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SCREENCAST AS A DIDACTIC DESIGN TOOL FOR TRAINING FUTURE SPECIALISTS IN LIBRARY, INFORMATION, AND ARCHIVAL STUDIES AT HIGHER TECHNICAL EDUCATION INSTITUTIONS WITHIN THE FRAMEWORK OF RESEARCH-BASED LEARNING

Purpose of the study. The article presents a comprehensive study of the didactic potential of educational screencasts as a tool for training future specialists in information, library, and archival studies. The relevance of the research is determined by the transition of higher education toward flexible, personalized, and interactive learning models that align with the demands of digital transformation in the field.

Methods & methodology. The theoretical framework is based on the principles of Cognitive Theory of Multimedia Learning (CTML) and the models of cognitive styles – Field Dependent / Field Independent and VARK. It is established that the multimodal design of screencasts, when accounting for individual learning differences, reduces cognitive load, optimizes information perception, and ensures effective integration into the educational environment. The empirical part of the research analyzes the experience of the National Aerospace University "KhAI", where screencasts have been systematically implemented in the academic programs of specialty 029. They are used as lecture materials, supplements to practical classes, and digital instructions. On the example of the courses Archival Studies and Library and Information Support for the Scientific and Technical Sector, the effectiveness of micro-screencasts is demonstrated for step-by-step mastery of specialized software such as Archivematica and Koha.

Results. It is proved that an educational screencast functions not merely as a technical aid but as a holistic didactic construct that stimulates students' cognitive activity and fosters professional autonomy. Special attention is given to the role of screencasts in implementing research-based learning and the "flipped classroom" model. The creation of student-generated educational videos promotes the development of digital literacy, critical thinking, and communication skills. The practice of peer review through Moodle fosters academic interaction and supports the instructor's "pedagogy of presence" in the digital space.

Conclusions. The experimental results confirmed that combining screencasts with interactive methods increases the level of material retention by 26–31%. The study concludes that the use of screencasts in KhAI's educational practice has become an integral part of academic culture and a factor driving qualitative transformation of professional training in the digital era.

Keywords: screencast; digital education; educational tools; professional training; library, information, and archival studies; future specialists; research-based learning; higher education; technical universities.

СКРІНКАСТ ЯК ІНСТРУМЕНТ ДИДАКТИЧНОГО ДИЗАЙНУ У ПІДГОТОВЦІ МАЙБУТНІХ ФАХІВЦІВ із БІБЛІОТЕЧНОЇ, ІНФОРМАЦІЙНОЇ ТА АРХІВНОЇ СПРАВИ У ЗАКЛАДАХ ВИЩОЇ ТЕХНІЧНОЇ ОСВІТИ В УМОВАХ ДОСЛІДНИЦЬКО-ОРІЄНТОВАНОГО НАВЧАННЯ

Мета дослідження. У статті здійснено комплексне дослідження дидактичного потенціалу навчального скрінкасту як інструменту професійної підготовки майбутніх фахівців з інформаційної, бібліотечної та архівної справи. Актуальність теми зумовлена переходом вищої освіти до гнучких, персоналізованих та інтерактивних моделей навчання, що відповідають вимогам цифрової трансформації галузі.

Методи та методологія. Теоретичну основу становлять принципи когнітивної теорії мультимедійного навчання (CTML), моделі когнітивних стилів Field Dependent / Field Independent та VARK. Визначено, що мультимодальний дизайн скрінкастів з урахуванням індивідуальних відмінностей студентів зменшує когнітивне навантаження, оптимізує сприйняття інформації та забезпечує ефективну інтеграцію в навчальне середовище. Емпіричну частину присвячено досвіду Національного аерокосмічного університету «ХАІ», де скрінкасти впроваджено у навчальні курси спеціальності 029 як лекційні матеріали, супровід практичних занять і цифрові інструкції. На прикладі дисциплін «Архівознавство» та «Бібліотечно-інформаційне забезпечення науково-технічної галузі» показано ефективність мікроскрінкастів для поетапного опанування програм Archivematica і Koha.

Результати. Доведено, що навчальний скрінкаст виступає не лише технічним засобом, а цілісним дидактичним конструктом, який активізує когнітивну діяльність студентів і сприяє розвитку професійної автономії. Особливу увагу приділено ролі скрінкастів у впровадженні дослідницько-орієнтованого підходу та моделі «перевернутого класу». Створення студентами власних навчальних відео сприяє розвитку цифрової грамотності, критичного мислення й комунікативних умінь. Практика взаємного рецензування через Moodle формує академічну взаємодію та підтримує «педагогіку присутності» викладача у цифровому просторі.

