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# COMICS AND ANIMATION AS AN INNOVATIVE LEARNING ENVIRONMENT

**533.01 – University Pedagogy**

**SUMMARY**
**of the doctoral thesis in educational sciences**

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## CONCEPTUAL MILESTONES OF THE RESEARCH

Comic strips and animated cartoons constitute innovative learning media, characterized by the harmonious integration of images, text, music, and narrative, to facilitate the perception and quality of the learning process in an inclusive, engaging, and accessible manner. Although initially conceived for entertainment or for promoting cultural values and historical events, these environments have evolved alongside the development of information and communication technologies, significantly contributing to the clarification of abstract concepts and to the efficient transmission of messages to a wide and diverse audience.

In the educational sciences, comic strips and animated cartoons represent forms of visual storytelling, used either independently or in combination with other pedagogical resources, to strengthen creative thinking and learning skills [1]. Their contribution to a deep understanding of content, stimulating imagination, creativity, and mental representations, as well as developing visual literacy skills, has also been demonstrated. Their integration into teaching highlights a positive impact on critical thinking, civic awareness, motivation, and academic achievement [2].

The doctoral thesis in educational sciences, "*Comic Strips and Animated Cartoons as an Innovative Learning Environment*", aims to analyze comic strips and animated cartoons from the perspective of didactics and transformative pedagogy, applying Kolb's Theory in relation to the fundamental principles of animation to identify the premises for creating an innovative learning environment in visual arts. The significance of the research topic is supported by:

1) *The demonstrated impact of comic strips and animated cartoons* on the formation of human values, which justifies the need to explore and utilize alternative educational resources for developing the competencies required in the 21st century.
2) *The shift from the traditional teaching-learning-assessment didactic paradigm,* centered on the teacher, to postmodern didactics with collaborative learning environments that allow each learner to become a content creator, to reflect, to promote, and to justify the value of the educational product obtained.
3) *The formative value of visual storytelling* is supported by experimental data demonstrating the possibility of simultaneously integrating visual, textual, and narrative codes for transformative learning, combining the multimodality of learning media, learners' intrinsic motivation, and their ability to understand the content taught through active engagement in the educational process.

4) *The accelerated integration of digital technologies* in formal and non-formal education, including artificial intelligence (AI)-based tools, necessitates a rethinking of traditional teaching strategies, processes, and learning outcomes, for adaptation to new realities.

**Framing the topic within national, international, and European issues.** The theme of comic strips and animated cartoons as an innovative learning environment aligns with national, international, and European issues, as well as with policy documents, and with the theory and methodology of school didactics across educational levels and subjects [3, 4]. Thus, universities in Europe offer bachelor's and master's programs in cities such as Rome, Cambridge, Berlin, Florence, Barcelona, Milan, etc., as well as short-term courses for doctoral students in the visual arts. Moldova has made significant progress in the digitalization of education; however, scientific research addressing the theme of comic strips and animated cartoons is generally limited to disseminating these forms of visual storytelling or integrating them into the teaching of art history/animation, with a focus on presenting and discussing cultural events with local impact. In contrast, the pedagogical dimension and didactic potential remain insufficiently explored. This doctoral thesis aims to fill an existing gap in school didactics from an epistemological and methodological perspective, to provide a pedagogical foundation, and to highlight the applied value of comic strips and animated cartoons in developing the professional competencies of visual arts students.

**Presentation of previous research results related to the chosen topic**. Comic strips and animated cartoons provide added value to the efforts of educators in creating innovative learning environments, particularly in the teaching of school subjects, including biology [5] and history [6]. From a didactic perspective, the subject of comic strips and animation began to be studied in the 1920s, primarily in the context of the development of information and communication technologies, audiovisual media, and mass media. New forms of visual message representation have marked the transformation of the semiotic system of graphic narratives into the language characteristic of comic strips and animated cartoons. However, although comic strips and animated cartoons are currently recognized for their educational effectiveness and impact, these forms of visual storytelling were initially perceived primarily as entertainment, incorporating elements of humor and satire, and only later as innovative learning media. This reality reflects an epistemological contradiction, highlighting how comic strips and animated cartoons are perceived within the educational context, as well as a psychopedagogical contradiction, which underscores their motivational potential to capture the interest and attention of a wide audience.

*The object of research* in this doctoral thesis is the didactic process of designing, developing, utilizing, and evaluating comic strips and animated cartoons as an innovative learning environment. The research undertaken explores how comic strips and animated cartoons can be

integrated into formal education to enhance teaching and learning, with a focus on stimulating students' interest, curiosity, and creativity. Based on real challenges and divergences, the research problem lies in identifying and analyzing the technologies, methodologies, theories, and didactic approaches through which these forms of visual storytelling can be effectively integrated into the educational process to support active, motivating, and transformative learning.

