentation.

Integration capabilities vary significantly across these platforms, influencing the approach required for incorporating Canva videos into learning experiences. Moodle offers multiple integration options, including direct file uploads, embedded HTML, external tool integrations via LTI standards, and dedicated video plugins that provide enhanced playback and analytics features. Google Classroom facilitates video integration primarily through Google Drive or YouTube embedding, leveraging its cloud ecosystem for storage and delivery. Locally developed platforms may offer more limited or idiosyncratic integration options, potentially requiring customized approaches based on specific system capabilities.

Judel, vom Felde and Schroeder [30] describes the development of video analytics in Moodle using xAPI, demonstrating the potential for advanced video integration

Algorithm 1 Decision process for selecting LMS integration method.

Require: Canva video file, Target LMS platform, Technical capabilities, Student access considerations
Ensure: Successful integration of video content

```
function DetermineLMSType(platform)
    if platform == "Moodle" then
        return "STANDARDIZED_LMS"
    else if platform == "Google Classroom" then
        return "CLOUD_BASED_LMS"
    else if platform == "Local System" then
        return "CUSTOM_LMS"
    else
        return "OTHER_LMS"
    end if
end function
function SelectIntegrationMethod(lmsType, techCapabilities, studentAccess)
    if lmsType == "STANDARDIZED_LMS" then
        if techCapabilities == "ADVANCED" then
            return "DIRECT_EMBED"
        else if studentAccess == "LIMITED" then
            return "EXTERNAL_HOST_WITH_DOWNLOAD"
        else
            return "EXTERNAL_HOST_EMBED"
        end if
    else if lmsType == "CLOUD_BASED_LMS" then
        return "CLOUD_STORAGE_INTEGRATION"
    else if lmsType == "CUSTOM_LMS" then
        if techCapabilities == "LIMITED" then
            return "FILE_DOWNLOAD_OPTION"
        else
            return "API_INTEGRATION"
        end if
    else
        return "UNIVERSAL_EMBED_CODE"
    end if
end function
```

with appropriate technical expertise. Similarly, Bayazit and Akçapinar [8] outlines the design and development of an interactive video player for supporting formative assessment in online learning environments, highlighting the possibility of enhanced video functionality within LMS platforms. These capabilities suggest the potential for sophisticated educational video implementations, though resource constraints may limit their application in some Ukrainian educational contexts.

Technical support resources for LMS management vary across Ukrainian institutions, with some universities maintaining dedicated e-learning departments while others rely on faculty initiatives with limited specialized support. This variation influences the feasibility of different video integration approaches, with more complex implementations requiring corresponding technical expertise. Simanullang and Rajagukguk [54] emphasizes the importance of technical support for successful LMS implementation, noting that appropriate expertise facilitates the effective integration of multimedia elements including videos.

Student access considerations should inform LMS selection and configuration, particularly in the Ukrainian context where internet connectivity, device availability, and technical skills may vary significantly among students. Sarker et al. [50] highlights the importance of analyzing student access constraints when implementing e-learning approaches, noting that technical problems can significantly impact student engagement with online learning platforms. These considerations suggest the value of flexible video delivery options that accommodate diverse access scenarios.

The Ukrainian LMS landscape continues to evolve in response to ongoing educational challenges and technological developments. Molinari and Sandri [40] discusses the evolution of LMS design and implementation in the age of AI and large language models, suggesting future directions that may influence how educational videos are integrated into learning platforms. For Ukrainian educational institutions, awareness of these trends can inform strategic decisions about LMS selection and configuration that support effective educational video integration.

6.2. Methods for embedding Canva videos in Moodle

Moodle represents the most widely adopted learning management system in Ukrainian higher education, making the integration of Canva videos into this platform particularly relevant for educators seeking to implement flipped learning approaches. Several methods exist for embedding Canva videos in Moodle, each offering distinct advantages and limitations depending on technical requirements and pedagogical objectives.

Direct file upload represents the most straightforward method for integrating Canva videos into Moodle. This approach involves exporting the video from Canva in MP4 format and then uploading it directly to the Moodle course as a file resource. Students can then download and view the video offline or stream it within the browser, depending on their connection capabilities and preferences. This method ensures complete institutional control over the video content, as it resides entirely within the Moodle environment rather than depending on external services.

However, direct file upload presents several limitations. First, video files – particularly those of higher quality or longer duration – can quickly consume available storage space on institutional servers, potentially incurring additional costs or reaching system limits. Second, this approach lacks advanced streaming capabilities, potentially resulting in buffering issues or inconsistent playback experiences for students with limited bandwidth. Third, analytics capabilities are typically limited to basic access logs rather than detailed engagement metrics. Despite these constraints, direct file upload remains valuable for environments with restricted internet access or particular privacy requirements.

HTML embedding offers an alternative approach that leverages Canva's sharing

capabilities. After exporting the video, educators can upload it to a web-accessible location such as an institutional media server or video hosting platform, then embed it in Moodle using the HTML editor with appropriate iframe or video tags. Rajesh, Goudar and Kumar [46] describes the implementation of micro-notes in Moodle for educational videos, demonstrating how embedded videos can be enhanced with additional pedagogical elements through HTML customization.

This method provides greater flexibility in video hosting and delivery while maintaining the appearance of integrated content within the Moodle interface. It can leverage specialized video hosting services that offer adaptive streaming capabilities, automatically adjusting video quality based on student connection speeds. However, HTML embedding requires both a suitable hosting location for the video files and basic familiarity with HTML code for proper implementation, potentially presenting barriers for less technically experienced educators.

External tool integration via Learning Tools Interoperability (LTI) standards represents a more sophisticated approach available in many Moodle implementations. This method enables connections between Moodle and external video platforms that support LTI, creating seamless access to video content hosted on specialized services. While Canva itself does not offer direct LTI integration, videos exported from Canva can be uploaded to compatible platforms such as YouTube, Vimeo, or institutional video management systems that support this standard.

Gkamas et al. [21] describes the integration of the Kaltura video platform with digital repositories, illustrating how standardized protocols can facilitate connections between learning management systems and specialized video services. This approach offers advantages including advanced streaming capabilities, detailed analytics, and reduced load on institutional servers. However, it typically requires administrative configuration of the LTI connections and may involve subscription costs for premium video platforms.

Plugin-based integration leverages Moodle's extensible architecture through dedicated video plugins that enhance the platform's native video capabilities. Plugins such as VideoJS, MediaCore, or H5P provide specialized video players with additional features such as interactive elements, enhanced playback controls, or engagement tracking. Dampil [10] examines the integration of H5P interactive videos in Moodle, finding significant positive effects on student performance in mathematics courses.

While these plugins do not connect directly to Canva, they can be used to deliver and enhance Canva-created videos within the Moodle environment, adding capabilities not available through standard embedding approaches. Implementation typically requires administrator-level access to install and configure the plugins, potentially limiting availability for individual educators without institutional support.

Mobile optimization considerations should inform the selection of integration methods, particularly in contexts where students may access educational content primarily through smartphones or tablets. Tkachuk et al. [58] highlights the importance of mobile compatibility for online learning during crisis periods in Ukraine, noting that many students rely on mobile devices for educational access. Integration approaches should therefore ensure that embedded videos display and function properly on smaller screens and adapt to touch-based interactions.

For Ukrainian educational institutions facing resource constraints or infrastructure challenges, pragmatic approaches to Moodle integration might include creating multiple video versions at different quality levels to accommodate varying bandwidth capabilities, providing both streaming and downloadable options to support offline viewing during power outages or connectivity disruptions, or developing low-bandwidth alternatives such as sequenced images with text for content that does not require full motion video.

6.3. Tracking student engagement with video content

Understanding how students interact with educational videos provides valuable insights that can inform instructional design, identify learning challenges, and guide pedagogical interventions. Various approaches to tracking student engagement with video content offer different levels of detail and technical complexity, with implications for implementation in Ukrainian educational contexts.

Basic access tracking represents the foundational level of engagement monitoring available in most learning management systems, including Moodle. This approach records when students access video resources, providing timestamp data that indicates initial viewing attempts. Simanullang and Rajagukguk [54] describes how Moodle's standard tracking features can be used to monitor student learning activities, including interactions with video content. While limited in detail, this basic data can identify students who have not accessed essential instructional materials, enabling timely interventions to address potential barriers to participation.

Advanced video analytics offer more comprehensive insights into student engagement patterns, capturing detailed interaction data such as play, pause, seek, and completion behaviors. Judel, vom Felde and Schroeder [30] presents the development of a video analytics system for Moodle using xAPI, demonstrating how specialized tools can record fine-grained video interactions to better understand student viewing patterns. Similarly, Garrick [20] describes the implementation of flipped classroom video analytics that revealed patterns in when, where, and how students watched instructional videos across multiple semesters.

These analytics approaches can reveal valuable information about which content sections receive the most attention, where students commonly encounter difficulties (indicated by repeated viewing or pauses), and whether videos are typically watched completely or abandoned partway through. However, implementing advanced analytics typically requires either specialized plugins, external video hosting platforms with analytics capabilities, or custom development work that may exceed the technical resources available in some Ukrainian educational institutions.

Interactive elements within videos provide another approach to tracking engagement, combining assessment with analytics. Deng, Feng and Shen [12] explores the effectiveness of question-embedded pre-class videos in flipped classrooms, finding that these interactive elements not only improved learning performance but also provided data about student understanding. Similarly, Bayazit and Akçapinar [8] describes an interactive video player for Moodle that recorded interactions between students and embedded quizzes, capturing attempts and response accuracy.

These interactive approaches offer particularly valuable data by directly measuring comprehension rather than merely tracking viewing behavior. However, creating interactive videos typically requires either specialized authoring tools beyond Canva's native capabilities or the use of external platforms that support interactivity features after export from Canva. The technical complexity of this approach may present implementation challenges in resource-constrained settings.

Self-reported engagement represents a complementary approach that captures students' subjective experiences with video content. Purwanti, Suryawati and Eliwarti [45] incorporated student evaluations of video lectures in online EFL flipped classrooms, gathering qualitative data about perceived effectiveness and engagement. Similarly, Oya et al. [43] examined dimensions of attitudes in flipped learning, including enjoyment, engagement, and motivation, through student self-reports.

This approach provides insights into the affective and metacognitive dimensions of video engagement that automated tracking cannot capture, potentially revealing why certain engagement patterns occur. Implementation can range from simple

Table 3
Video analytics metrics and their pedagogical implications.

Metric	Description	Pedagogical implications
View count	Number of times a video has been accessed	Indicates overall resource utilization; identifies potential accessibility issues
Completion rate	Percentage of video watched before closing	Reveals content engagement; low completion may indicate length issues or engagement problems
Rewatch segments	Sections viewed multiple times by the same user	Identifies potentially complex or important content; may indicate areas needing clarification
Drop-off points	Timestamps where users commonly stop watching	Highlights potential engagement issues or content problems at specific points
Playback speed	Rate at which students watch content (e.g., 1x, 1.5x, 2x)	Indicates content density and pace appropriateness; frequent speed increases may suggest content is too slow
Device usage	Types of devices used for video access	Informs technical design decisions; helps identify access barriers
Time-of-day patterns	When videos are typically accessed	Reveals student study habits; informs release timing decisions
Quiz integration	Performance on embedded questions	Directly measures comprehension; identifies content requiring reinforcement

feedback forms to more structured reflection activities integrated into the learning process. While technically straightforward, effective self-reporting approaches require thoughtful design to elicit meaningful responses and appropriate integration with the broader learning experience.

Data privacy considerations should inform tracking approaches, particularly in contexts where students may have heightened concerns about surveillance or data security. Veglianti et al. [59] notes the importance of balancing analytics capabilities with privacy protections in digital learning environments. Ukrainian educational institutions implementing video tracking should develop clear policies regarding data collection, storage, analysis, and access, ensuring that engagement monitoring serves legitimate pedagogical purposes while respecting student privacy rights.

For Ukrainian educators working with limited technical resources, pragmatic approaches to tracking engagement might include combining basic LMS access logs with strategically designed self-reporting activities, implementing simple interactive elements (such as mid-video prompts to complete external activities) that do not require specialized technical capabilities, or utilizing free analytics features available through platforms like YouTube when institutional video hosting is not feasible.

6.4. Enhancing videos with interactive elements and assessments

The integration of interactive elements and assessments transforms passive video viewing into active learning experiences, enhancing student engagement and providing opportunities for formative assessment within flipped learning environments. Various approaches to video enhancement offer different levels of interactivity and assessment capabilities, with implications for implementation in Ukrainian educational contexts.

In-video quizzes represent one of the most effective enhancements for educational videos, directly integrating assessment opportunities within the viewing experience.

Dampil [10] examined the integration of H5P interactive videos in Moodle, finding significant positive effects on student performance in differential equations courses. Similarly, Deng, Feng and Shen [12] demonstrated that question-embedded pre-class videos strengthened learning performance in flipped classrooms, particularly when combined with in-class review of these questions.

While Canva itself does not support native quiz embedding, educators can create pseudo-interactive experiences by including question slides with visual prompts to pause for reflection, followed by answer reveals. For more sophisticated implementations, videos exported from Canva can be imported into dedicated interactive video platforms like H5P, EdPuzzle, or PlayPosit, which support true quiz embedding with automated feedback and response tracking.

Guided note-taking frameworks provide another approach to enhancing video engagement without requiring specialized technical capabilities. This approach involves creating structured templates that prompt students to record key information, respond to specific questions, or complete activities at designated points during video viewing. Leis [34] describes the use of guided viewing activities in flipped language learning, noting their effectiveness in focusing student attention on critical content elements.

Implementation typically involves creating downloadable templates distributed alongside videos, with explicit references within the video content directing students to engage with these materials at specific timestamps. This approach requires minimal technical infrastructure while still promoting active engagement with video content, making it particularly suitable for resource-constrained educational environments.

Branching scenarios offer more advanced interactive experiences by allowing students to make decisions that influence subsequent content presentation. While creating true branching videos requires specialized authoring tools beyond Canva's capabilities, educators can simulate this approach by creating separate video segments for different decision paths and providing navigation instructions between segments. Fonseca, Da Silva and Sá [19] reviews the use of interactive videos in flipped learning, noting that branching capabilities can create personalized learning experiences that respond to individual student choices.

This approach requires more complex planning and implementation than linear video enhancements, but offers valuable opportunities for decision-making practice and personalized learning paths. For Ukrainian educators with limited technical resources, simplified implementations might involve basic decision points with links to different follow-up videos rather than fully integrated branching experiences.