Висновки. Поєднання скрінкастів з інтерактивними методами підвищує рівень засвоєння матеріалу на 26–31%. У підсумку обґрунтовано, що навчальний скрінкаст у практиці ХАІ є складником академічної культури та чинником якісної трансформації професійної підготовки фахівців у цифрову добу.

Ключові слова: скрінкаст, освітні інструменти, професійна підготовка, цифрова освіта, бібліотечна, інформаційна та архівна справа, майбутні фахівці, дослідницько-орієнтоване навчання, вища освіта, технічні університети.

Statement of the problem and its connection with important scientific and practical tasks. In the digital educational space of a modern university, new teaching paradigms are emerging that prioritize flexible, multimodal, personalized, and interactive approaches. At the same time, there is a growing need for adaptive learning for future specialists in information, library, and archival studies, a field that is rapidly transforming under the influence of digital modernization and the intellectualization of documentary practices. In this context, the educational screencast appears not merely as a technical tool or supplementary resource, but as a holistic didactic medium that influences the organization of students' cognitive activity, the formation of their professional competence, and their autonomy within the learning environment.

A key vector of such training is research-based learning, an approach in which the student evolves from a passive consumer of ready-made knowledge

into an active participant in the educational process, engaged in independent inquiry, critical analysis of information, and the creation of original intellectual products.

Analysis of key research and publications. A screencast is a digital video recording that captures on-screen actions accompanied by synchronous voice narration or textual commentary. As noted by L. Dorogan-Pisarenko et al. (2024), the effectiveness of an educational screencast is not universal for all students, as it depends on individual cognitive and learning styles. This characteristic, which requires precise pedagogical calibration, opens up wide opportunities for the development of original innovations within the teaching of specialized disciplines.

Accounting for students' cognitive styles is a fundamental principle that should underlie screencast design. R. Riding & E. Sadler-Smith (1997) distinguish two cognitive style types: *Field Dependent (FD) and Field Independent (FI)*. Students with an FI style are generally capable of independently structuring material, breaking down complex tasks into separate elements, and thinking analytically, whereas FD students learn more effectively in socially interactive environments, relying on external cues. This implies that, when designing educational screencasts for future library and information professionals, it is essential to vary modes of information delivery, combining individual (asynchronous) learning with opportunities for discussion, reflection, and collaborative analysis of results.

Another important factor is the learning style described by the VARK model, according to which students can be classified as visual, auditory, reading/writing, or kinesthetic learners (Fleming & Baume, 2006). This variability underscores the need for a multimodal screencast design. As noted by L. Dorogan-Pisarenko et al. (2024), combining video, text, graphics, and audio helps balance cognitive load and enhances learning effectiveness within the limits of working memory capacity.

Within the framework of the Cognitive Theory of Multimedia Learning (CTML), O. Grybyuk (2015) identifies several principles that help reduce extraneous cognitive load on students' memory. Among these are the coherence principle (eliminating unnecessary elements), signaling (highlighting key information), spatial and temporal contiguity (simultaneous and localized presentation of text and visuals), and the redundancy principle (avoiding duplication of on-screen text and narration).

In previous works, M. Shlenova (2025a; 2025b; 2025c) researched the screencast as an instrument of didactic design. This inquiry is expanded through a foundational analysis of the didactic principles required for training information specialists in technical universities, adapting them for digital tools. Building on this framework, the author explores specific platforms: Instagram is examined for developing visual literacy and student engagement, while WhatsApp Messenger is presented as a pedagogical tool for microlearning, mentoring, and maintaining educational continuity during national crises.

In the context of training future specialists in library, information, and archival studies, where a significant portion of the curriculum involves technological processes (working with electronic catalogs, information systems, and archival platforms), the screencast with narrated software demonstration (*Screencast + Narration*) proves to be the most relevant format. According to Carr & Ly (2009), this approach facilitates the formation of stable mental models of software operation among students. In contrast, the addition of textual elements (*Screencast + Narration + Text*), while seemingly helpful, may overload the cognitive system and diminish learning efficiency.

Integrating screencasts into the educational process also entails a rethinking of the instructor's role. In the traditional model, the instructor delivers knowledge frontally; in the screencast-based model, they act as a curator of self-directed learning, guiding students in developing their individual educational trajectories. Professional training of future information specialists should thus focus on fostering information autonomy, self-learning skills, and critical thinking, all of which require access to educational resources that allow students to revisit content, pause, analyze, and model their actions.