**The thesis aims** to explore and substantiate the epistemological and methodological foundations for using comic strips and animated cartoons as innovative learning media, from the perspective of school didactics, by stages and educational disciplines. The aim is achieved through the following objectives:

- *identification and analysis* of the epistemological and methodological foundations for using comic strips and animated cartoons as innovative learning environments;
- *development of a theoretical framework* for integrating comic strips and animated cartoons into teaching strategies and new learning methods adapted to various educational levels, aimed at promoting critical thinking, based on which the model, hypotheses, and corresponding pedagogical approach will be constructed;
- *evaluation of the pedagogical effectiveness* of comic strips and animated cartoons through case studies and empirical research, to investigate the degree of students' active engagement in cooperative and collaborative learning processes.

**Hypothesis of research**: If comic strips and animated cartoons are used as innovative learning media in the training of animation students, then they will more effectively develop conceptual learning, critical thinking, creativity, and practical skills of students.

The general hypothesis was validated through the following secondary hypotheses:

H1: Comic strips and animated cartoons facilitate conceptual learning.

H2: Character illustration used to reinterpret the fundamental principles of classic animation enhances attention to detail and contributes to critical thinking skills in art students.

H3: If the methodology of the "History of Animation" course is designed based on Kolb's model, then students will better understand the evolution of animation and develop their critical thinking and ability to apply theoretical knowledge in practice.

H4: If the teaching methodology of the "Stop Motion" course includes Kolb's revised model, then students will more effectively develop practical skills, creative thinking, and the ability to complete an animation project from pre-production to post-production.

**The scientific novelty and originality** of the research consist in identifying, defining, and validating the permissive and flexible character of the didactic model of using comics and animated cartoons as an innovative learning environment in school didactics at various stages and levels of

education. The paper makes an original contribution by conceptualizing an adaptable teaching framework, applicable at various levels of education, which capitalizes on the educational potential of visual narrative in the process of training professional skills.

**Synthesis of research methodology and justification of identified research methods**. The research is based on a mixed-methods approach, with methods to explore the didactic potential of comic strips and animated cartoons as innovative learning environments. The most frequently used methods are scientific literature analysis, case study, modeling, and pedagogical experimentation. The analysis of the scientific literature was necessary to substantiate the epistemological part of the research and to justify storytelling as an innovative learning environment. The case study method was useful for exploring the universe of creative exercises from the perspective of qualitative and quantitative techniques by closely observing learning processes, behavioral responses, and the creative strategies of participants in the pedagogical experiment. The integration of qualitative methods (observation, interviews, analysis of comic strips/animated cartoons) and quantitative methods (online questionnaires, numerical assessments, analysis of respondents' opinions) provided a comprehensive view. The pedagogical experiment allowed for testing the effectiveness of the didactic model of comic strips/animated cartoons as innovative learning media and comparing the results obtained in the experimental group (where the didactic model was applied) and the control group (where the innovative didactic model was not applied).

**Theoretical significance of research** is in expanding and consolidating the scientific base and didactic framework regarding the status of comic strips and animated cartoons as an innovative learning environment. The study provides a clear epistemological framework for understanding comic strips and animation as an innovative learning environment for the application of knowledge. It identifies, utilizes, and formulates operational concepts, establishes correlations between the artistic, technological, pedagogical, and didactic dimensions of visual storytelling, and proposes a new theoretical perspective on their integration into formal and non-formal education.

**The practical significance** of the research lies in the development and validation of a didactic model for integrating comic strips and animated cartoons into an innovative learning environment, adaptable to different educational levels for conducting teaching activities in general, vocational, and higher education. The research provides teaching strategies that can be used to stimulate active learning, critical thinking, visual expressiveness, and creative engagement among students. The results obtained can serve as a didactic resource for the continuous professional development of teachers within programs focused on visual and digital education.

**The validation of the scientific results** was carried out through a series of scientific and didactic activities, including presentations, scientific lectures, thematic seminars, practical work, and creative exercises, conducted both in the United States (University of Florida) and in the Republic of Moldova (Ion Creangă State Pedagogical University in Chișinău), as well as within national and international scientific conferences. This integrated approach allowed for validation of the results obtained and their consolidation within an academic and pedagogical context.