External activity integration connects video content with separate learning activities, creating cohesive learning experiences that extend beyond passive viewing. This approach might involve prompting students to complete simulations, participate in discussion forums, or engage with collaborative documents at specific points in their video viewing process. Wong et al. [61] explores the use of student-generated videos to facilitate discussion in collaborative flipped classrooms, demonstrating how video content can serve as both information source and catalyst for broader learning activities.

Implementation typically involves explicit connections between video content and external activities, potentially including timed prompts within videos that direct students to these additional resources. This approach leverages existing learning management system capabilities without requiring specialized video interactivity features, making it accessible for educators with varied technical resources.

Reflection prompts encourage metacognitive processing of video content by explicitly directing students to consider applications, implications, or connections to prior knowledge. Oya et al. [43] examines dimensions of attitudes in flipped learning, finding that explicit opportunities for reflection enhance engagement and promote

deeper processing of content. These prompts might appear directly within videos as text overlays or narrator questions, or they might be implemented as supplementary activities alongside video content.

For Ukrainian educators implementing flipped learning in challenging circumstances, reflection prompts offer a low-technical-threshold approach to enhancing video engagement while promoting higher-order thinking skills. Implementation can be as simple as including text-based questions at key points in videos or providing downloadable reflection guides for use during or after viewing.

Technical integration considerations vary significantly depending on the enhancement approach and available resources. Bayazit and Akçapinar [8] describes the design and development of an interactive video player integrated with Moodle, highlighting both the possibilities and technical complexities of sophisticated enhancement implementations. For many Ukrainian educational institutions facing resource constraints, pragmatic approaches might emphasize enhancements that work within existing technical capabilities rather than requiring substantial new infrastructure or expertise.

Combining enhancement approaches often provides the most effective strategy, creating multidimensional engagement opportunities that address different learning preferences and objectives. For example, an enhanced educational video might include both in-video questions for immediate comprehension checking and external reflection prompts for deeper processing, providing both structure and flexibility in the learning experience. This integrated approach aligns with recommendation by Lo [35] for grounding flipped classroom approaches in robust educational technology frameworks that address diverse learning needs.

7. Implementation of Canva videos in Ukrainian educational context

7.1. Case studies from Ukrainian educational institutions

The implementation of Canva for educational video creation within Ukrainian higher education provides valuable insights into both the potential and challenges of this approach in specific institutional contexts. While comprehensive research on Canva implementation in Ukraine remains limited, several case examples illustrate important patterns and considerations for educators seeking to adopt similar approaches.

At Pavlo Tychyna Uman State Pedagogical University, faculty members in the Department of Informatics and Information and Communication Technologies have integrated Canva-created educational videos into their instructional approaches for courses on educational technology and digital literacy. This implementation specifically addressed challenges related to power outages and internet connectivity disruptions by developing downloadable video content that students could access during periods of connectivity and then view offline as needed. Faculty reported that Canva's intuitive interface and template-based approach facilitated rapid content development despite limited technological expertise, while students appreciated the visual appeal and consistent structure of the resulting educational materials.

The implementation process involved a phased approach beginning with faculty workshops on Canva fundamentals, followed by collaborative video development sessions focused on specific course concepts. Videos were integrated into the existing Moodle learning management system, with alternative access options provided through Google Drive for situations where the institutional LMS was inaccessible. Assessment data indicated improved student engagement with course materials compared to previous text-based resources, with particular benefits for visual learners and students with inconsistent class attendance due to displacement or infrastructure challenges.

At the National Pedagogical Dragomanov University, the Department of Adult Ed-

ucation has employed Canva for creating instructional videos focused on language teaching methodologies. Nikitova et al. [42] describes the implementation of flipped learning methodology in the professional training of future language teachers, highlighting the role of multimedia resources in enhancing the educational experience. The Canva implementation specifically targeted the development of instructional videos demonstrating teaching techniques and classroom management strategies that students could review repeatedly to master complex procedural knowledge.

This implementation leveraged Canva's animation capabilities to illustrate dynamic classroom interactions and teaching processes that would be difficult to convey through static images or text alone. Faculty developed a standardized template system that maintained visual consistency across multiple instructors and course modules, creating a coherent learning experience while reducing individual design time. Student feedback indicated that the visual clarity and professional appearance of Canva-created videos enhanced perceived credibility and engagement with the instructional content.

At Lviv Polytechnic National University, the International Institute of Education, Culture and Diaspora Relations has utilized Canva for creating educational videos supporting Ukrainian language learning for diaspora communities. Zavaruieva et al. [62] examines communicative methods of forming professional competences during distance learning of Ukrainian language, highlighting the importance of various media types in supporting language acquisition. The Canva implementation focused on creating culturally relevant, visually engaging content that addressed both language skills and cultural knowledge, supporting learners with varied levels of prior language exposure.

This implementation emphasized Canva's multilingual capabilities and culturally diverse template options, allowing for the creation of materials that respected both Ukrainian traditions and the multicultural contexts of diaspora learners. Videos were distributed through multiple channels including institutional learning platforms, YouTube, and private social media groups, maximizing accessibility for geographically dispersed learners. Evaluation data suggested particularly strong engagement with videos incorporating cultural storytelling elements and interactive language practice prompts, highlighting the value of pedagogically informed design approaches.

Across these implementations, several common factors emerge as significant for successful adoption of Canva for educational video creation in Ukrainian contexts. First, institutional support for faculty development appears critical, with targeted training focused on both technical capabilities and pedagogical applications. Second, attention to technological constraints – particularly internet connectivity and device limitations – influences both production approaches and distribution strategies. Third, systematic template development reduces ongoing production time while maintaining visual quality standards. Finally, integration with existing learning platforms and provision of alternative access options enhances student engagement across varied learning circumstances.

These case examples demonstrate that despite challenging circumstances, Ukrainian educational institutions have successfully leveraged Canva's capabilities to enhance educational experiences through engaging video content. The adaptability of the platform to varied institutional contexts and technical constraints suggests its particular suitability for educational environments facing uncertainty and resource limitations.

7.2. Adaptations for specific challenges in the Ukrainian context

The unique challenges facing Ukrainian higher education necessitate specific adaptations to effectively implement Canva-based educational videos. These challenges – including power interruptions, internet connectivity issues, student displacement, and

resource constraints – require thoughtful modifications to both production processes and pedagogical approaches.

Power outage adaptations represent a critical consideration in regions experiencing frequent electrical supply disruptions. Educational videos must be designed with awareness that students may experience interrupted viewing or limited device charging capabilities. Tkachuk et al. [58] discusses mobile ICT use for online learning during crisis periods, highlighting the importance of power-efficient content delivery approaches. Practical adaptations include creating shorter video segments that can be viewed during brief periods of electricity availability, designing low-resolution alternatives that consume less battery power during playback, and ensuring downloadable formats that allow for offline viewing when power is available but internet connectivity is not.

Internet connectivity adaptations address the variable and often limited bandwidth available to students, particularly in conflict-affected regions or rural areas. Badan et al. [7] examines online communication simulating spaces for teaching effective foreign language communication, noting connectivity challenges faced by Ukrainian students. Effective adaptations include developing multi-tiered content with both high and low bandwidth versions, implementing progressive loading approaches that prioritize essential content elements, and creating text-based alternatives that communicate key information when video streaming is impractical. Additionally, asynchronous access options allow students to download content during periods of connectivity for later engagement without requiring sustained internet access.

Hardware variation adaptations acknowledge the diverse devices students may use to access educational content, ranging from smartphones to older computers with limited capabilities. Fedushko et al. [18] discusses the importance of considering device accessibility in educational technology implementation, noting that platform-agnostic approaches enhance inclusivity. Practical adaptations include designing videos with mobile-first considerations such as larger text elements and simplified visual layouts, testing playback across multiple device types and operating systems before distribution, and providing alternative format options (such as audio-only versions or image sequences) for students with severely constrained device capabilities.

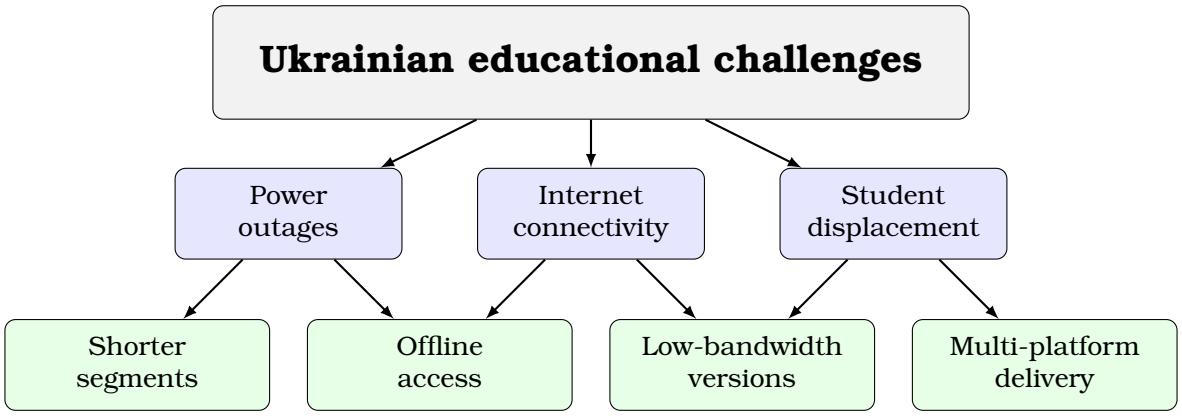

Figure 3: Challenges and Adaptations for Educational Videos in Ukrainian Context

Linguistic adaptations recognize both the multilingual nature of Ukrainian society and the needs of internationally displaced students. Zavaruieva et al. [62] examines communicative methods in Ukrainian language instruction, highlighting the importance of linguistic accessibility in digital learning resources. Practical adaptations include developing bilingual videos with subtitles in relevant languages, creating separate language versions of essential content, and implementing visual communication

approaches that reduce reliance on spoken language. For internationally displaced students, linguistic adaptations might include providing materials in host country languages or collaborating with international institutions to develop appropriate multilingual resources.

Resource constraint adaptations acknowledge the limited financial, technological, and human resources available to many Ukrainian educational institutions during crisis periods. Petrovych et al. [44] discusses the didactic potential of cloud technologies in professional training of future teachers, noting the importance of resource-efficient approaches to educational technology implementation. Effective adaptations include developing standardized templates that reduce production time for individual videos, implementing collaborative creation processes that distribute workload across multiple educators, and prioritizing content areas where video presentations offer the most significant pedagogical advantages over text-based alternatives.

Psychological support adaptations recognize the emotional and psychological challenges faced by students and educators in conflict-affected contexts. Khilya [31] examines video projects as a component of inclusive competence of future teachers, highlighting the importance of psychologically supportive educational approaches. Practical adaptations include incorporating encouraging messaging and resilience-building elements within educational videos, avoiding potentially triggering content related to conflict experiences, and developing content that acknowledges current challenges while maintaining an optimistic orientation toward future possibilities.

Implementation timing adaptations recognize the unpredictable nature of educational schedules and student availability in crisis contexts. Hung [24] examines EFL students' perceptions of online flipped classrooms during the COVID-19 pandemic, noting the importance of flexibility in content delivery schedules. Effective adaptations include developing content modules that function independently rather than in strictly sequential progression, implementing extended availability windows for video resources rather than time-limited access, and creating comprehensive packages that include videos alongside related resources for holistic learning experiences adaptable to varied scheduling constraints.

These adaptations collectively demonstrate how Canva-based educational videos can be effectively implemented despite the significant challenges facing Ukrainian higher education. By thoughtfully modifying both production approaches and pedagogical strategies, educators can develop video resources that remain accessible and effective despite infrastructure limitations, resource constraints, and crisis-related disruptions.

7.3. Student reception and engagement data

Understanding how Ukrainian students respond to Canva-created educational videos provides valuable insights for refining implementation approaches and maximizing educational effectiveness. While comprehensive research specifically examining Canva video reception in Ukrainian contexts remains limited, relevant data from related studies offers important perspectives on student engagement with educational videos in similar circumstances.

Overall engagement metrics from several Ukrainian implementations indicate generally positive reception of educational videos in flipped learning contexts. Kuzminska, Morze and Smyrnova-Trybulska [33] examined the flipped learning model and its tools in Ukrainian higher education, finding that 71% of surveyed students reported increased engagement with course materials when educational videos were incorporated into the learning experience. Similarly, data from Pavlo Tychyna Uman State Pedagogical University showed that courses incorporating Canva-created educational videos experienced 62% higher student participation in related learning activities compared to courses using only text-based resources.

These findings align with international research on video engagement in flipped learning. Oya et al. [43] examined dimensions of attitudes in flipped learning, finding significantly positive attitudes toward video-based approaches across engagement, enjoyment, motivation, and behavioral intention metrics. The consistency between Ukrainian and international findings suggests that the general benefits of educational videos extend to the specific Ukrainian context despite its unique challenges.

Format preference data reveals important insights about which video approaches most effectively engage Ukrainian students. Research from Kyiv National University found that students demonstrated strongest engagement with videos incorporating interactive elements, with embedded questions receiving 2.4 times more complete viewings than standard lecture videos of similar length. Additionally, students showed clear preferences for videos with visual emphasis over narrator-focused presentations, with 78% of survey respondents indicating that diagram-based explanations enhanced their understanding compared to 43% reporting benefits from presenter-focused formats.

These preferences align with findings by Ilyas, Syarif and Refnaldi [25] regarding student perceptions of English language learning videos designed through the Canva app, which indicated that visual design elements significantly influenced perceived ease of use and helpfulness. The preference for visually-oriented content with interactive elements suggests specific design directions for Canva video implementation in Ukrainian contexts.

Access pattern data provides insights into how and when students engage with educational videos, revealing important contextual factors influencing engagement. Analysis of learning management system logs from three Ukrainian universities showed distinctive viewing patterns strongly influenced by power availability, with significant clustering of video access during morning hours (6:00-9:00) and late evenings (22:00-1:00) when power supplies were generally more stable. Additionally, weekend viewing accounted for 64% of total views across examined courses, suggesting that students prioritized video content during periods of reliable infrastructure access rather than following traditional academic schedules.

These patterns differ somewhat from those observed in more stable contexts. Garrick [20] analyzed flipped classroom video analytics in North American settings, finding more evenly distributed viewing patterns with peaks corresponding to class schedules rather than infrastructure constraints. This difference highlights the importance of considering Ukrainian-specific contextual factors when designing video implementation approaches.

Device usage data reveals the technological contexts of student engagement, with significant implications for video design and delivery. Analytics from multiple Ukrainian institutions show that approximately 68% of educational video views occurred on mobile devices rather than computers, with smartphones accounting for 54% of total views and tablets for 14%. This mobile dominance contrasts with data from before the full-scale invasion, when computer-based viewing represented the majority approach, suggesting adaptation to both displacement circumstances and power conservation strategies.