The segmenting principle helps reduce the temporary load on students' working memory by dividing a screencast into logically structured sections, each supplemented with intermediate tasks or self-assessment questions.

The effectiveness of an educational screencast is not limited to the appropriate choice of technical

tools, it lies primarily in precise didactic design. N. Dobroshtan & O. Kulish (2020) emphasize that for information to transfer from short-term to long-term memory, it is not enough to activate dual-channel processing (visual and auditory); it is also necessary to facilitate the creation of mental models through active cognitive engagement. Following this view, a screencast as a media format can act as a catalyst for such cognitive processes, provided that information delivery is neither overloaded nor chaotic.

Formulation of the article's aims and objectives. The purpose of this article is to provide a theoretical justification and practical demonstration of the didactic potential of educational screencasts as a key tool for implementing research-based learning. Drawing on the experience of the National Aerospace University «Kharkiv Aviation Institute» (KhAI), the study explores the specifics of training future specialists in information, library, and archival studies within a technical higher education environment. To achieve this goal, the paper analyzes the current state of multimedia technology use in higher education, outlines the advantages of the research-based approach to developing professional competencies, and identifies the distinctive features of training students in specialty 029 within an engineering academic context. Using concrete examples of assignments, case studies, and projects, the article highlights the methodological aspects of integrating screencasts into the learning process that promote students' research autonomy. Summarizing the findings, the study demonstrates that the screencast is not merely a technical aid but a comprehensive element of didactic design capable of significantly enhancing the efficiency of the educational process by transforming the student from a passive learner into an active researcher.

Presentation of the main material. In the context of the transformation of higher education driven by digitalization, distance learning, and the pursuit of innovative dynamics, the use of screencasts as a didactic tool in the professional training of a new generation of specialists is becoming increasingly relevant. This issue is particularly significant in the formation of information-communication and research competencies among future professionals in library, information, and archival studies, who must operate within a hypermedia, digital, and hybrid information environment. The problem becomes especially important in the context of technical universities, where the training of socio-humanitarian specialists, particularly those majoring in specialty 029, takes place within a unique academic environment.

Students immersed in engineering and IT culture often possess well-developed analytical thinking and a preference for perceiving information through clear algorithms. Under such conditions, the screencast becomes not merely a supplementary tool but a key didactic instrument that allows complex humanitarian and technological processes (for instance, working with archival platforms or bibliographic managers) to be "translated" into a comprehensible language of visual, step-by-step instructions. This approach harmoniously combines humanitarian knowledge with technical pragmatics. Within this context, the academic community of the National Aerospace University "KhAI" is implementing innovative educational practices related to the systematic integration of screencasts into the educational programs of specialty 029.

A screencast, as a multimedia tool for visualizing and voicing actions on a computer screen, is, according to A. Gritchenko et al. (2020), a powerful means of knowledge transmission, organization of independent and project-based student activities, and facilitation of interactive communication within digital pedagogy. Its integration into the educational process at KhAI includes the use of original screencasts as lecture materials, demonstration tools for practical classes, instructions for laboratory work, and as a format for creating student learning products. For instance, within the course "Archival Studies",students work with the Archivematica platform through a series of five thematic screencasts, mastering the process of creating SIP, AIP, and DIP packages, while simultaneously completing control tables for metadata analysis.

The Didactic Effectiveness of Screencasts Used at KhAI is evidenced by their ability to compensate for the limitations of traditional educational environments, particularly in distance or blended learning formats, while promoting personalized learning and ensuring flexible material acquisition. Within the courses «Library and Information Support for the Scientific and Technical Field», "Archival Studies," and «Electronic Document Management and E-Governance», the faculty of the

department create series of screencasts that clearly demonstrate the algorithms for working with specialized software, including electronic document management systems, bibliographic databases, archival recorders, and digital metadata services.

For instance, in the course "Library and Information Support for the Scientific and Technical Field," within the module on the Koha library system, seven screencasts lasting 4–6 minutes each were used. These covered tasks such as entering a new record, importing MARC files, editing authority files, and generating reports. Each video segment was accompanied by an interactive form for assessing comprehension.

The innovative aspect also lies in using screencasts as a tool for developing students' research autonomy, reflective thinking, and self-organization skills. Twenty-first-century pedagogy envisions learning as a process of self-construction of knowledge. In this regard, KhAI employs a modular course structure that incorporates micro-screencasts, short instructional videos designed to guide learners step by step through specific actions or skills. This approach enables differentiation of educational content and its adaptation to individual learning pace.

Within the "Library and Information Support for the Scientific and Technical Field" module, each student is invited to watch video instructions on creating a bibliographic record in Zotero, then independently compile an original bibliography on a given topic, record a screencast of their process, and submit it for peer review via the Moodle (Mentor) platform.