## CONTENTS OF THE PHD THESIS

**The Introduction** presents a synthesis of the main ideas regarding the relevance and importance of the research topic, a description of the situation in the field of comics and animated films, and the justification of the research problem, as well as the aim and objectives of the research, the research methodology, the scientific novelty and originality, the scientific problem solved through the research, the implementation and validation of the research results, and the structure of the thesis.

**Chapter 1, "Epistemological Foundations of the Use of Comics and Animated Films as an Innovative Learning Medium,"** describes the context of the learning environment in the era of audiovisual communication and digitalization. It presents comics as an innovative learning medium, including the principles of comic creation. Subsequently, animated films and their hybrid forms are analyzed, and the main differences between comics and animated films are highlighted.

The analysis of the historical period allows us to state that at the end of the 19th century is recognized as a period of profound transformation in communication technologies, marked by the emergence and popularization of comics (1895) and cartoons (1900), which demonstrated their capacity to engage and persuade mass audiences. These innovations revolutionized the transmission of information through visual media by integrating text, imagery, sound, and music, thereby becoming effective educational tools. They also influenced the development of postmodern language and the adoption of new teaching approaches. Visual media becomes as a form of didactic expression in both formal and non-formal education through visual storytelling, where image, color, visual dynamics, sound, and music collaboratively construct the accessible meaning of the presented content and facilitate the learning process.

With the development of digital technologies, the structure and organization of the educational process, as well as how learners and teachers interact with data, information, and knowledge, have fundamentally changed. These transformations marked the shift from transmissive didactics, focused on delivering the educational message in its entirety through static or animated content, to transformative didactics, characterized by an active and interactive learning process achieved

through engagement with and personalization of content. Learning has become multisensory, multidimensional, and multimodal. Moreover, as audiovisual technologies were complemented by the power of the Internet, a paradigm shift in education has occurred, orienting the educational process toward the effective implementation of lifelong learning strategies.

The new paradigm can be illustrated in several ways, one of which is through the analysis of key concepts from General Systems Theory: system, environment, and feedback [7]. These concepts are also used in pedagogy. However, the definition of environment has evolved from the concept of *traditional school environment,* initially understood as the physical space of a classroom or educational institution, toward a broader concept of the *learning environment*. The learning environment can be physical or virtually extended, socio-cultural, and technological, encompassing teaching materials, pedagogical resources, strategies, and tools accessible for learning, as well as psychopedagogical conditions that ensure a climate of trust and safety, thereby promoting deep and sustainable learning. An innovative learning environment reflects a modern conceptual and methodological framework that embraces and fosters innovation in didactics.

The nature of an innovative learning environment is changing as educational technologies evolve. An innovative learning environment can be interactive, adaptive, or personalized, depending on the needs and characteristics of the learners. Learning strategies implemented in this environment can be individual, cooperative, collaborative, or mixed, promoting both autonomy and the development of cognitive, digital, social, and metacognitive competencies. An innovative learning environment may include comic strips, graphic novels, animated cartoons, innovative curricula, and other creative educational resources designed to stimulate students' interest, engagement, and active learning. Nevertheless, any educational innovation is specific to a particular historical context, influenced by the technological, cultural, and social levels of the respective period. For example, comic books can be analyzed in light of the philosophical, psychological, pedagogical, cybernetic, and managerial aspects of the dynamics of an innovative learning environment.

Comic strips are, in essence, a series of adjacent static images, drawn either by hand or digitally, intended to be read as a visual narrative or a sequence of events presented chronologically. In some cases, a comic strip consists of interconnected panels depicting sequences from life, designed to convey brief humor or to construct a narrative, often accompanied by text in speech balloons and captions. Comic strips are widely recognized in many countries, for example, in France (bande dessinée), Germany (Bildergeschichte, Bilderstreifen), and Italy (fumetto). An early form of visual storytelling is represented by monastery frescoes of Bukovina (Voroneț, Humor, Moldovița, etc.) and the ceramics of the Cucuteni–Trypolia culture.

At the end of the 19th century, comic strips served as a means to „enhance literacy levels and the prosperity of the middle classes" [8, p. 40]. Thus, in Germany, the weekly magazine Fliegende Blätter was launched, publishing illustrations by the most renowned satirists, while in the United Kingdom, the magazines Judy and Ally Sloper's Half Holiday were established, while in the United States, comics were popularized by Katzenjammer Kids (1897), Happy Hooligan (1900), and Buster Brown (1902). These educational materials conveyed a story, emotion, or idea within a specific context, often with satirical or political undertones. The basic elements of a comic strip include images, sequentiality, visual composition, context, and brief text (optional).