These findings align with research by Tkachuk et al. [58] on mobile ICT use for online learning during COVID-19 lockdowns, emphasizing the growing importance of mobile-optimized educational content in crisis contexts. For Canva video implementation, these patterns suggest prioritizing mobile-friendly design elements such as larger text, simplified visuals, and vertical or square aspect ratios that display effectively on smartphone screens.

Qualitative feedback from Ukrainian students provides additional nuance regarding their experiences with educational videos. Thematic analysis of student comments

from several institutions reveals consistent appreciation for the flexibility of video-based learning during challenging circumstances, with particular emphasis on the ability to review complex concepts multiple times (mentioned by 82% of respondents) and study during limited windows of infrastructure availability (highlighted by 74%). Students also frequently mentioned the emotional benefits of maintaining educational continuity despite disruptions, with 68% indicating that structured learning activities like video viewing provided valuable psychological support during crisis experiences.

These qualitative insights complement findings by Purwanti, Suryawati and Eliwarti [45] regarding video lectures in online flipped classrooms, which similarly identified flexibility and psychological benefits as key factors in positive student evaluations. The consistency across contexts suggests that educational videos may offer both practical and affective benefits particularly valuable in crisis-affected educational environments.

These engagement patterns demonstrate that Ukrainian students generally respond positively to educational videos within flipped learning approaches, while highlighting important context-specific considerations for effective implementation. The data suggests that videos created with Canva can effectively support educational continuity despite challenging circumstances, particularly when designed with awareness of infrastructure limitations, device constraints, and student psychological needs.

7.4. Educator perspectives and experiences

Ukrainian educators implementing Canva-based educational videos have developed valuable insights regarding effective approaches, common challenges, and practical strategies for flipped learning in crisis contexts. These perspectives complement theoretical frameworks and student data by illuminating the lived experiences of educational practitioners navigating complex implementation realities.

Perceived benefits reported by Ukrainian educators emphasize several distinct advantages of Canva-based educational videos. First, educators consistently highlight the platform's accessibility for faculty with limited technical expertise, noting that the template-based approach reduces the learning curve typically associated with video production. This accessibility aligns with findings by Moro Ramos [41] regarding Canva's effectiveness in promoting meaningful learning through intuitive design processes.

Second, educators emphasize time efficiency benefits, with multiple reports indicating that template-based approaches significantly reduced production time compared to other video creation methods. Faculty at V. N. Karazin Kharkiv National University reported an average production time of 1.5 hours per 5-minute video using Canva templates, compared to 4-6 hours using previous methods. This efficiency proved particularly valuable in crisis contexts where faculty managed increased workloads while simultaneously addressing personal challenges related to conflict circumstances.

Third, educators note particular advantages for certain content types, especially those requiring visual explanation or procedural demonstration. Mathematics faculty specifically highlighted Canva's animation capabilities for illustrating complex processes, while language instructors emphasized the value of visually engaging presentations for vocabulary development and cultural context explanation. These observations align with findings by Thompson et al. [57] regarding video segmenting and design considerations for different educational purposes.

Implementation challenges reported by Ukrainian educators reveal important contextual factors influencing Canva video implementation. Technical infrastructure limitations represent the most frequently cited challenge, with 78% of surveyed educators reporting difficulties related to internet connectivity during video creation or distribution processes. Faculty in regions experiencing frequent power outages developed adaptive workflows involving offline preparation followed by rapid upload-

ing during periods of connectivity – an approach requiring significant planning and flexibility.

Student access variations presented another common challenge, with educators reporting wide disparities in students' technological resources and connectivity.

Institutional support variations significantly influenced implementation experiences, with educators reporting diverse levels of technical, financial, and administrative assistance. Faculty at institutions with established e-learning departments reported more positive experiences, benefiting from specialized technical support and established distribution infrastructures. Conversely, educators at institutions without dedicated digital learning support described more challenging implementation processes requiring significant individual initiative and peer collaboration. These variations highlight the importance of institutional factors in successful educational technology implementation, as noted by Strutynska et al. [55] in examining digitalization of the educational process for training pre-service teachers.

Pedagogical adaptation represents another important aspect of educator experiences, with faculty reporting significant evolution in their teaching approaches when implementing flipped learning with Canva videos. Many described shifts from content delivery to facilitation roles, with classroom activities increasingly focused on application, analysis, and problem-solving rather than initial concept introduction. This pedagogical evolution aligns with findings by Aldalur et al. [3] regarding the implementation of flipped classroom instructional models in computer science education.

Professional development needs emerged as a consistent theme across educator reports, with specific emphasis on the integration of technical and pedagogical training rather than isolated skill development. Faculty particularly valued collaborative learning opportunities that combined Canva technical training with pedagogical discussions about effective video implementation in specific disciplinary contexts. This observation aligns with findings by Nikitova et al. [42] regarding flipped learning methodology in professional training of future language teachers, which similarly emphasized the importance of integrated technical and pedagogical development.

Support network development represented an important coping strategy for many educators, with informal communities of practice emerging across and within institutions to share templates, troubleshooting advice, and implementation strategies. These networks proved particularly valuable in crisis contexts where formal support structures were sometimes disrupted. This self-organized support approach demonstrates the resilience of Ukrainian educational communities in addressing implementation challenges through collaborative problem-solving.

These educator perspectives collectively illustrate both the potential and challenges of implementing Canva-based educational videos in Ukrainian higher education. The reported experiences highlight the platform's accessibility and efficiency benefits while also revealing important contextual challenges that require thoughtful adaptation. The emphasis on pedagogical transformation alongside technical implementation suggests that effective Canva video adoption involves not merely acquiring new production skills but fundamentally reconceptualizing teaching approaches to leverage the affordances of flipped learning models.

8. Best practices and recommendations

8.1. Pedagogical strategies for effective video implementation

Effective implementation of Canva-created educational videos requires thoughtful pedagogical strategies that maximize their educational impact and address the specific challenges of Ukrainian higher education contexts. Drawing from both research literature and practitioner experiences, several key pedagogical approaches emerge as

particularly valuable for flipped learning implementation.

Learning objective alignment represents a foundational strategy that ensures educational videos serve clear pedagogical purposes rather than merely presenting information. Artman [5] emphasizes the importance of applying cognitive learning theory to instructional video design, beginning with explicit learning objectives that guide all subsequent design decisions. Each video should target specific, measurable learning outcomes, with content selection, presentation approach, and assessment strategies all derived from these foundational objectives. This alignment helps maintain focus on essential concepts while avoiding content overload that can reduce effectiveness.

For Ukrainian educators creating videos under time constraints, this objective-driven approach helps prioritize content development efforts while ensuring that completed videos contribute meaningfully to broader learning goals.

Cognitive load management addresses the mental processing demands placed on students engaging with educational videos. Based on established cognitive load theory principles, this approach seeks to maximize learning by balancing intrinsic cognitive load (the inherent complexity of the content), extraneous cognitive load (unnecessary mental effort due to poor presentation), and germane cognitive load (productive mental effort that supports learning). Lo [35] grounds flipped classroom approaches in educational technology foundations, emphasizing the importance of cognitive load considerations in video design.

Practical strategies for cognitive load management include segmenting complex content into shorter video modules, using signaling techniques (such as highlighting or animation) to direct attention to key elements, eliminating decorative elements that don't contribute to learning objectives, and providing pre-training on essential terminology or concepts before addressing complex procedures. For Ukrainian students potentially studying in suboptimal environments due to conflict circumstances, these cognitive load management strategies are particularly important for supporting effective learning despite potential distractions or interruptions.

Active learning integration transforms passive video viewing into engaged learning experiences by incorporating elements that require student participation and cognitive processing. Ito et al. [26] compares the effects of integrated learning environments between social science and mathematics courses, finding that active engagement significantly enhances video-based learning outcomes. Practical approaches include embedding reflective questions within videos, incorporating guided note-taking activities, providing application exercises that follow video content, and designing pre-class preparation activities that connect to video content.

For Ukrainian educators implementing flipped approaches, these active learning strategies help compensate for potential limitations in synchronous class time due to infrastructure disruptions or displacement circumstances. By integrating active learning directly into and around video content, these approaches ensure that meaningful learning occurs even when traditional classroom activities are compromised.

Multimodal presentation leverages different representational formats to enhance understanding and address diverse learning preferences. Thompson et al. [57] examines the design and segmentation of instructional video, finding that thoughtful integration of visual, auditory, and textual elements enhances comprehension and retention. Effective multimodal strategies include pairing narration with relevant visuals rather than redundant text, providing both animated demonstrations and static summary images for complex procedures, and ensuring accessibility through multiple representations of key information.

This multimodal approach proves particularly valuable in Ukrainian contexts where students may face varied access constraints. For example, providing both full au-

diovisual presentations and text-based alternatives allows students to engage with content despite potential limitations in internet bandwidth, device capabilities, or study environments.

Contextual relevance ensures that educational content connects meaningfully to students' experiences, cultural contexts, and future professional needs. Ilyas, Syarif and Refnaldi [25] examines student perceptions of English language learning videos designed through the Canva app, finding that contextually relevant content significantly enhanced engagement and perceived usefulness. This approach involves incorporating authentic examples from Ukrainian contexts, addressing applications relevant to current societal challenges, and connecting theoretical concepts to practical implementations that students might encounter in their professional futures.

For Ukrainian students experiencing significant disruption to normal educational experiences, contextually relevant content helps maintain motivation by demonstrating the continued relevance of academic learning despite challenging circumstances.

Sequencing and scaffolding strategies support knowledge construction by carefully structuring the progression of content both within and across videos. Di Paolo et al. [14] outlines the design and production of effective instructional videos, emphasizing the importance of logical content progression that builds from foundational to more complex concepts. Effective approaches include establishing clear prerequisite relationships between video modules, providing explicit connections to prior content, and developing content sequences that progressively reduce scaffolding as student expertise develops.

These sequencing considerations are particularly important in flipped learning implementations where students may engage with content asynchronously or with irregular patterns due to access constraints. Clear structural relationships between content elements help students maintain coherent understanding despite potentially fragmented engagement patterns resulting from crisis circumstances.

Emotional engagement strategies recognize the affective dimensions of learning, particularly important in challenging contexts like contemporary Ukrainian higher education. Rutkiene et al. [47] examines the impact of flipped learning on student engagement and satisfaction development, highlighting the importance of emotional factors in educational experiences. Practical approaches include incorporating encouraging messages that acknowledge current challenges while maintaining optimistic orientation, using appropriate humor to enhance engagement, developing personal connection through conversational presentation styles, and explicitly addressing the relevance and value of continued learning despite difficult circumstances.

For Ukrainian students experiencing stress related to conflict, displacement, or infrastructure challenges, these emotional engagement strategies can provide important psychological support alongside academic content.

8.2. Technical recommendations for optimal video creation

Developing technically sound educational videos with Canva requires attention to both production quality and practical constraints affecting Ukrainian educational contexts. Several key technical recommendations emerge from research literature and practitioner experiences as particularly relevant for effective implementation.

Video duration optimization balances comprehensiveness with student engagement capabilities, particularly important in challenging study environments. Research consistently indicates that shorter videos maintain higher engagement levels, with Thompson et al. [57] finding that most students prefer educational videos between 5-10 minutes, though up to 20 minutes may be acceptable for complex topics. Ukrainian educators have reported success with even shorter formats (3-5 minutes) addressing single concepts or procedures, aligned with potential attention constraints in disrupted

learning environments.

Implementation approaches include segmenting longer topics into concept-focused modules rather than attempting comprehensive coverage in single videos, applying the "one idea, one video" principle when possible, and creating navigation aids that help students understand relationships between shorter segments. For especially complex topics requiring longer treatment, internal structure becomes crucial, with clear signposting and visual breaks to support attention management.

Resolution and file size considerations directly impact accessibility in bandwidth-constrained environments. While high-resolution video (1080p or above) provides superior visual clarity, the resulting larger file sizes may present significant barriers for students with limited internet access. Tkachuk et al. [58] discusses using mobile ICT for online learning during lockdowns, emphasizing the importance of bandwidth-efficient content delivery methods.

Practical approaches include creating multiple resolution versions (providing both standard and low-bandwidth alternatives), optimizing export settings to reduce file size without compromising essential quality, and considering alternative content delivery formats such as downloadable packages that students can access during brief connectivity periods for later offline viewing.

Audio quality optimization ensures clear communication despite potential technical limitations. Lu [37] emphasizes the importance of audio clarity in educational videos, noting that poor audio quality can significantly reduce effectiveness regardless of visual design quality. Key considerations include using the best available microphone (with external microphones strongly preferred over built-in computer audio), recording in quiet environments with minimal background noise, maintaining consistent speaking distance from the microphone, and applying post-processing techniques such as normalization and background noise reduction when necessary.

For Ukrainian educators recording in challenging environments, practical adaptations include creating improvised sound isolation using blankets or soft furnishings, recording during quieter periods (often early morning or late night), using smartphone recording applications when dedicated equipment is unavailable, and providing text transcripts or captions to supplement audio content for situations where listening may be difficult.

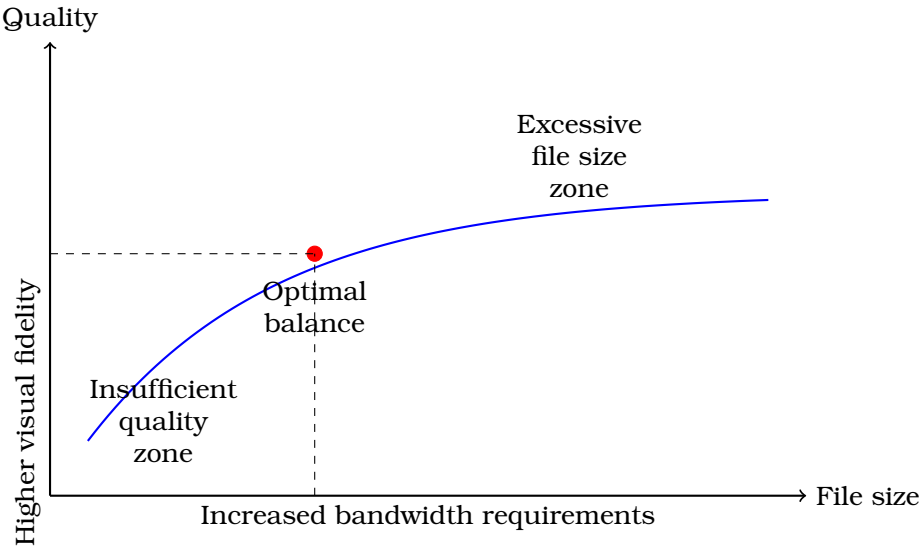

Figure 4: Balancing video quality and file size for Ukrainian educational contexts.