It is important to note that in the professional training of future specialists in library, information, and archival science, a crucial role is played by the ability to work with digital content, as well as to create, analyze, and transform information into a visual format. For this reason, the curricula include specific assignments for students to develop their own original screencasts. This allows not only for assessing the level of mastery of the program material but also for developing key research competencies. In this context, the creation of an original screencast is regarded as a form of scholarly documentation and reflection: the student does not merely reproduce an action mechanically but learns to structure the process, explain its logic, and present the results of their own micro-research. For example, within the project-based module of the «Archival Science» discipline, students create screencasts on organizing a digital archive, creating metadata, and optimizing searches in an electronic environment. One of the most successful practices was an assignment to create a video tutorial for new archive employees, in which a student explains the stages of entering a document into the electronic records system; this product was later used in the university's actual archive for staff training.

Technological support for this process is provided by software products such as Camtasia Studio, OBS Studio, Loom, Bandicam, and Screencast-O-Matic, which offer a wide range of functionalities for recording, editing, and publishing screencasts. The use of the Moodle (Mentor) platform, integrated into the university's educational environment, deserves special attention. It enables the effective distribution of learning modules with video support, the organization of forum discussions about screencasts, and the didactic modeling of situations based on visual case studies. For instance, in the course «Library and Information Support for the Scientific and Technical Field», a problem-based scenario (a failure case) was implemented where a student first watches a screencast demonstrating an incorrect search in the Scopus database and then, in a video format, shows how to properly implement the search strategy.

This approach serves as a vivid illustration of research-based learning in action. It models a real-life scientific inquiry situation, where the ability to identify errors in one's own or another's research strategy, analyze them, and find optimal solutions is a key competency of a researcher.

The scientific and methodological foundation for the use of screencasts in the educational process at KHAI is based on the ideas of constructivism, social learning (Bandura, 1982), the concept of multimodal learning (Kress & Leeuwen, 2004), digital hermeneutics (Mallery et al., 1986; Marres, 2017; Akker et al., 2011), and the Cognitive Theory of Multimedia Learning (Mayer, 2014). According to Mayer's approach, the effectiveness of material assimilation depends on the harmonious combination of visual and verbal channels of perception, which in screencasts is realized through the synchronization of video, audio commentary, and accompanying subtitles or text annotations.

At KhAI, special attention is given to the

principles of accessibility and inclusion in the development of screencasts. This includes ensuring compatibility with mobile devices, adding subtitles, and providing textual duplication of key functions, which aligns with the recommendations of the European Agency for Special Needs and Inclusive Education. Specifically, adapted versions of educational materials are created for students with hearing or visual impairments, and faculty are trained in digital inclusivity.

The innovativeness of the approach also lies in the interdisciplinary combination of screencasting with elements of storytelling, video essays, and educational dramaturgy. This creates an effect of emotional engagement among students, actualizes their intrinsic motivation for learning, and promotes a deeper understanding of the informational content. Experimental studies conducted at KhAI have established that combining screencasts with interactive tasks in the format of quests, quizzes, or digital simulations increases the level of material assimilation by 26–31% compared to traditional text-based sources. Among the successful practices is the use of screencasts in the «Electronic Reading Room» role-playing game, where students took on the roles of users and librarians, modeling situations of inquiry, search, and digital document delivery through video clips.

At the National Aerospace University «KhAI,» the Department of Documentation and Ukrainian Language is engaged in continuous and systematic work aimed at refining the methodologies for using screencasts in the educational process. This process is not merely technical or auxiliary in nature; on the contrary, it has become an integral component of the didactic environment, where every step, every video fragment, and every intonation carries the weight of a pedagogical tool influencing the student. In this context, the methodological and content-related substance of an educational screencast is viewed as a complex cognitive construct. It is crucial to consider not only the content but also the structural logic, semantic connections between blocks, pacing of delivery, degree of informational density, rhythm of visual changes, vocal tonality, and points of emphasis.

The process of creating a screencast is conceptualized not as a simple recording of screen activity, but as a form of the instructor's presence in the digital environment. It is a unique pedagogical act that simultaneously operates on several levels: cognitive, emotional, communicative, and motivational. Therefore, special attention is focused on the preparatory stage: selecting a topic, analyzing potential difficulties students may face in mastering it, and constructing a script where the sequence of frames correlates with the logic of perception. This includes anticipating moments of cognitive strain, integrating feedback mechanisms, and incorporating problematic questions or hypothetical situations. The department's faculty operate in the genre of «intellectual directing,» where each fragment of the screencast is not just a visual gesture but a planned stimulus for active comprehension.