A comic book is a printed publication dedicated exclusively to this artistic-literary genre, compiling multiple pages of comic strips into a single volume. Such books develop more extensive stories, featuring complex plots, well-defined characters, and expansive narrative universes, conveying a story through caricatures and satirical drawings that were originally published in multiple editions in newspapers or as standalone books. An educational comic book is a printed publication that uses comic strips as a method for conveying educational information by combining images, text, and sound. Today, these books have broad applicability in social pedagogy [9]. However, the most widespread characters remain *Superman* and *Batman.*

A key innovation in the history of comic strips is their departmentalization—a concept referring to the specialization of roles in the production of serialized comics. The comic production team typically includes: a) the writer, responsible for outlining the narrative, dialogues, and overall story structure; b) the illustrator, who produces the initial sketches; c) the inker, who finalizes the drawing details; d) the colorist, who applies the colors; e) the letterer, who inserts text and sound effects; and f) the editor, who oversees and coordinates the entire process.

With the departmentalization of comic strips, the emergence and spread of the educational graphic novel as a thematic series can be observed. The specificity of this form of visual communication lies in the absence of an explicitly didactic aim; however, this does not prevent the transmission of formative messages with a strong emotional impact on a wide audience. The most common themes include the dangers of war, migration, and mental health. Examples of narrative graphic novels include Maus (Art Spiegelman), March (John Lewis), Fun Home (Alison Bechdel), and When Stars Are Scattered (Omar Mohamed), among others.

**In the Republic of Moldova,** satirical graphics developed through the integration of caricature, drawing, and comic strips to reflect social and political life humorously. This art form is particularly known through the illustrated books of Sergiu Puică and Alexei Grabco, primarily disseminated in the magazines *Chiparus* and *Крокодил* (2011). For children, the magazine *Alunelul* was published, combining visual elements with creative exercises in logic and critical thinking. The

sections of the magazine were accessible and interactive, while the illustrations contributed to conveying educational, logical, and recreational messages.

The first national animations were based on folk tales, especially the stories of Ion Creangă: *The Goat and Her Three Kids* (1968), *The Purse with Two Coins* (1969), and other works dedicated to children [12]. In the 1980s, the animated series *Guguță* was produced at the Moldova-Film studio. One well-known episode is *The Sweepers*, directed by Constantin Balan in 1984, with animation created by V. Donțu and L. Cobzac, and music composed by Gheorghe Mustea [10].

Later, animation studios were influenced by international experiences, and beginning in the 2000s, animators started to explore digital technologies and techniques. With the development of digital technologies, action-driven narratives were introduced into animation, unfolding within complex settings built from carefully designed and structured elements, creating a distinct universe and atmosphere characteristic of the Moldovan rural environment. These advances have been supported by educational institutions and independent animation studios, for example Simpals, which have played an important role in promoting this field internationally.

After 2000, comic strips and comic books migrated to the Internet, and their definition was reformulated as follows: *a pictorial and other images juxtaposed in a deliberate sequence, intended to convey information and/or produce an aesthetic response in the viewer's perception* [11]. At the same time, the principles of creating comic strips have remained unchanged. Thus, the first principle is *sequential storytelling, applied to emphasize that 'a whole is defined by having a beginning, a middle, and an end <...> a well-constructed plot should neither start nor end arbitrarily, but must adhere to these norms*' [12]. The second principle describes the image-text relationship: the image conveys the essence of the narrative, while the text expresses its context, emotion, and tone. The principle of creating comic strips with sound and music refers to multimodality, which integrates sound with visual and textual elements into a unified whole to create a richer and more engaging experience. Another principle refers to *panel composition and page layout*: each comic strip constitutes a narrative and visual unit in which it is important to follow graphic design rules and reading conventions. Equally important is the principle that applies character design norms - also known as "*character design*" which can serve as an epistemological foundation for the interdisciplinary field bridging graphic design, psychology, and pedagogy.

*The principle of scaling in grayscale and color* applies the norms for selecting the artistic style (realistic, caricatural, minimalist, painterly, etc.), as well as colors, textures, and contour lines. Simplicity of form is often an indicator of a successful character model. Color selection is based on cultural symbolism and aesthetic norms.

Animated cartoons represent a logical continuation of the technologies used in the creation of comic strips. Also referred to as a 'cartoon,' following its English designation, animation is a form of visual art and entertainment that employs moving images, typically created through hand-drawn or digital animation, to convey a message. Animation represents an educational technology of the moving image, characterized by its structure based on frames, each of which may be hand-drawn, digitally created, or generated by artificial intelligence. The illusion of movement is produced through the rapid succession of these frames.