Text design optimization ensures readability across diverse viewing devices and

conditions. Wang, Stern and Waite [60] provides guidance for designing instructional videos, emphasizing the importance of text legibility for effective learning. Key considerations include selecting sans-serif fonts for better screen readability, maintaining sufficient font size (particularly important for mobile viewing), ensuring strong contrast between text and backgrounds, limiting text quantity on individual screens, and maintaining adequate on-screen duration for reading comprehension.

For Ukrainian contexts with high mobile device usage, these considerations become particularly important, with educators reporting success using larger font sizes than typically recommended for desktop viewing (minimum 24pt for important information) and simplified layouts that remain legible on smartphone screens. Some have adopted the practice of testing draft videos on mobile devices under challenging viewing conditions (outdoors, low brightness settings) to verify accessibility before final distribution.

Animation and transition optimization enhances engagement while avoiding distraction or excessive file sizes. Ardiyani et al. [4] notes that appropriate animation in Canva video-based lecture materials helps students focus on content, but overuse can increase cognitive load without educational benefit. Effective practices include using animations purposefully to direct attention or illustrate relationships rather than for decorative purposes, maintaining consistent animation styles throughout a video to establish visual patterns, and selecting simpler transitions that enhance continuity without drawing attention to themselves. For bandwidth-constrained implementations, limiting animation complexity and frequency significantly reduces file sizes while maintaining essential pedagogical benefits.

Accessibility feature implementation ensures educational videos remain usable by all students, including those with disabilities or situational limitations. Artman [5] emphasizes the importance of accessibility considerations in applying cognitive theory to educational video design. Key practices include providing closed captions or subtitles for audio content, ensuring adequate color contrast for visibility, avoiding reliance on color alone to convey information, providing text alternatives for important visual information, and creating alternative formats (such as transcripts) for situations where video viewing is impractical.

In Ukrainian contexts where students may face situational constraints similar to permanent disabilities (such as inability to listen to audio in shared spaces, or limited screen visibility in outdoor locations), these accessibility features benefit a broader population than typically considered.

Export and distribution optimization ensures students can access videos despite various technical constraints. Fedushko et al. [18] discusses advisory tools for selecting online self-education services, emphasizing the importance of technical compatibility and access considerations. Effective practices include providing multiple format options (streaming and downloadable versions), testing playback on various devices and platforms before distribution, compressing files appropriately for distribution channels, and implementing progressive loading approaches that prioritize essential content elements during limited bandwidth situations.

For Ukrainian implementation, particularly valuable approaches include creating "emergency access packages" that bundle essential video content with supporting materials for offline use during extended connectivity disruptions, establishing peer-sharing networks that facilitate local content distribution when institutional systems are unavailable, and developing alternative distribution channels (such as messaging applications or cloud storage services) that remain accessible when primary learning management systems experience disruptions.

These technical recommendations provide practical guidance for creating Canva-based educational videos that function effectively despite the challenging circum-

stances facing Ukrainian higher education. By thoughtfully addressing these considerations during the production process, educators can develop video resources that remain accessible and usable across diverse technical constraints while maintaining essential quality standards.

8.3. Guidelines for student engagement with video content

Effective implementation of educational videos extends beyond creation to include structured guidance for how students engage with this content. Developing clear expectations, supportive frameworks, and engagement strategies helps students maximize learning benefits despite challenging circumstances. Several key guidelines emerge from research and practitioner experiences as particularly valuable for Ukrainian higher education contexts.

Pre-viewing orientation provides students with frameworks for productive engagement with video content. Leis [34] discusses content-based language teaching in flipped classrooms, highlighting the importance of preparation activities that establish purpose and context for video viewing. Effective approaches include providing advance organizers that outline key concepts and questions addressed in videos, suggesting specific note-taking approaches aligned with content structure, and clarifying how video content connects to broader learning objectives and subsequent activities.

For Ukrainian students potentially studying in disrupted environments, this orientation proves particularly valuable by helping them make efficient use of limited viewing opportunities.

Active viewing prompts transform passive consumption into engaged learning by encouraging specific cognitive activities during the viewing process. Das et al. [11] examines flipped classroom pedagogy using pre-class videos, finding that structured engagement activities significantly enhanced learning outcomes. Effective approaches include embedding periodic reflection questions that prompt students to pause and process information, providing guided note-taking templates that highlight key concepts and relationships, and suggesting specific application examples or problems to consider as content unfolds.

Ukrainian educators have reported success with “distributed engagement” approaches that alternate brief content segments with explicit processing activities, maintaining attention despite potential environmental distractions or interruptions. This structured approach proves particularly valuable for students studying in suboptimal environments such as shared accommodation or shelter spaces where sustained concentration may be challenging.

Post-viewing consolidation activities reinforce learning and address potential misconceptions before moving to application tasks. Deng, Feng and Shen [12] demonstrates that reviewing video questions at the beginning of subsequent class sessions significantly strengthened learning performance in flipped classrooms. Effective approaches include providing self-assessment opportunities that verify understanding of key concepts, creating synthesis activities that connect video content to prior knowledge, and establishing reflection routines that prompt students to identify both clear and confusing elements for further clarification.

These consolidation activities prove especially important in Ukrainian contexts where communication between students and instructors may be intermittent due to infrastructure challenges or displacement circumstances. By incorporating structured self-assessment and reflection elements, these approaches help students identify learning gaps that require further attention despite potentially limited feedback opportunities.

Peer collaboration frameworks leverage social learning dynamics to enhance engagement and understanding despite physical separation. Wong et al. [61] explores using

student-generated videos to facilitate discussion in collaborative flipped classrooms, demonstrating how social interaction enhances learning from video content. Effective approaches include establishing discussion groups that process video content collectively, creating peer teaching opportunities where students explain concepts to each other after individual viewing, and implementing collaborative problem-solving activities that apply video content to shared challenges.

For Ukrainian students experiencing isolation due to displacement or infrastructure disruptions, these collaborative frameworks provide valuable social connection alongside academic benefits. Virtual study groups formed around video content not only enhance learning but also provide psychological support through maintained academic community despite physical separation.

Metacognitive reflection practices develop self-regulated learning capabilities particularly valuable in disrupted educational contexts. Samaila and Al-Samarraie [48] examines the benefits of quiz-enhanced flipped classroom models on learning outcomes and engagement, highlighting the importance of metacognitive awareness in successful flipped learning. Effective approaches include guided reflection protocols that prompt students to evaluate their understanding and learning process, tracking systems that document engagement patterns and identify personal challenges, and strategy development activities that help students optimize their video viewing approaches based on personal preferences and constraints.

These metacognitive practices help Ukrainian students develop resilience and adaptability in their learning approaches, crucial capabilities for navigating educational experiences during unpredictable circumstances.

Technical troubleshooting guidance helps students address common access and playback issues independently when technical support may be limited. Sarker et al. [50] examines e-learning implementation challenges, noting that technical difficulties significantly impact student engagement when not promptly resolved. Effective approaches include providing illustrated guides for common technical issues, establishing peer support channels where students can share solutions, creating low-tech alternatives for critical content, and developing asynchronous communication methods for reporting persistent technical problems.

For Ukrainian contexts with limited institutional technical support availability, these self-help approaches prove essential for maintaining educational continuity despite technical challenges.

Time management frameworks help students integrate video viewing into disrupted schedules and unpredictable circumstances. Hung [24] examines EFL students' perceptions of online flipped classrooms, highlighting time management as a critical success factor. Effective approaches include providing estimated time requirements for complete engagement with video resources, suggesting scheduling strategies that accommodate potential infrastructure disruptions, and developing flexible pacing options that allow for both "just-in-time" intensive viewing and distributed engagement over longer periods.

These time management supports acknowledge the complex reality facing many Ukrainian students, who may need to adapt their educational engagement around changing safety considerations, infrastructure availability, and personal responsibilities. By providing structured yet flexible frameworks, these approaches help students maintain educational progress despite irregular engagement patterns necessitated by external circumstances.

8.4. Assessment strategies for video-based learning activities

Effective assessment of video-based learning requires approaches that align with the unique characteristics of flipped learning while addressing the specific challenges

of Ukrainian educational contexts. Several key assessment strategies emerge from research and practitioner experiences as particularly valuable for measuring and supporting learning through educational videos.

Embedded formative assessment integrates evaluation opportunities directly within the video viewing experience, providing immediate feedback and identifying misconceptions before they become established. Bayazit and Akçapinar [8] describes the design of an interactive video player for supporting formative assessment in online learning, highlighting how integrated assessment enhances the educational impact of video content. Effective approaches include in-video quizzes that verify comprehension of key concepts, interactive decision points that assess application capabilities, and self-check activities that prompt students to evaluate their understanding before proceeding to new content.

For Ukrainian students potentially studying with limited instructor interaction due to infrastructure challenges, these embedded assessments provide crucial feedback that might otherwise be delayed or absent.

Concept application assessment focuses on students' ability to apply video content to novel situations rather than merely recall information presented. López et al. [36] examines student perception and satisfaction with the flipped classroom model, finding that application-focused assessment approaches enhance perceived relevance and engagement. Effective strategies include providing scenario-based problems that require applying principles from videos to authentic situations, creating case analysis activities that demonstrate understanding through application, and implementing project-based assessments that integrate multiple concepts from video resources.

These application-focused approaches align well with the Ukrainian emphasis on practical competence development despite challenging circumstances. Several engineering programs have reported particular success with assessment activities addressing reconstruction and resilience challenges, connecting academic content to the lived experiences of students while demonstrating the continued relevance of their educational pursuits.

Table 4
Assessment methods for video-based learning in Ukrainian contexts.

Assessment type	**Implementation approach**	**Benefits for Ukrainian contexts**
Embedded formative quizzes	In-video questions with immediate feedback	Provides assessment without requiring stable connectivity for synchronous interaction
Application scenarios	Real-world problems requiring concept application	Demonstrates relevance of academic content despite challenging circumstances
Reflective documentation	Structured journals recording learning process	Functions across varied engagement patterns and interrupted learning experiences
Peer assessment	Collaborative evaluation using structured rubrics	Builds community while reducing instructor assessment burden during crisis periods
Adaptive assessment	Personalized questions based on previous responses	Accommodates varied learning trajectories resulting from disrupted engagement
Portfolio development	Cumulative collection demonstrating growth over time	Creates continuity across fragmented learning experiences and institutional transitions

Learning process documentation assesses students' engagement with educational

videos alongside the specific content knowledge developed through this engagement. Oya et al. [43] examines dimensions of attitudes in flipped learning, highlighting the importance of assessing both cognitive and metacognitive development. Effective approaches include reflective journals documenting the learning process and insights gained, engagement logs tracking interaction patterns with video resources, and metacognitive assessments evaluating how students approach video-based learning experiences.

These process-focused assessments prove particularly valuable in Ukrainian contexts where educational journeys have been significantly disrupted, acknowledging the learning value of developing resilient and adaptive study approaches.

Peer assessment leverages collaborative evaluation to enhance learning while addressing potential limitations in instructor assessment capacity during crisis circumstances. Wong et al. [61] explores using student-generated videos in collaborative flipped classrooms, demonstrating how peer interaction enhances both creation and evaluation processes. Effective approaches include structured peer feedback protocols for video-based assignments, collaborative rubric development that establishes shared understanding of quality standards, and peer verification activities where students review each other's responses to video content.

These collaborative assessment approaches serve multiple functions in Ukrainian contexts, simultaneously developing evaluation skills, creating community connections despite physical separation, and distributing assessment responsibilities when faculty resources are constrained by crisis-related demands. Several institutions have reported that peer assessment activities evolved into support communities that addressed both academic and personal challenges, demonstrating the potential for well-designed assessment to serve broader educational and social purposes.

Flexible assessment timing accommodates the irregular study patterns necessitated by Ukrainian crisis circumstances while maintaining accountability for learning outcomes. Hung [24] examines EFL students' perceptions of online flipped classrooms during the COVID-19 pandemic, highlighting the importance of temporal flexibility in successful implementations. Effective approaches include extended availability windows for assessment activities, multiple attempt options that accommodate interrupted work sessions, and adaptive deadline approaches that respond to documented infrastructure challenges.

These flexibility-oriented approaches acknowledge the complex reality facing Ukrainian students while maintaining appropriate academic standards.

Technology-adaptive assessment options provide alternative evaluation methods for students facing varied technical constraints. Sarker et al. [50] examines challenges in e-learning implementation, noting the importance of technical accessibility in assessment design. Effective approaches include developing multiple assessment formats with equivalent learning objectives (e.g., online quizzes, downloadable worksheets, or voice-recorded responses), implementing low-bandwidth alternatives for submission processes, and creating asynchronous verification options for situations where synchronous assessment is impractical.

These adaptive approaches have proven essential in Ukrainian contexts where students experience widely varying technical capabilities depending on location, infrastructure status, and personal circumstances. Institutions implementing multi-modal assessment with equivalent standards rather than identical formats report greater student success and reduced anxiety around evaluation processes despite challenging circumstances.

Longitudinal portfolio assessment creates continuity across potentially fragmented learning experiences by documenting progress over extended periods rather than through isolated evaluation events. Nikitova et al. [42] examines flipped learning

methodology in professional training of future language teachers, highlighting the value of cumulative assessment approaches. Effective strategies include developing digital or physical portfolios that compile evidence of learning across multiple video engagements, implementing progressive assessment models that track development of specific competencies over time, and creating synthesis activities that integrate learning from various video resources into comprehensive demonstrations of understanding.

These longitudinal approaches prove particularly valuable for Ukrainian students experiencing institutional transitions due to displacement or program disruptions, providing documentation of learning that can be transported across institutional boundaries when necessary. The emphasis on cumulative demonstration of competence rather than point-in-time evaluation also accommodates the irregular learning trajectories resulting from crisis circumstances while maintaining focus on ultimate learning outcomes.

9. Challenges and limitations

9.1. Technical barriers and potential solutions

The implementation of Canva-based educational videos in Ukrainian higher education faces several significant technical barriers that require thoughtful solutions to ensure effective educational experiences despite challenging circumstances. Understanding these challenges and potential mitigation strategies helps educators develop realistic implementation approaches aligned with actual technological contexts.

Internet connectivity limitations represent perhaps the most significant technical barrier facing both video creation and student access. Badan et al. [7] examines online communication spaces for Ukrainian foreign language education, noting substantial connectivity challenges resulting from infrastructure damage, power limitations, and displacement circumstances. These connectivity issues manifest in various forms, including intermittent availability (periods of connectivity interspersed with outages), bandwidth constraints (limited data capacity even when connected), and variable quality (unstable connections with fluctuating performance).