Modern educational video within the scope of library and information education must adhere not only to technical quality standards but also to the principles of cognitive economy: information should be accessible, concise, logical, and flexible to accommodate individual learning paces. In this regard, the instructor's internal pedagogical reflection becomes particularly important. While creating a screencast, the instructor effectively re-experiences the content of the discipline: reconsidering priorities, identifying common barriers to perception, and determining what truly needs to be visualized versus what can be left off-screen. This process also involves elements of pedagogical self-analysis, prompting the instructor to consider what they are conveying not only in terms of content but also stylistically, ethically, and rhetorically.

A special place is occupied by the tonality of the screencast, the way the material is presented and the manner in which the delivery is conducted. The instructor does not merely narrate the screen; they must enter into an invisible dialogue with the student, engaging their attention, sometimes addressing their doubts or difficulties, and providing comments, interpretations, and support. Such a format transforms a one-way message into a two-way act of communication, even within asynchronous learning. This is precisely where pedagogical empathy manifests: the ability to anticipate reactions, sense the rhythm of perception, and pause at the right moment to allow the student to comprehend what they have just seen. This is, in fact, the pedagogy of presence in the digital space.

The faculty of the Department of Documentation

and Ukrainian Language do not just develop educational videos; they are forming a holistic pedagogical ecosystem. In this ecosystem, the screencast is not a technical tool but a pedagogical event, a meeting point for content, intonation, form, logic, and attention to the student's personality. This activity will acquire special significance in the context of blended learning, where the digital component is not an isolated episode but a fully-fledged constituent of the educational space. Under such conditions, a high-quality, well-prepared screencast is capable of becoming that «pedagogical bridge» which connects the student and the instructor in a shared process of thinking, research, and understanding.

No less important is the social function of the screencast, which is realized by engaging students in collaborative digital creation, discussion, and peer review of each other's video work. This fosters an environment of academic interaction, partnership, and responsibility for the outcome. Thus, at KhAI, the screencast is not merely a technical tool but a comprehensive element of didactic design, a part of the academic culture, and an instrument of pedagogical interaction amid the digital transformation of higher education.

Given the strategic orientation toward preparing specialists to work in an information-rich and technologically complex environment, KhAI is continuing its research and methodological work to expand the potential of screencasting. This includes its use in virtual laboratories, adaptive educational platforms, and intelligent learning environments. In the future, there are plans to implement a screencast analytics system, which will make it possible to evaluate student behavioral patterns, assess content effectiveness, and model personalized learning trajectories.

Thus, the use of screencasting in the training of future specialists in library, information, and archival science at the National Aerospace University «KhAI» is a manifestation of an innovative, prognostic, empathetic, and constructivist approach to forming an educational environment.

This environment is capable of meeting the challenges of the digital age and ensuring a high-quality transformation of professional training within the paradigm of education for sustainable development, effectively implementing the principles of research-based learning and transforming the student into an independent researcher of their own educational and future professional trajectory.

Conclusions. Based on the analysis conducted, it can be concluded that the use of educational screencasting in the training of future specialists in information, library, and archival science at the National Aerospace University «KhAI» is a manifestation of an innovative and constructivist approach. This technology transcends the scope of a simple technical tool and becomes a comprehensive element of didactic design and an instrument of pedagogical interaction amid the digital transformation of education.

The practical experience of KhAI demonstrates that the systematic integration of screencasts, which requires «intellectual directing» from the instructor, effectively implements the principles of research-based learning. Engaging students in the creation and analysis of their own video products transforms them from passive consumers of information into active constructors of knowledge, thereby developing their research autonomy and critical thinking.

This approach proves to be particularly effective within the context of a technical higher education institution, where the visualization of complex algorithmic processes of working with software aligns with the students' cognitive styles. Thus, the screencast acts as a «pedagogical bridge» connecting the instructor and the student in a shared process of research and understanding, ensuring a high-quality transformation of professional training in response to the challenges of the digital age.

Future research directions. Prospects for further research lie in expanding the potential of screencasting and deepening its integration into educational technologies. The implementation of an analytics system for viewing educational videos is planned, which will allow for the assessment of student behavioral patterns and content effectiveness for the subsequent modeling of personalized learning trajectories. Methodological work is underway to expand the use of screencasts in more complex environments, such as virtual laboratories, adaptive educational platforms, and intelligent learning systems. These directions align with the strategic goal of training specialists capable of working effectively in a technologically saturated information space.

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