The main differences between comic strips and animated cartoons relate to format, presentation, the illusion of movement, and the mode of storytelling as a continuous narrative. (Tab. 1.1):

**Table 1.1. Main differences between comic strips and animated cartoons**

| Element | Comic strip | Animated cartoon |
|---|---|---|
| Type of images | Static images | Animated images |
| Format | Sequence of drawn frames | Sequential static and animated images |
| Presentation | Newspapers, magazines, books, web | Film, TV, newspapers, digital magazines (caricature) |
| Illusion of motion | No, they are static images | Yes (animator-simulated to principles) |
| Sound and music | No | Yes (integrated) |
| Continuous story | Yes (narrative story) | Not always |
| Primary medium | Newspaper, journal, book | Educational film, TV, digital |

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Between the 1960s and 1990s, animated cartoons and animated films spread worldwide, including in the Republic of Moldova. In 1967, Victoria and Iosif Barbă founded the Floricica studio, which operated until 1996 and was later transformed into the Creative Animation Center for Children. Here, animated films were produced using a variety of animation techniques, including hybrid methods that combined animation with children's songs based on the verses of Grigore Vieru and music by Eugen Doga, as well as video films with animated sequences. With the spread of the Internet, the process of creating animated cartoons became faster and more engaging. "Animation stands out for its ability to exploit various cultural formulas, often rooted in classical or contemporary national culture." [13]. A defining feature of this period is that the Internet enabled animated films to serve as a global environment for learning and communication.

From the perspective of the perspective of instructional design, animated cartoons are created "frame by frame" to convey information and knowledge useful to a broad audience. In all cases, twelve universal principles are applied, namely: "squash and stretch," "anticipation,"

"staging," "continuous action & key frames," "follow-through and overlapping action," "slow in and slow out," "arcs," "secondary action," "timing and spacing," "exaggeration," "solid drawing," and "appeal." Adherence to these principles is mandatory for all types and technologies of animated cartoons. In addition, animation technologies have evolved from 2D to 3D. While 2D animation is less complex in terms of technology, it is more labor-intensive and slower to produce compared to 3D animation.

**Chapter 2, "The Methodology of Comics and Animated Films as an Innovative Learning Medium,"** describes the paradigm of learning based on visual narratives and the research hypothesis, as well as the specifics of designing the experimental approach. It further presents the hypotheses and the methodology used to validate them in the context of higher education, together with the principles of animation from the students' perspective.

It is postulated that one of the proponents of visual narrative is David Kolb and that there is not an unified theory that comprehensively describes the instructional design of innovative learning environments from the perspective of objectives, teaching strategies, process indicators, and learning outcomes. Engagement in visual metaphor activities is closely linked to the development of both verbal and visual literacy, and visual-verbal metaphors contribute significantly to strengthening this literacy [14].

The principles of learning through visual narratives can be derived from Experiential Learning Theory, which is based on the idea that, in learner-centered environments, learning progresses through four distinct phases: concrete experience, reflective observation, abstract conceptualization, and active experimentation. The effectiveness of Kolb's theory depends on how technologies, resources, and learning analyses are integrated, given that today's learners require new forms of organizing the instructional process, innovative teaching materials, constructivist-focused discussions, interactive dialogues, and projects based on real-world case studies.

The pedagogy of learning based on visual narratives is, above all, a pedagogy of community constructivism, through which learners can construct meaning from reality by creating comic strips or animated cartoons individually and in groups, and by analyzing them. In this context, each learner creates and aligns visual narratives with their own knowledge and practical skills. Learning is thus a personalized process of meaning-making through visual narratives, while also being a collaborative team activity. The learning context influences how visual narratives are perceived and understood, with meaning being "constructed" and "justified" rather than "taught for a grade." Images, symbols, and visual representations are used to facilitate long-term learning.

An innovative learning environment is learner-centered, and active learning is based on experimentation, discovery, and project-based activities. In such an environment, emphasis is placed on

collaboration and cooperation, which fosters the development of social and relational skills. Furthermore, learning spaces, time, strategies, and teaching methods must be adapted to the pace required for deep learning and the demonstration of learning outcomes. Linking theory and practice in the instructional design of innovative learning environments based on visual narratives is a necessary and sufficient condition for the development of methodologies specific to these environments.