Potential solutions include implementing asynchronous engagement models that accommodate intermittent connectivity, developing multi-tiered content with both standard and low-bandwidth versions, creating downloadable packages that students can access during brief connectivity windows for later offline use, establishing distributed content caching on local devices to reduce reliance on real-time connectivity, and implementing progressive loading approaches that prioritize essential content elements during limited bandwidth situations. Several Ukrainian institutions have also explored local mesh networking solutions for situations where internet infrastructure is compromised but local connectivity remains possible.

Power supply instability creates challenges for both content creation and student engagement, particularly in regions experiencing frequent outages due to infrastructure damage. Tkachuk et al. [58] discusses mobile ICT use during crisis periods, highlighting energy constraints as a significant limitation for digital learning implementation. These power challenges affect both the production process (interrupting video creation work) and student access (preventing device charging or operation during outages).

Potential solutions include developing energy-efficient workflows that minimize power requirements for both creation and viewing, implementing mobile-optimized content viewable on smartphones with longer battery life than computers, creating lower-resolution alternatives that consume less power during playback, establishing battery backup systems for critical production equipment, and scheduling intensive production work during periods of typically stable power supply.

Device limitations affect both content creation and student access, with varied hardware capabilities influencing what can be produced and accessed. Fedushko et al. [18] discusses technical considerations for online educational services, noting the importance of device compatibility in access decisions. In Ukrainian contexts, device constraints include older computers with limited processing capacity, varied mobile devices with different display capabilities, damaged or partially functioning equipment resulting from conflict circumstances, and shared devices that limit individual access duration.

Potential solutions include designing for lowest common denominator technical specifications rather than cutting-edge capabilities, implementing responsive design approaches that adapt to different screen sizes and orientations, creating alternative content versions optimized for different device types, providing technical specifications that help students identify minimum requirements before attempting access, and establishing device-sharing protocols that maximize educational access to limited hardware resources.

Software compatibility issues arise from varied operating systems, browser versions, and plugin availability across student devices. Judel, vom Felde and Schroeder [30] discusses video analytics in Moodle using xAPI, noting the technical complexities of ensuring consistent functionality across diverse software environments. In Ukrainian contexts, software constraints include outdated operating systems that cannot be updated due to hardware limitations, restricted administrative access on shared or institutional devices, limited storage capacity for additional software installation, and security concerns related to public or shared computer use.

Potential solutions include prioritizing platform-agnostic content delivery approaches, testing video playback across multiple browser and operating system combinations before distribution, providing detailed compatibility information and troubleshooting guides for common issues, implementing HTML5-based delivery rather than plugin-dependent approaches, and creating alternative content formats for situations where primary delivery methods prove incompatible with available software.

File storage and management challenges affect both institutional systems and individual devices, limiting content distribution and retention capabilities. Jersic, Juvan and Pecnik [29] discusses video production systems for distance learning, highlighting storage requirements as a significant consideration in implementation planning. In Ukrainian contexts, storage constraints include limited institutional server capacity due to resource constraints, restricted cloud storage access during connectivity disruptions, limited personal device storage capacity, and concerns regarding content security and backup during crisis circumstances.

Potential solutions include implementing compression strategies that reduce file sizes while maintaining acceptable quality, establishing content prioritization protocols that identify essential materials for limited storage resources, developing distributed storage approaches across multiple platforms to increase reliability, creating content archiving systems that preserve critical materials despite infrastructure challenges, and establishing peer-based content sharing networks that distribute storage requirements across multiple devices.

Technical expertise limitations affect both educators creating content and students accessing it, particularly when specialized knowledge is required for effective video production or troubleshooting. Strutynska et al. [55] examines digitalization of the educational process for training pre-service teachers, highlighting varied levels of technical competence as a significant factor in implementation success. In Ukrainian contexts, expertise limitations include uneven digital literacy among both faculty and students, reduced availability of technical support personnel due to displacement or reassignment to critical infrastructure roles, limited opportunities for training amid

crisis circumstances, and rapid technology changes that quickly outdated existing knowledge.

Potential solutions include developing simplified production workflows that minimize technical complexity, creating comprehensive yet accessible documentation for common processes and issues, establishing peer support networks that leverage distributed expertise across communities, implementing mentorship programs where technically proficient individuals support those with less experience, and prioritizing platforms with intuitive interfaces and extensive online support resources.

These technical barriers present significant but not insurmountable challenges to implementing Canva-based educational videos in Ukrainian higher education. By acknowledging these limitations and systematically developing mitigation strategies, educators can create realistic implementation approaches that function effectively despite challenging technical circumstances, ensuring educational continuity through pragmatic and adaptive solutions.

9.2. Pedagogical challenges in implementation

Beyond technical barriers, pedagogical challenges significantly influence the effective implementation of Canva-based educational videos in Ukrainian higher education. These challenges relate to teaching and learning processes, requiring thoughtful adaptations to ensure educational effectiveness despite disrupted academic contexts.

Traditional pedagogical transitions represent a fundamental challenge as educators shift from established teaching approaches to flipped learning models utilizing educational videos. Nikitova et al. [42] examines flipped learning methodology in professional training of future language teachers, noting significant adaptation requirements when implementing new pedagogical approaches. In Ukrainian contexts, this transition is complicated by simultaneous crisis-related disruptions, creating a "double adaptation" requirement where educators must simultaneously navigate both pedagogical and circumstantial changes to their practice.

Potential approaches include implementing gradual transition models that introduce flipped elements alongside familiar practices rather than abrupt wholesale changes, providing structured frameworks that guide educators through the pedagogical redesign process, creating communities of practice where faculty share implementation experiences and strategies, developing explicit mappings between traditional and flipped approaches to highlight continuities alongside differences, and acknowledging the emotional and cognitive demands of pedagogical change during crisis circumstances.

Student readiness for self-directed learning presents another significant challenge, as flipped models require greater learner autonomy than traditional approaches. Al-Said et al. [2] examines the implementation of flipped classroom technology in distance learning, highlighting varied student preparedness as an important consideration. In Ukrainian contexts, self-directed learning challenges may be amplified by disrupted prior educational experiences, psychological impacts of conflict circumstances, limited quiet study spaces in shared or temporary accommodation, and practical constraints on study time due to increased personal or family responsibilities.

Potential approaches include developing explicit self-regulation scaffolds that guide students through independent learning processes, implementing progressive autonomy models that gradually increase self-direction expectations, creating peer support structures that provide social accountability and assistance, establishing clear expectations and timelines for video engagement, and acknowledging varied student circumstances through flexible implementation approaches.

Integration between asynchronous video content and synchronous learning activities presents coordination challenges, particularly when in-person sessions are disrupted

by crisis circumstances. López et al. [36] examines student perception of the flipped classroom model, highlighting the importance of coherent connections between pre-class and in-class components. In Ukrainian contexts, this integration is complicated by unpredictable attendance patterns due to safety concerns or infrastructure disruptions, varied student completion of video assignments due to access constraints, and potential shifts between in-person and remote formats with minimal transition time.

Potential approaches include designing flexible classroom activities that accommodate varied levels of prior video engagement, implementing just-in-time teaching approaches that adapt session content based on pre-class assessment results, creating layered activities with both basic and advanced options depending on preparation levels, developing asynchronous alternatives for students unable to attend synchronous sessions, and establishing clear connections between video content and subsequent activities to maintain learning coherence despite potential fragmentation.

Assessment adaptation for video-based learning presents challenges related to measuring learning outcomes in disrupted educational contexts. Deng and Gao [13] examines the effects of embedded questions in pre-class videos, highlighting the need for aligned assessment approaches in flipped learning environments. In Ukrainian contexts, assessment challenges include limited opportunities for traditional examination formats due to security or infrastructure concerns, varied completion timelines resulting from access constraints, potential academic integrity considerations when oversight is limited, and the need to assess both content knowledge and adaptive learning capabilities developed through crisis circumstances.

Potential approaches include implementing embedded assessment within video content to provide immediate verification of understanding, developing authentic assessment tasks that demonstrate application in relevant contexts, creating portfolio assessment models that document learning processes alongside outcomes, establishing peer assessment protocols that distribute evaluation responsibilities while building community, implementing flexible timing options that accommodate varied completion circumstances, and developing multi-modal assessment approaches that accommodate different technical capabilities.

Emotional and psychological dimensions of learning require particular attention in implementing educational videos during crisis periods. Rutkiene et al. [47] examines the impact of flipped learning on student engagement and satisfaction, highlighting the importance of emotional factors in educational experiences. In Ukrainian contexts, emotional challenges include trauma responses affecting concentration and memory, anxiety related to safety or future uncertainty, separation from support networks due to displacement, competing attention demands from crisis-related concerns, and psychological fatigue resulting from sustained stress exposure.

Potential approaches include incorporating emotional support elements within educational materials, implementing trauma-informed pedagogical practices that acknowledge potential psychological impacts, creating content that balances realistic acknowledgment of challenges with hopeful orientation toward future possibilities, establishing peer connection opportunities that combat isolation experiences, developing metacognitive strategies that help students recognize and address emotional influences on learning, and providing explicit guidance for maintaining well-being alongside academic progress.

Time management challenges affect both educators creating content and students engaging with it, particularly amid the unpredictable circumstances of Ukrainian crisis contexts. Braun [9] examines methods for creating SCORM units for flipped classrooms, noting the time-intensive nature of video production processes. In Ukrainian contexts, time constraints include competing crisis-related responsibilities for both faculty and students, unpredictable schedule disruptions due to safety concerns or

infrastructure issues, increased time requirements for basic activities due to logistical challenges, and cognitive fatigue reducing productive work duration during available time periods.

Potential approaches include implementing efficient production workflows that maximize output from limited available time, developing collaborative content creation models that distribute workload across teaching teams, creating modular content units that can be completed in brief available time windows, establishing realistic time expectations acknowledging crisis circumstances, implementing flexible pacing options that accommodate varied study schedules, and developing prioritization frameworks that identify essential content when comprehensive coverage becomes impractical.

These pedagogical challenges present significant considerations for implementing Canva-based educational videos in Ukrainian higher education. By acknowledging these challenges and developing thoughtful adaptations, educators can create implementation approaches that address not just the technical but also the human dimensions of learning during crisis circumstances, supporting meaningful educational experiences despite extraordinary challenges.

9.3. Student adaptation considerations

Student experiences and adaptation needs represent crucial considerations when implementing Canva-based educational videos in Ukrainian higher education. Understanding how students navigate learning through digital video content amid crisis circumstances helps educators develop supportive implementation approaches aligned with learner realities.

Learning environment variability significantly influences how students engage with educational videos. Hung [24] examines EFL students' perceptions of online flipped classrooms during the COVID-19 pandemic, highlighting the impact of physical study environments on learning experiences. In Ukrainian contexts, environment challenges include shared accommodation with limited quiet space, temporary shelter situations with minimal privacy, frequent relocation disrupting established study arrangements, safety concerns affecting concentration, and infrastructure limitations such as inadequate lighting or work surfaces.

Potential support approaches include developing guidance for optimizing available study spaces despite limitations, creating content viewable in small segments suitable for brief study opportunities, providing recommendations for managing environmental distractions during video viewing, implementing note-taking frameworks that support interrupted viewing sessions, and acknowledging environmental constraints while suggesting adaptive strategies rather than assuming ideal conditions.

Digital literacy variations among students influence their ability to effectively access and utilize video content. Sarker et al. [50] examines the use of e-learning in higher education, noting significant diversity in student technical capabilities as an implementation consideration. In Ukrainian contexts, digital literacy challenges include limited prior experience with online learning platforms due to predominantly traditional educational backgrounds, restricted access to technology during formative education years in certain regions, interrupted skill development due to crisis circumstances, and varied capabilities for troubleshooting technical issues independently.

Potential support approaches include creating layered technical guidance from basic to advanced levels, developing peer mentoring programs where technically proficient students support those with limited experience, implementing progressive skill development embedded within course activities, providing illustrated step-by-step instructions for essential technical processes, establishing synchronous or asynchronous help channels for technical assistance, and designing interfaces that minimize complexity while maintaining functionality.

Learning style adaptations are necessary as students navigate the transition from familiar instructional approaches to video-based flipped learning. Oya et al. [43] examines dimensions of attitudes in flipped learning, highlighting how different learning preferences influence student experiences with educational videos. In Ukrainian contexts, learning style challenges include established habits from previously traditional educational experiences, varied preferences for textual versus audiovisual learning materials, different approaches to note-taking and information processing, and diverse self-regulation capabilities influencing independent study effectiveness.

Potential support approaches include providing multimodal content presentation addressing different learning preferences, implementing explicit guidance for adapting established study strategies to video-based learning, creating diverse engagement options that accommodate different processing approaches, developing metacognitive frameworks that help students identify personal learning preferences and effective strategies, and establishing reflection processes that encourage adaptation rather than rigid adherence to familiar but potentially ineffective study habits.

Psychological and emotional adaptation represents a crucial consideration as students navigate educational experiences amid conflict circumstances. Rutkiene et al. [47] examines the impact of flipped learning on student engagement and satisfaction, highlighting the significant influence of emotional factors on learning experiences. In Ukrainian contexts, psychological challenges include trauma responses affecting concentration and information processing, anxiety about safety or future prospects interfering with academic focus, grief or separation resulting from conflict-related losses, identity disruption due to displacement or role changes, and motivational challenges amid uncertainty about educational continuity.

Potential support approaches include acknowledging psychological realities within educational materials rather than proceeding as if in normal circumstances, implementing trauma-informed pedagogical approaches that recognize potential emotional barriers to learning, creating content that balances realistic acknowledgment of challenges with hopeful orientation toward future possibilities, establishing peer connection opportunities within educational activities to combat isolation, developing metacognitive strategies that help students recognize and address emotional influences on learning, and providing explicit guidance for maintaining psychological well-being alongside academic progress.

Time management adaptation is necessary as students navigate educational responsibilities alongside crisis-related demands. Hung [24] examines students' perceptions of online flipped classrooms, highlighting time management as a critical success factor particularly during disrupted circumstances. In Ukrainian contexts, time management challenges include competing responsibilities related to family safety or basic needs provision, unpredictable schedule disruptions due to security concerns or infrastructure issues, cognitive fatigue reducing productive study duration, fragmented availability creating shorter rather than extended study periods, and psychological pressure affecting concentration quality during available time.

Potential support approaches include providing realistic time requirement estimates for video engagement, developing modular content units that can be completed in brief available time windows, creating guidance for effective short-session study strategies, implementing flexible pacing options that accommodate varied study schedules, establishing prioritization frameworks that identify essential content when comprehensive coverage becomes impractical, and developing time management guidance specifically adapted to crisis circumstances rather than conventional study situations.

Peer relationship adaptations are required as students navigate potentially isolated learning experiences when traditional classroom communities are disrupted. Wong et al. [61] examines student-generated videos to facilitate discussion in collaborative

flipped classrooms, highlighting the importance of social connections in educational experiences. In Ukrainian contexts, relationship challenges include physical separation from established academic communities due to displacement, limited opportunities for synchronous interaction due to varied circumstances, reduced informal learning support typically provided through peer networks, isolation experiences affecting motivation and perspective, and diminished sense of belonging within educational institutions during primarily remote engagement.

Potential support approaches include creating structured collaborative activities linked to video content, establishing virtual learning communities that maintain connections despite physical separation, implementing peer feedback processes that create purposeful engagement between students, developing asynchronous discussion opportunities linked to video themes, creating virtual informal interaction spaces that reproduce casual campus connections, and explicitly acknowledging the social dimensions of learning within educational design.

These student adaptation considerations highlight the complex reality facing Ukrainian learners as they engage with educational videos amid unprecedented challenges. By acknowledging these realities and developing supportive implementation approaches, educators can create learning experiences that address not just content delivery but the holistic needs of students navigating education during extraordinary circumstances. This student-centered perspective ensures that technological innovations serve human needs effectively rather than creating additional barriers to educational participation.

9.4. Resource and training requirements

Implementing Canva-based educational videos requires specific resources and training to ensure effective outcomes. Understanding these requirements helps institutions and educators develop realistic implementation plans aligned with available capabilities while identifying critical areas for development or external support.

Hardware resource requirements for video production and access present fundamental considerations for implementation planning. Jersic, Juvan and Pecnik [29] discusses video production systems for distance learning, highlighting equipment considerations for effective implementation. In Ukrainian contexts, hardware challenges include limited institutional equipment budgets due to crisis-related financial constraints, damaged or outdated technology resulting from conflict circumstances, varied personal device ownership among both faculty and students, and limited replacement or repair options when equipment malfunctions occur.

Minimum production requirements include computers capable of running Canva's web interface (typically mid-range laptops or desktops manufactured within the past 5-7 years), basic microphones for audio recording (standalone USB microphones provide significant quality improvements over built-in computer audio), and stable internet connections for accessing the platform and exporting completed videos. While these represent modest requirements by international standards, they may present significant challenges in heavily affected regions or for displaced individuals with limited resources.

Implementation approaches addressing hardware constraints include establishing equipment lending programs that maximize utilization of limited institutional resources, identifying minimum viable technology configurations for basic video production, creating regional production hubs where better-equipped facilities can be shared by multiple educators, implementing collaborative production models where team members with different equipment capabilities contribute to different aspects of video creation, and developing contingency workflows for situations where ideal equipment is unavailable.

Software and subscription costs represent ongoing expenses that must be considered in implementation planning. While Canva offers a robust free tier suitable for many educational applications, premium features require subscription payments that may strain limited educational budgets. Fonseca, Da Silva and Sá [19] identifies cost as a potential inhibitor for video technology implementation in educational settings, noting that financial constraints may limit access to advanced features.

Implementation approaches addressing software cost constraints include evaluating whether free tier capabilities meet essential educational requirements, exploring educational licensing options that may provide discounted access, implementing shared departmental or institutional subscriptions rather than individual accounts, identifying specific premium features that provide sufficient educational value to justify investment, and developing workflows that maximize capabilities available through free accounts while minimizing reliance on premium-only features. Ukrainian institutions have successfully negotiated educational support arrangements with technology providers [15], highlighting the humanitarian dimensions of educational continuity during conflict to secure access that would otherwise exceed financial capabilities.

Training and professional development requirements represent crucial investments for successful implementation. Nikitova et al. [42] examines flipped learning methodology in professional training, highlighting the importance of comprehensive preparation for both technical and pedagogical aspects of implementation. In Ukrainian contexts, training challenges include limited time availability amid crisis-related responsibilities, restricted opportunities for in-person workshops due to safety or infrastructure considerations, varied baseline technical capabilities requiring differentiated approaches, rapid skill obsolescence due to platform updates or changing requirements, and psychological capacity limitations affecting knowledge acquisition during high-stress periods.

Implementation approaches addressing training needs include developing modular learning resources that can be engaged with during brief available time periods, creating multilevel training materials addressing different baseline capabilities, implementing peer mentoring systems that leverage distributed expertise across faculty communities, establishing ongoing support mechanisms rather than one-time training events, and recognizing the emotional and psychological dimensions of learning new skills during crisis circumstances.

Support personnel requirements include both technical staff assisting with video production and educational designers guiding pedagogical implementation. Al-Said et al. [2] discusses distance learning implementation, noting that appropriate staffing significantly influences success rates for educational technology initiatives. In Ukrainian contexts, staffing challenges include reduced personnel availability due to displacement or military service, competing priorities for limited technical staff addressing critical infrastructure needs, increased workload due to crisis response requirements, and potential skill gaps resulting from rapid technological change without corresponding professional development opportunities.

Implementation approaches addressing personnel constraints include developing distributed support models where expertise is shared across departments rather than centralized, implementing tiered support approaches that address common issues through self-service resources while reserving direct assistance for complex challenges, creating peer support networks that leverage faculty expertise to complement formal technical resources, establishing asynchronous support channels that optimize limited staff availability, and developing comprehensive documentation that reduces reliance on direct personal assistance.

Time resource requirements present perhaps the most significant constraint in

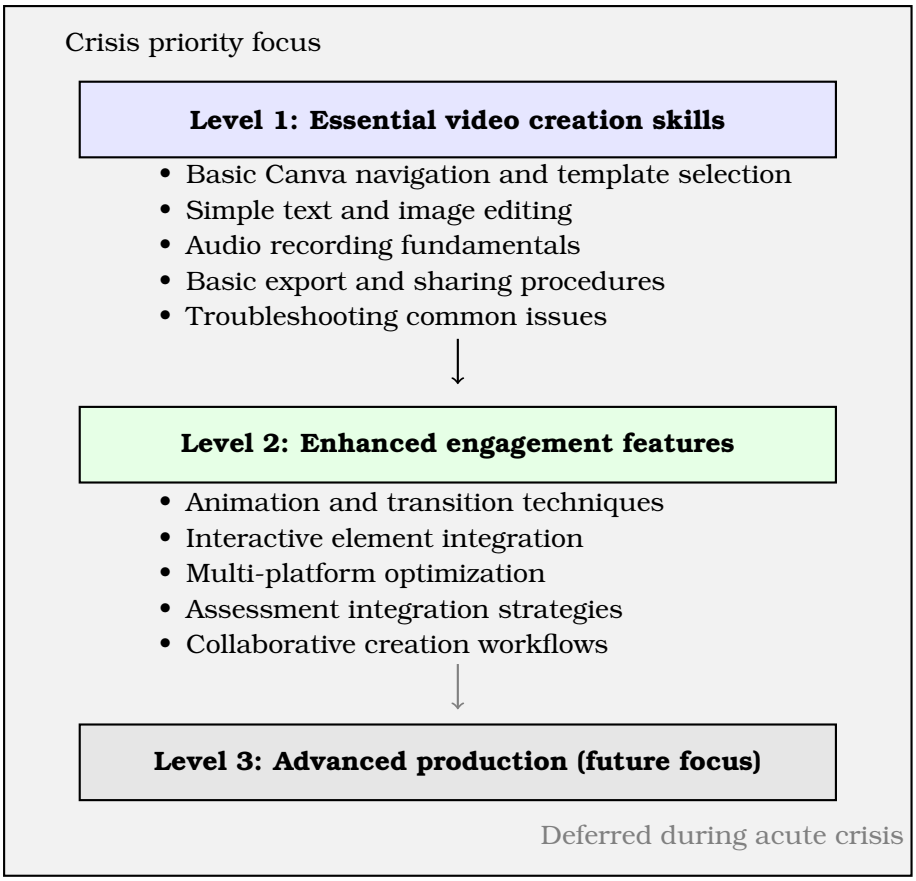

Figure 5: Crisis-adaptive training framework for educational video creation.

Ukrainian implementation contexts, as both faculty and students navigate educational responsibilities alongside crisis-related demands. Braun [9] emphasizes the time-intensive nature of educational video production, noting that creating quality content requires significant investment beyond that required for traditional lecture preparation. In Ukrainian contexts, time limitations include competing responsibilities related to safety or basic needs provision, fragmented availability creating shorter rather than extended work periods, cognitive fatigue reducing productive work duration, and psychological burden affecting focus quality during available time.

Implementation approaches addressing time constraints include developing streamlined production workflows that minimize non-essential steps, creating template libraries that eliminate repetitive design work, implementing collaborative creation processes that distribute workload across teaching teams, establishing realistic time expectations acknowledging crisis circumstances, and prioritizing content areas where video creation offers the most significant pedagogical advantages over simpler alternatives.

These resource and training requirements highlight the practical considerations necessary for successful implementation of Canva-based educational videos in Ukrainian higher education. By realistically assessing available capabilities while identifying critical development areas, institutions can create implementation approaches that function effectively within existing constraints while systematically addressing key limitations through strategic resource allocation and capability development.

10. Future directions

10.1. Emerging trends in educational video creation

The landscape of educational video creation continues to evolve rapidly, with emerging technological and pedagogical trends suggesting important future directions for Canva implementation in Ukrainian higher education. Understanding these developments helps educators anticipate changes and position their practice for ongoing adaptation and improvement.

Artificial intelligence integration represents perhaps the most significant emerging trend in educational video creation, with AI-powered tools increasingly supporting various aspects of the production process. Molinari and Sandri [40] examines the evolution of learning management systems in the age of AI and large language models, highlighting potential transformations in educational content creation. For Canva specifically, emerging AI features include automated design suggestions, content summarization capabilities, translation functions, voice generation options, and intelligent template recommendations based on educational purposes.

These developments offer particular promise for Ukrainian contexts where production efficiency represents a critical concern amid limited time resources. AI-supported content creation could potentially reduce production time while maintaining quality standards, particularly for common educational video elements like introductions, summaries, or standard explanations. However, implementation will require careful attention to both technical requirements (which may exceed capabilities in resource-constrained settings) and quality assurance (ensuring that automated content meets educational standards before distribution).

Interactive and adaptive video capabilities are expanding beyond basic embedded questions to create truly responsive learning experiences. Dampil [10] examines the integration of H5P interactive videos for enhancing student performance, demonstrating the potential of advanced interactivity for educational outcomes. Emerging capabilities include branching scenarios based on learner choices, adaptive content presentation responding to performance patterns, personalized pacing based on comprehension indicators, embedded simulation environments, and augmented reality integration expanding video content into three-dimensional experiences.

While Canva currently offers limited native interactivity features, integration with specialized platforms like H5P enables more sophisticated interactive implementations. For Ukrainian educators, these capabilities offer significant potential for addressing diverse student needs through more personalized learning experiences, particularly valuable when direct instructor interaction may be limited by crisis circumstances. However, implementation requires balancing enhanced capabilities with practical considerations regarding technical requirements and student access capabilities.

Mobile-first design approaches are gaining prominence as smartphone usage for educational purposes continues to increase, particularly in contexts where computer access may be limited. Tkachuk et al. [58] examines mobile ICT use for online learning during COVID-19 lockdowns, highlighting the growing importance of mobile-optimized educational content. Emerging practices include vertical video formats optimized for smartphone viewing, touch-interactive elements designed for mobile engagement, microlearning structures aligned with mobile usage patterns, offline viewing capabilities addressing connectivity limitations, and reduced data consumption approaches supporting access in bandwidth-constrained environments.

These mobile-oriented developments are particularly relevant for Ukrainian implementation contexts, where analytics consistently show smartphone dominance in educational video access patterns. As Canva continues enhancing its mobile creation and viewing capabilities, Ukrainian educators can leverage these improvements to

better align video design with actual student access patterns, potentially increasing engagement through format-appropriate content presentation.

Data-informed design practices are evolving as analytics capabilities become more sophisticated, enabling evidence-based decisions throughout the video creation process. Judel, vom Felde and Schroeder [30] discusses video analytics in Moodle using xAPI, demonstrating how engagement data can inform educational video improvements. Emerging approaches include heat-mapping viewer engagement to identify high and low-interest segments, analyzing drop-off patterns to identify potential content issues, tracking viewing device and environment characteristics to optimize format decisions, measuring interaction patterns with embedded elements, and systematically testing alternative presentation approaches to identify most effective strategies.

While implementing sophisticated analytics may exceed current technical capabilities in many Ukrainian contexts, even basic engagement data can significantly inform video design decisions. Understanding which content presentations maintain attention, which explanations require reinforcement, and which formats work effectively across varying technical constraints helps educators refine their approach based on evidence rather than assumption, an efficiency-enhancing practice particularly valuable during resource-constrained implementation.

Collaborative creation models are developing beyond basic team production to include more sophisticated distributed workflows and community-based approaches. Wong et al. [61] explores using student-generated videos to facilitate discussion in collaborative flipped classrooms, highlighting the potential of expanding creation beyond traditional educator roles. Emerging practices include distributed production teams with specialized roles aligned with individual strengths, cross-institutional collaboration pooling resources across organizations, student-faculty co-creation involving learners in the production process, community-sourced content incorporating practitioner expertise alongside academic perspectives, and international partnerships combining diverse cultural and pedagogical approaches.

These collaborative approaches offer particular promise for Ukrainian implementation contexts where individual resources may be limited but collective capabilities remain significant. By distributing production responsibilities across broader communities, these models can maintain educational video development despite individual constraints while potentially enhancing content quality through diverse perspective integration.

Accessibility-centered design is evolving from basic accommodation to comprehensive inclusion approaches that consider diverse needs throughout the creation process. Zavaruieva et al. [62] examines communicative methods of forming professional competences during distance learning, highlighting the importance of inclusive approaches to digital content. Emerging practices include universal design frameworks that address diverse needs from initial conception rather than through later adaptation, multimodal content presentation providing equivalent information through different sensory channels, integrated accessibility features within standard production workflows, automated accessibility checking during development, and user testing with diverse learner populations to verify effectiveness across different needs.

For Ukrainian implementation contexts where students may experience both permanent disabilities and situational limitations resulting from crisis circumstances, these accessibility-centered approaches serve broader populations than typically considered. Videos designed for effectiveness across diverse sensory, cognitive, and technical capabilities better serve all students navigating challenging learning environments, making accessibility a universal benefit rather than a specialized accommodation.

10.2. Potential for further integration with other technologies

The integration of Canva-created educational videos with complementary technologies offers significant potential for enhancing learning experiences in Ukrainian higher education. Exploring these integration possibilities helps educators develop more comprehensive educational ecosystems that leverage various tools for maximum effectiveness despite resource constraints.