**Research Hypothesis:** If comic strips or animated cartoons are used as innovative learning media in the training of animation students, then they will more effectively develop conceptual learning, critical thinking, creativity, and practical skills. To validate this general hypothesis, several secondary hypotheses have been established:

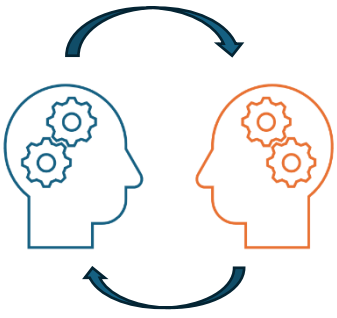
**H1:** Comic strips and animated cartoons facilitate conceptual learning.

**H2:** Character illustration used to reinterpret the fundamental principles of classical animation enhances attention to detail and contributes to the critical thinking of art students.

**H3:** If the methodology of the course „*History of Animation*" is designed based on Kolb's model, then students will gain a better understanding of the evolution of animation and will develop critical thinking skills as well as the ability to apply theoretical knowledge in practice.

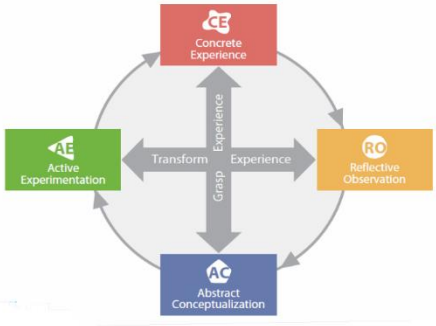
**H4:** If the instructional methodology of the „*Stop Motion*" course incorporates Kolb's revised model, then students will more effectively develop practical animation skills, creative thinking, and the ability to complete an animation project from pre-production to post-production.

To validate H1–H4 hypotheses, the specific characteristics of the courses "*History of Animation*," "*History of Video Games*," and "*Stop Motion*" were examined, and then hypotheses were tested between 2023 and 2025 on a sample of 143 students, according to the following model.



**Emphasis on an innovative learning environment:**

- non-linear cycle
- emphasis on cognitive, metacognitive, affective, and social learning strategies
- educational technology




**Constraints:**

- linear cycle, emphasis on learning style
- Focus on cognitive processes
- developed research infrastructure
- time/human resource constraints
- neglect of collaborative learning

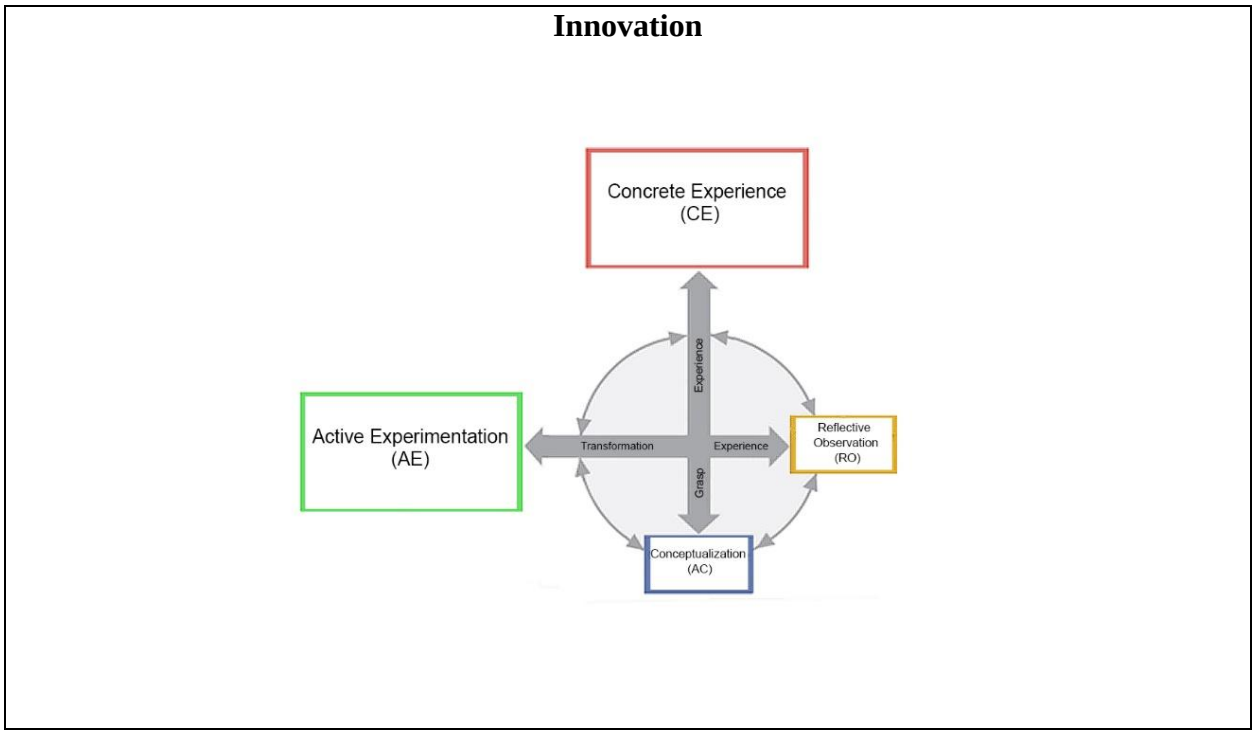


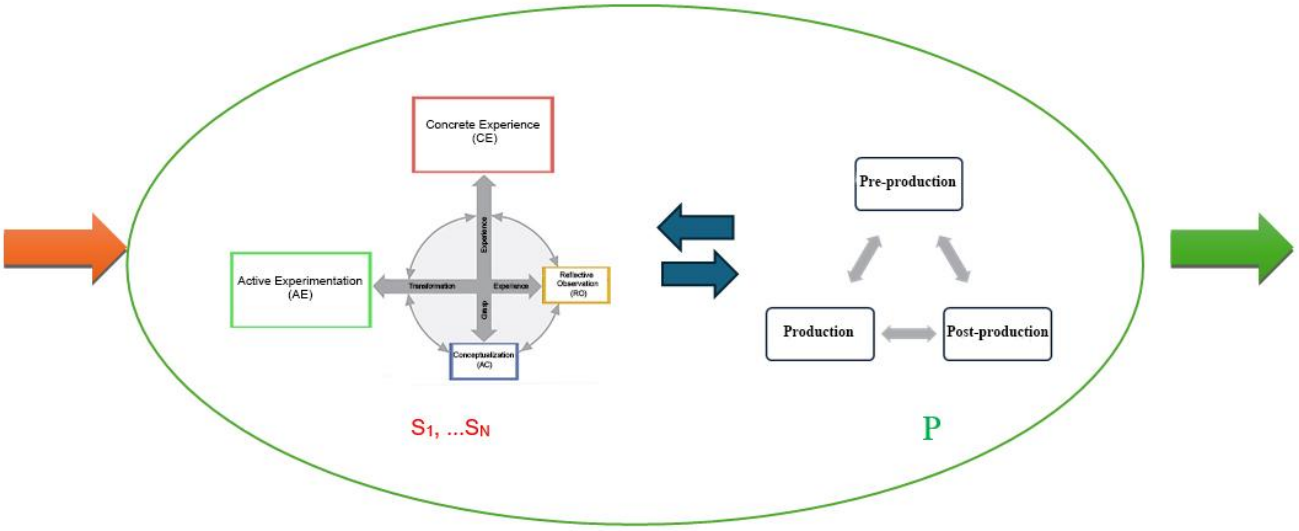

**Fig. 2.1. Conceptual model for designing learning environments with visual narratives**

The conceptual model for designing learning environments with visual narratives proposes a theoretical framework that integrates elements of visual storytelling with innovations in instructional design. The emphasis is placed on building an innovative learning environment and prioritizing cognitive, metacognitive, affective, and social learning strategies. Learning through visual narratives is a flexible process in which each component contributes to the development of professional competencies. These interconnected components constitute the essence of an effective educational technology, provided that the infrastructure is sufficiently developed to support the implementation of technologies and to facilitate interaction among students, instructors, and digital interfaces.

The model was conceptualized for the courses "*History of Animation*" and "*Stop Motion*." Within these courses, emphasis was placed on instructional design and the development of curricular materials from the instructor's perspective, as well as on monitoring the learning process and learning outcomes from the student's perspective. This approach is grounded in the understanding that "*visual pedagogy has its roots in cognitive and constructivist learning theories*" [14] and in the fact that narratives are learning tools that facilitate critical thinking and enhance creativity, we emphasize that a learning environment based on visual narratives can support the complex process of deep learning.

The educational technology of an innovative learning environment with visual narratives represents a set of strategies, methods, tools, resources, procedures, and pedagogical techniques for instructional design, organization of the learning process, and evaluation of the conceptual

framework from the students' perspective. Due to the emphasis on visual narratives, learning becomes experiential, multisensory, multimodal, and constructivist, with students serving as active participants in both the learning process and the assessment of learning outcomes. This technology involves not only the use of digital creative tools but also the rigorous design of the learning space, which leverages cognitive processes such as analysis, synthesis, and critical reflection (Fig.2.2).