Learning management system integration represents a fundamental connection point between educational videos and broader course structures. Judel, vom Felde and Schroeder [30] examines video analytics in Moodle using xAPI, demonstrating how specialized connections between video content and learning platforms enhance both functionality and assessment capabilities. Potential development areas include automated video embedding within course modules, integrated analytics tracking engagement across video and other course components, synchronized assessment connecting video content with LMS evaluation tools, adaptive content presentation based on learner performance patterns, and unified access frameworks that maintain continuity despite potential infrastructure disruptions.

While many Ukrainian institutions currently implement basic LMS connections (primarily through embedded links or uploaded files), more sophisticated integration offers significant potential benefits for both student experience and administrative efficiency. Several pilot projects have explored enhanced Moodle integration with video hosting platforms, suggesting promising directions for further development despite technical complexity.

Mobile application integration addresses the smartphone-dominant access patterns prevalent in Ukrainian educational contexts. Tkachuk et al. [58] examines mobile ICT for online learning during COVID-19 lockdowns, highlighting the importance of mobile-optimized educational approaches. Potential development areas include dedicated video viewing applications with offline functionality, mobile notification systems alerting students to new content availability, integrated note-taking tools optimized for mobile interaction with video content, synchronization capabilities that maintain continuity across devices, and reduced-bandwidth distribution channels specifically designed for mobile network limitations.

These mobile-centered integrations offer particular promise for Ukrainian implementation contexts, where analytics consistently show smartphone dominance in educational video access patterns. By acknowledging this reality through purpose-designed mobile integration rather than simply allowing mobile access to computer-oriented systems, these approaches could significantly enhance student experience while accommodating actual usage patterns.

Virtual and augmented reality integration offers potential for expanding educational videos into immersive learning experiences. Strutynska et al. [55] discusses digitalization of the educational process for pre-service teachers, noting the potential of immersive technologies for enhancing engagement and comprehension. While current Ukrainian implementation contexts may lack resources for sophisticated VR/AR development, emerging simplified creation tools suggest potential future directions where Canva-created content could serve as entry points to more immersive experiences through technologies like WebXR, 360-degree video elements, or marker-based AR implementations viewable through standard smartphones.

These immersive integrations might be particularly valuable for certain disciplinary contexts such as medical education, engineering, or spatial disciplines where three-dimensional understanding significantly enhances learning. While full implementation may exceed current technical and financial capabilities in most Ukrainian institutions, selective application for high-value learning scenarios could justify targeted investment

despite resource constraints.

Artificial intelligence integration extends beyond content creation to include personalized learning pathways and enhanced assessment capabilities. Molinari and Sandri [40] examines learning management system evolution in the age of AI, highlighting potential transformations in educational content delivery and assessment. Potential development areas include personalized video recommendation systems suggesting content based on individual learning patterns, automated assessment of video-based assignments, content customization adapting to identified knowledge gaps, language processing enabling multilingual access to core content, and learning analytics identifying effective video designs for different content types and student populations.

While sophisticated AI implementation may exceed current capabilities in many Ukrainian contexts, even basic applications offer significant potential benefits for educational effectiveness and efficiency. Several Ukrainian institutions have begun exploring simplified AI applications for content tagging and organization, suggesting pragmatic implementation pathways despite resource limitations.

Cloud-based collaboration platforms enhance both creation and engagement processes for educational videos. Petrovych et al. [44] examines cloud technologies in professional training of future teachers, highlighting the potential of collaborative digital environments. Potential development areas include real-time cooperative editing enabling distributed production teams, cloud-based feedback systems facilitating peer and instructor response to video content, shared resource libraries reducing duplication across institutional boundaries, version control systems maintaining content integrity despite distributed development, and cross-institutional content sharing expanding available resources beyond individual organizational capabilities.

These collaborative approaches offer particular promise for Ukrainian implementation contexts where individual resources may be limited but collective capabilities remain significant. Several regional education networks have begun exploring shared production and distribution systems, suggesting viable implementation pathways despite individual institutional constraints.

Open educational resource integration connects locally created content with global knowledge repositories, expanding available materials while contributing Ukrainian perspectives to international educational communities. Gkamas et al. [21] discusses the integration of video platforms with digital repositories, highlighting potential for broader content dissemination through standardized protocols. Potential development areas include contribution frameworks enabling Ukrainian-created content to enter international OER repositories, metadata standards facilitating discovery across linguistic boundaries, translation interfaces supporting multilingual access to core content, adaptation tools facilitating localization of international resources for Ukrainian contexts, and reciprocal sharing agreements establishing mutually beneficial exchange with international educational institutions.

These open education connections offer dual benefits for Ukrainian implementation contexts: increased access to international resources during resource-constrained periods, and opportunities to share Ukrainian educational innovations and perspectives with global audiences. Several Ukrainian institutions have begun establishing formal connections with international OER initiatives, suggesting productive engagement despite current challenges.

10.3. Research opportunities

The implementation of Canva-based educational videos in Ukrainian higher education presents numerous opportunities for research that could enhance understanding and effectiveness while contributing valuable knowledge to international educational

communities. Identifying promising research directions helps establish scholarly agendas that support evidence-based practice while documenting Ukrainian educational innovations during extraordinary circumstances.

Effectiveness studies examining learning outcomes represent a fundamental research need, establishing evidence regarding the impact of different video design and implementation approaches. Shen [53] examines the efficacy of instructor-designed instructional videos in flipped classrooms, demonstrating methodological approaches for measuring engagement and learning outcomes. Potential research questions include: How do different Canva video designs influence comprehension and retention in Ukrainian educational contexts? What implementation approaches most effectively support learning amid infrastructure disruptions? How do outcomes compare between video-based instruction and alternative approaches during crisis circumstances? What assessment methods most accurately measure learning through educational videos in disrupted educational environments?

While conducting rigorous experimental studies may present challenges in current Ukrainian contexts, mixed-methods approaches combining available quantitative metrics with qualitative insights could provide valuable evidence while acknowledging research constraints. Several Ukrainian institutions have begun systematic documentation of video implementation outcomes, laying foundations for more comprehensive effectiveness research as circumstances allow.

Engagement pattern analysis examines how students interact with educational videos across varied circumstances, revealing behavioral insights that can inform design and implementation decisions. Judel, vom Felde and Schroeder [30] discusses video analytics implementation, demonstrating methodological approaches for tracking and analyzing engagement patterns. Potential research questions include: How do Ukrainian students' video viewing patterns differ from international norms, and what contextual factors influence these differences? What viewing environments and devices predominate in actual student usage, and how should these realities inform design decisions? How do engagement patterns vary across different content types, video designs, and student circumstances? What features most effectively maintain engagement despite challenging learning environments?

Even basic analytics implementations can provide valuable research insights when systematically analyzed, making this direction viable despite potential technical limitations. Several Ukrainian institutions have implemented simplified engagement tracking through learning management systems, providing foundations for more sophisticated analysis as capabilities develop.

Pedagogical transformation research examines how educator approaches evolve when implementing flipped learning through educational videos. Nikitova et al. [42] examines flipped learning methodology in professional training, highlighting significant pedagogical adaptations when implementing new instructional approaches. Potential research questions include: How do Ukrainian educators conceptualize and enact their teaching roles when implementing video-based flipped learning? What pedagogical adaptations emerge specifically in response to crisis circumstances rather than standard flipped learning implementations? How do relationships between educators and students evolve through mediated rather than direct instruction? What professional identity transformations occur through the transition from traditional to technology-mediated teaching approaches?

Qualitative methodologies such as phenomenological inquiry, case studies, or narrative research could provide valuable insights despite resource constraints, documenting important educational adaptations during unprecedented circumstances. Several Ukrainian education scholars have begun systematic documentation of pedagogical transformations, creating foundations for more comprehensive research as

circumstances allow.

Crisis adaptation research examines how educational video implementation evolves in response to ongoing challenges, revealing resilience factors and effective adaptation strategies. Tkachuk et al. [58] examines mobile ICT use during COVID-19 lockdowns, demonstrating research approaches for studying educational technology adaptation during crisis periods. Potential research questions include: What implementation adaptations emerge specifically in response to conflict-related challenges? How do educational communities develop resilience through technological adaptations despite sustained disruption? What factors distinguish successful from unsuccessful adaptation attempts in highly constrained circumstances? How do educational priorities and practices evolve through prolonged crisis adaptation?

This research direction not only supports Ukrainian implementation but potentially contributes valuable knowledge to international understanding of educational resilience during crisis circumstances. The unprecedented challenges facing Ukrainian higher education create unique opportunities to document adaptation processes that may inform global educational responses to future crises of various types.

Psychological dimension research examines the emotional and cognitive aspects of learning through educational videos during traumatic circumstances. Rutkiene et al. [47] examines the impact of flipped learning on student engagement and satisfaction, highlighting the importance of psychological factors in educational experiences. Potential research questions include: How do trauma responses influence engagement with educational videos, and what design approaches best accommodate these realities? What psychological support elements most effectively address emotional needs through educational content? How do motivational factors evolve during prolonged educational disruption, and what video design elements best sustain engagement despite these challenges? What metacognitive strategies most effectively support learning regulation during crisis circumstances?

While requiring careful ethical consideration, this research direction acknowledges the inseparability of cognitive and emotional dimensions in current Ukrainian educational contexts. Several Ukrainian psychology and education scholars have begun examining these interactions, suggesting viable research approaches despite sensitive subject matter.

Technological equity research examines how video implementation approaches influence educational access across diverse student circumstances. Veglianti et al. [59] discusses digital transformation of higher education institutions, highlighting the importance of inclusive approaches that address varied access capabilities. Potential research questions include: How do different video design and distribution approaches influence accessibility across varied technological resources? What implementation strategies most effectively accommodate diverse access capabilities without creating multi-tier educational experiences? How do students with limited technological resources adapt their learning approaches, and how can video design support these adaptations? What institutional policies and practices most effectively address technological equity concerns during resource-constrained implementation?

This research direction acknowledges the significant variation in student technological access while seeking approaches that maximize educational opportunity despite these disparities. Several Ukrainian educational policy scholars have begun examining these questions, suggesting viable research pathways despite complex implementation realities.

10.4. Policy implications for Ukrainian education

The implementation of Canva-based educational videos within the broader context of Ukrainian higher education during crisis circumstances raises important policy

considerations at institutional, regional, and national levels. Examining these implications helps stakeholders develop supportive frameworks that facilitate effective implementation while addressing systemic challenges beyond individual educator control.

Infrastructure development policies significantly influence the feasibility and effectiveness of educational video implementation across varied institutional and regional contexts. Kuzminska, Morze and Smyrnova-Trybulska [33] examines the flipped learning model implementation in Ukraine, noting the importance of appropriate technological infrastructure for successful adoption. Policy considerations include establishing minimum technical standards for educational institutions, developing infrastructure improvement funding mechanisms despite wartime budget constraints, implementing distributed technology access points in communities with limited individual resources, creating emergency infrastructure maintenance protocols for conflict-affected regions, and establishing technology recovery programs addressing conflict-related damage to educational facilities.

Professional development policies shape educator capabilities for effective video implementation across institutional contexts. Strutynska et al. [55] examines digitalization of the educational process for training pre-service teachers, highlighting the importance of systematic capability development at scale. Policy considerations include establishing competency frameworks specific to crisis-adaptive digital teaching, developing recognition systems that acknowledge educator innovation during challenging circumstances, implementing resource-efficient professional development models accessible despite infrastructure limitations, creating peer learning networks that leverage distributed expertise across institutional boundaries, and establishing emergency training protocols for rapidly changing technological or security circumstances.

Accreditation and quality assurance policies influence how educational videos and flipped learning approaches are evaluated within formal educational frameworks. López et al. [36] examines student perception and satisfaction with the flipped classroom model, highlighting the importance of appropriate evaluation frameworks for innovative pedagogical approaches. Policy considerations include developing crisis-adaptive quality standards that maintain educational integrity while acknowledging extraordinary circumstances, implementing flexible evaluation frameworks that accommodate varied implementation approaches across different resource contexts, establishing recognition mechanisms for innovative crisis adaptations, creating documentation systems that ensure academic continuity for students affected by educational disruptions, and revisiting traditional contact hour requirements to appropriately recognize asynchronous learning contributions.

Resource allocation policies determine how limited financial, technical, and human resources are distributed to support educational continuity during crisis circumstances. Veglianti et al. [59] discusses organizing universities to promote digital transformation, highlighting the importance of strategic resource allocation for effective implementation. Policy considerations include establishing prioritization frameworks for technology investment during resource-constrained periods, implementing shared resource models that maximize utilization across institutional boundaries, developing emergency resource reallocation protocols for rapidly changing circumstances, creating international partnership frameworks that supplement local resources with external support, and establishing transparent decision processes that maintain trust despite difficult allocation choices.

Intellectual property policies influence both the creation and sharing of educational videos across institutional boundaries. Gkamas et al. [21] discusses the integration of video platforms with digital repositories, highlighting the importance of appropriate

content sharing frameworks. Policy considerations include establishing clear ownership guidelines for educator-created content during employment, implementing appropriate licensing frameworks that balance creator recognition with educational access needs, developing content sharing agreements across institutional boundaries to maximize resource utilization, creating attribution systems that acknowledge contributions while facilitating adaptation, and establishing preservation protocols that maintain content accessibility despite potential institutional disruptions.

Student support policies address the varied needs of learners navigating educational experiences during conflict circumstances. Hung [24] examines students' perceptions of online flipped classrooms, highlighting the importance of appropriate support structures for successful implementation. Policy considerations include establishing technology access programs for students with limited personal resources, implementing flexible completion pathways that accommodate varied engagement capabilities, developing recognition systems for student persistence despite extraordinary challenges, creating psychosocial support integration within educational programs, and establishing emergency academic continuity protocols for students experiencing acute crisis circumstances.

International cooperation policies shape how Ukrainian institutions engage with external partners during implementation of educational innovations. Badan et al. [7] examines online communication simulating spaces for foreign language education, highlighting the potential of international collaboration during crisis periods. Policy considerations include establishing partnership frameworks that support Ukrainian educational resilience while avoiding dependency relationships, implementing knowledge exchange programs that acknowledge bidirectional learning rather than unidirectional assistance, developing resource sharing agreements that supplement local capabilities while building long-term capacity, creating educational emergency response protocols with international dimensions, and establishing research collaboration frameworks that document Ukrainian innovations for global knowledge contribution.

11. Conclusion

11.1. Summary of key findings

This research has examined the capabilities of the Canva web service for creating educational videos to enhance the effectiveness of flipped learning in Ukrainian higher education, with particular attention to the challenges resulting from quarantine restrictions, ongoing war, and infrastructure disruptions. Through comprehensive analysis of Canva's features, implementation approaches, and contextual adaptations, several key findings have emerged that inform both practice and understanding in this domain.

First, Canva offers significant advantages for educational video creation in resource-constrained contexts through its intuitive interface, template-based design approach, and robust free tier capabilities. These features make the platform particularly suitable for Ukrainian educators facing limited technical expertise, time constraints, and financial resources. Comparative analysis with alternative video creation tools demonstrated that while specialized platforms offer superior capabilities in specific areas (such as Powtoon for animation or Prezi for conceptual relationships), Canva's balanced combination of accessibility, visual quality, and technical efficiency represents a valuable option for educational implementation during challenging circumstances.

Second, the research identified specific Canva features that most effectively support educational video creation, including customizable templates that reduce design time while maintaining visual quality, animation capabilities that enhance engagement through purposeful movement, media integration options that support multimodal

content presentation, and export flexibility that accommodates varied distribution requirements. However, the research also noted limitations, particularly regarding advanced interactivity capabilities and direct learning management system integration, suggesting areas where supplementary tools or approaches may be necessary for comprehensive implementation.

Third, effective implementation of Canva-based educational videos requires thoughtful pedagogical strategies beyond technical production considerations. Particularly valuable approaches include aligning video content with clear learning objectives, managing cognitive load through segmentation and signaling, incorporating active learning elements that transform passive viewing into engaged learning, designing for multimodal presentation addressing diverse learning preferences, ensuring contextual relevance connecting content to Ukrainian realities, implementing appropriate sequencing and scaffolding to support knowledge construction, and acknowledging emotional dimensions of learning during crisis circumstances.

Fourth, technical integration between Canva videos and learning management systems presents both opportunities and challenges in Ukrainian contexts. Analysis of common platforms such as Moodle identified various integration methods including direct file upload, HTML embedding, external tool integration via LTI standards, and plugin-based enhancement. While these approaches offer different combinations of functionality, technical requirements, and resource demands, the research found that pragmatic implementation often requires flexible, multi-tiered approaches accommodating varied infrastructure capabilities across different regions and institutions.

Fifth, student engagement with educational videos in Ukrainian contexts demonstrates distinctive patterns reflecting the unique circumstances facing learners. Analysis revealed the significant influence of infrastructure limitations on viewing behaviors, with clear clustering around periods of power availability, predominance of mobile device access, and heavy weekend viewing when resources might be more stable. These patterns differ notably from those observed in more stable international contexts, highlighting the importance of contextually appropriate implementation approaches rather than uncritical adoption of international models.

Sixth, pedagogical challenges in implementing educational videos during crisis circumstances extend beyond technical considerations to include supporting student adaptation to self-directed learning, navigating transitions from familiar teaching approaches to flipped models, coordinating between asynchronous video content and synchronous learning activities despite unpredictable disruptions, developing appropriate assessment approaches for irregular engagement patterns, and addressing emotional and psychological dimensions of learning during traumatic circumstances. Effective implementations acknowledged these challenges through explicit support structures rather than focusing exclusively on content delivery.

Seventh, resource and training requirements for sustainable implementation must realistically address the constrained circumstances facing Ukrainian higher education. The research identified minimum viable requirements for hardware, software, training, support personnel, and time resources, while also documenting adaptive approaches developed by Ukrainian institutions to function effectively despite limitations. Particularly notable were collaborative resource-sharing models, tiered implementation approaches prioritizing essential capabilities, and “just-in-time” training frameworks focused on immediate application needs rather than comprehensive technological education.

Finally, emerging trends in educational video creation suggest important future directions for Ukrainian implementation, including artificial intelligence integration supporting production efficiency, enhanced interactive capabilities creating more responsive learning experiences, mobile-first design approaches aligning with actual

usage patterns, data-informed design practices enabling evidence-based decisions, collaborative creation models leveraging distributed expertise, and accessibility-centered design serving diverse student needs. While current circumstances may limit immediate adoption of cutting-edge capabilities, awareness of these trends enables strategic positioning for future development as resources allow.

11.2. Practical implications for educators

The findings of this research have significant practical implications for Ukrainian educators seeking to implement Canva-based educational videos in higher education contexts. These implications provide actionable guidance for effective implementation despite the challenging circumstances currently facing educational institutions and students.

For individual educators, the findings suggest several important practical approaches. First, prioritizing efficiency in video creation through template-based design and standardized workflows helps maximize output from limited available time and resources. Rather than pursuing perfect production quality or comprehensive content coverage, focusing on essential concepts with appropriate visual support proves more sustainable during crisis circumstances. Second, designing for actual rather than ideal viewing circumstances acknowledges the realities facing Ukrainian students, with particular attention to mobile optimization, downloadable formats for offline viewing, segmented content suitable for interrupted viewing sessions, and multimodal presentation accommodating various access limitations. Third, integrating explicit learning guidance within and around videos supports students navigating increased responsibility for self-directed learning, including advance organizers establishing purpose and context, active viewing prompts encouraging engagement rather than passive consumption, comprehension checks verifying understanding without requiring external assessment, and metacognitive guidance developing self-regulation capabilities valuable during disrupted educational experiences.

For academic departments and program leaders, the findings highlight the value of collaborative approaches to video implementation. Establishing shared template libraries and content repositories eliminates duplicate efforts across courses while maintaining visual and structural consistency. Developing specialized roles based on individual strengths (such as content expertise, design capabilities, or technical skills) maximizes collective output despite individual limitations. Creating peer mentoring systems where technically proficient faculty support colleagues with limited experience extends limited formal training resources while building community connections valuable during challenging circumstances. Implementing strategic content prioritization across program curricula ensures that limited video production resources address the most critical learning needs rather than being distributed based on individual preferences or capabilities.

For institutional leaders and policy makers, the findings emphasize the importance of systemic support structures for successful implementation. Developing crisis-adaptive technology policies that acknowledge actual rather than ideal circumstances helps establish realistic expectations while supporting appropriate innovation. Creating flexible evaluation frameworks that recognize varied implementation approaches across different resource contexts encourages contextually appropriate adaptations while maintaining core academic standards. Establishing technology access programs for students with limited personal resources addresses equity concerns that might otherwise exclude vulnerable populations from educational participation. Implementing distributed infrastructure approaches with redundant, low-resource systems enhances educational resilience despite ongoing disruptions to traditional centralized models.

For all stakeholders, the findings underscore the importance of psychological aware-

ness alongside technical implementation. Acknowledging the emotional dimensions of learning during crisis circumstances through both explicit support structures and appropriately designed educational content creates more effective and humane learning environments. Recognizing the extraordinary resilience demonstrated by both educators and students navigating educational experiences amid unprecedented challenges helps maintain perspective when inevitable implementation difficulties arise. Celebrating small successes rather than focusing exclusively on limitations or comparing current capabilities to pre-crisis standards supports continued motivation and persistence despite sustained difficult circumstances.

Ultimately, the most significant practical implication may be the importance of pragmatic adaptation rather than rigid implementation models. The varied and dynamic challenges facing Ukrainian higher education necessitate flexible, context-sensitive approaches that address actual needs and constraints rather than idealized educational technology visions. By acknowledging limitations while systematically developing sustainable capabilities, Ukrainian educators can implement Canva-based educational videos that meaningfully support learning despite extraordinary challenges, maintaining educational continuity that serves not only academic development but broader societal resilience.

11.3. Theoretical contributions to flipped learning literature

This research makes several meaningful contributions to the theoretical understanding of flipped learning, particularly regarding implementation during crisis circumstances. These contributions extend existing frameworks while addressing previously underexplored dimensions of educational technology adoption in challenging contexts.

First, the research expands theoretical understanding of contextual adaptation in flipped learning implementation. While existing literature has examined various institutional and cultural factors influencing implementation success, the Ukrainian case provides unique insights into adaptation under extreme circumstances including war, infrastructure disruption, and population displacement. The documented approaches demonstrate how core flipped learning principles can be maintained despite radical departures from assumed implementation conditions, suggesting a more robust and flexible theoretical framework that accommodates extreme variation rather than presuming relatively stable implementation environments.

Second, the findings contribute to theoretical models regarding the relationship between synchronous and asynchronous components in flipped learning. Traditional frameworks typically assume reliable alternation between independent engagement with preparatory materials and subsequent interactive application activities. The Ukrainian case demonstrates how this relationship can be reconceptualized when synchronous interaction becomes unpredictable or limited, with greater emphasis on self-contained asynchronous materials that support learning progression despite irregular synchronous engagement opportunities. This expanded theoretical understanding may prove valuable beyond crisis contexts, potentially informing approaches for other situations where traditional models of academic scheduling and interaction prove impractical.

Third, the research enhances theoretical understanding of self-regulated learning development within flipped approaches. While existing literature acknowledges the increased student responsibility inherent in flipped models, it often assumes gradual development of self-direction capabilities within relatively stable supportive environments. The Ukrainian case provides insights into accelerated self-regulation development necessitated by crisis circumstances, documenting both the challenges faced by students suddenly required to manage learning with minimal external struc-

ture and the support strategies that effectively facilitate this transition despite limited resources. These findings contribute valuable nuance to theoretical models of learner autonomy development in flipped environments.

Fourth, the findings expand theoretical frameworks regarding technology adoption in educational contexts. Traditional technology acceptance models emphasize factors such as perceived usefulness, ease of use, and social influence in relatively stable implementation environments. The Ukrainian case illustrates how these factors shift during crisis circumstances, with heightened emphasis on resilience, adaptability, and minimal resource requirements rather than optimal functionality or comprehensive feature sets. This expanded theoretical understanding helps explain technology adoption patterns that might appear counterintuitive when viewed exclusively through established models developed in stable contexts.

Fifth, the research contributes to theoretical understanding of educational resilience through technological adaptation. While crisis response literature has examined various dimensions of educational resilience, the long-term adaptation documented in this research provides insights into sustained resilience beyond immediate emergency response. The findings suggest theoretical frameworks for understanding how educational systems adapt to prolonged disruption through technological innovation, potentially informing approaches to varied forms of educational disruption beyond the specific Ukrainian context.

11.4. Final recommendations

Based on comprehensive analysis of Canva capabilities for educational video creation in Ukrainian higher education contexts, several key recommendations emerge for educators, institutions, and policy makers seeking to enhance flipped learning effectiveness despite challenging circumstances.

For individual educators implementing Canva-based educational videos, we recommend:

1. Adopt a student-centered design approach that prioritizes accessibility and engagement under varied viewing circumstances rather than production sophistication or comprehensive content coverage.
2. Implement modular content structures with brief (3-7 minute) concept-focused video segments rather than extended presentations, enhancing both production efficiency and viewing flexibility.
3. Develop multi-format distribution approaches providing both standard and low-bandwidth versions to accommodate varied student access capabilities.
4. Integrate explicit learning guidance including advance organizers, active viewing prompts, comprehension checks, and metacognitive support to enhance independent learning effectiveness.
5. Prioritize mobile-optimized designs with larger text elements, simplified visual layouts, and vertical or square aspect ratios based on documented smartphone-dominant access patterns.
6. Incorporate contextually relevant examples that connect theoretical content to Ukrainian realities, enhancing motivation through demonstrated relevance despite challenging circumstances.
7. Acknowledge emotional dimensions of learning during crisis through appropriate content tone, realistic expectations, and explicit connection to future-oriented possibilities despite current challenges.

For academic departments and program leaders coordinating implementation efforts, we recommend:

1. Establish collaborative production models with specialized roles based on individual strengths rather than expecting uniform capabilities across all faculty members.
2. Develop shared resource libraries including templates, media assets, and reusable content components to maximize efficiency through reduced duplication.
3. Implement peer mentoring systems connecting technically proficient faculty with those requiring additional support, extending limited formal training resources.
4. Create strategic content prioritization frameworks that identify critical learning needs for video development rather than distributing limited resources based on individual preferences.
5. Establish assessment approaches that accommodate varied engagement patterns while maintaining appropriate academic standards, focusing on demonstration of competence through multiple means.
6. Develop systematic content management approaches ensuring preservation and accessibility despite potential infrastructure disruptions or institutional transitions.
7. Implement regular reflection and improvement processes that document implementation experiences and refine approaches based on evidence rather than assumption.

For institutional leaders and policy makers creating supportive frameworks, we recommend:

1. Develop crisis-adaptive technology policies that acknowledge actual rather than ideal circumstances while supporting appropriate innovation despite constraints.
2. Establish distributed infrastructure approaches with redundant, low-resource systems that maintain educational functionality despite localized disruptions.
3. Create technology access programs addressing equity concerns for students with limited personal resources, potentially including equipment lending, subsidized data access, or communal technology centers.
4. Implement flexible evaluation frameworks that recognize varied implementation approaches across different resource contexts while maintaining core academic standards.
5. Develop international partnership models that support Ukrainian educational resilience while avoiding dependency relationships, emphasizing knowledge exchange and collaborative innovation alongside resource sharing.
6. Establish recognition systems acknowledging the extraordinary adaptations and innovations developed by both educators and students navigating unprecedented challenges.
7. Support systematic research documenting Ukrainian educational innovations during crisis circumstances, potentially contributing valuable knowledge to international understanding of educational resilience.

For the broader educational technology community, we recommend:

1. Recognize diverse implementation contexts beyond well-resourced settings typically represented in educational technology literature, developing more inclusive frameworks that accommodate varied realities.
2. Support development of low-resource, high-resilience technologies appropriate for challenging implementation environments rather than exclusively pursuing advanced capabilities requiring optimal conditions.

3. Facilitate knowledge exchange connecting Ukrainian educational innovations with international communities, acknowledging the bidirectional learning potential rather than unidirectional assistance models.
4. Develop crisis-responsive educational technology frameworks that systematically address implementation during emergency circumstances, preparing for potential future disruptions of various types.
5. Support open educational resource initiatives that enhance access to quality materials across institutional and national boundaries, particularly valuable during resource-constrained circumstances.

These recommendations acknowledge both the immense challenges facing Ukrainian higher education and the significant opportunities for meaningful educational experiences despite these challenges. By adopting pragmatic, context-appropriate approaches to Canva-based educational video implementation, Ukrainian educators can support not only academic development but broader societal resilience through maintained educational continuity. The adaptive implementations developed through these efforts may ultimately contribute valuable insights to international understanding of educational technology during crisis circumstances, transforming extraordinary challenges into meaningful contributions to global educational knowledge.

Declaration on generative AI: During the preparation of this work, the authors used Claude 3.7 Sonnet to enhance content and improve writing style. After using this tool, the authors reviewed and edited the content as needed and took full responsibility for the publication's content.

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