***Basic competencies***

**Innate abilities,**

**Ability to draw**

***Professional competencies***

**Technical skills**

**Hard/soft skills**

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**Fig. 2.2. The technology of an innovative learning environment with visual narratives**

The technological process of constructing an innovative learning environment with a focus on visual narratives includes three distinct phases: pre-production, production, and post-production. In the pre-production phase, the visual narrative learning environment is designed, with emphasis on the students' intrinsic motivation to find inspiration and develop the idea for an engaging scenario featuring memorable characters and impactful storylines. This phase is composed of sub-phases for preparing the final project, including the creation of characters, backgrounds, and an animatic—a simplified version of the animation with sound used to test the timing and sequence of scenes.

*In the production phase,* character design is approved, and the project is realized through live-action filming on a film set or within a learning space established for production. During this phase, the visual guide (storyboarding) is created, the artistic concept and thematic music are developed, and voices are recorded as needed. Characters, backgrounds, sets, and props are constructed, and the camera setup is established, including cinematographic angles and lighting

sources. The storyboarding technique facilitates the creation of shots and panels, ensures the synchronization of dialogues, facial expressions, and movement details, and allows for adjustments to visual elements and narrative sequences before the finalization of the drawings.

*Post-production* is the phase in which the design of sound and background music, visual effects editing, dialogue recording, sound mixing, and the final assembly of the audio-visual narrative take place. Sound and music environmental design involves decisions regarding background sounds and sounds accompanying specific actions, as well as the recording and editing of dialogues, completion of the musical composition, sound mixing for volume and panning, and editing of special effects, including Foley. The purpose of these processes is to create an atmosphere consistent with the scenario, enhance the narrative's message, and intensify the visual impact of the production. Additionally, post-production allows for final adjustments to timing, pacing, and transitions, ensuring that all visual and auditory elements work together seamlessly. This phase also provides an opportunity to refine the emotional and narrative flow, maximizing audience engagement and reinforcing the intended educational or storytelling objectives.

In didactics, the instructional design of curricular materials and lessons can be correlated with the phases of experiential learning. In this context, learning strategies include methods, procedures, and techniques related to ideas for visual narratives, content, processes, and criteria for evaluating completed projects. A central element of instructional design is the production of a making-of video by the group of students. Students also develop an ArtBook, in which they detail the work process, visual sequences, project information, team composition, challenges encountered, and creative solutions applied. The creation of an ArtBook is crucial for documenting the entire creative process and synthesizing the efforts invested, serving as a portfolio for each team.

The experimental design approach aims to test the conceptual model for learning environments with visual narratives, as well as the technologies associated with this innovative environment, from the students' perspective. It involves evaluating the impact of visual narratives on the quality of the learning process and on the development of students' visual competencies. The choice of experimental design is based on the need to test the effectiveness of using comic strips and animated cartoons as innovative learning environment by comparing results obtained before and after the implementation of the instructional intervention based on Kolb model and identifying causal relationships between the *independent variables* (use of visual narrative learning media – comic strips and animated cartoons) and the *dependent variables* (emphasis on innovation, creativity, and critical thinking). The experimental approach focuses not only on measuring the learning outcomes of the instructional intervention but also on gaining a deep understanding of the creative and conscious learning process from the perspective of the participants involved.

The experimental group consisted of students participating in instructional activities dedicated to the development of innovative learning environments, in which comic strips and animated cartoons were used. Participants in the pedagogical experiment were engaged in practical sessions focused on the creation and analysis of these innovative learning environments through storyboarding exercises, simple animation, and the application of universal principles of animation production. The control group is of students following traditional teaching methods. In this case, instructional activities focused on adhering to the curriculum and included classical teaching and assessment methods.

Within the experimental approach, quantitative methods (questionnaires) and qualitative methods (analysis of student-created products based on predetermined criteria) were applied. This combination allowed for the evaluation of the flexibility of the innovative learning environment, both in terms of the results achieved by students and their perceptions of the quality of the visual narratives produced within the innovative environment. *Instructional activities* were organized in stages, including the presentation of the course content, methodology, and assessment; critical analysis of visual narratives created using various techniques and from different periods; practical group activities; and feedback and evaluation. The control group followed traditional teaching methods, designed to compare the effectiveness of innovative approaches used in the experimental group.

Conceptual learning represents a bridge between learning as a reflective cognitive process and learning as the result of action. This type of learning emphasizes critical thinking and the practical applicability of acquired knowledge and can be effectively applied in school didactics. To validate this idea, as well as the general research hypothesis, a first secondary hypothesis was formulated:

**H1: Comic strips and animated cartoons facilitate conceptual learning.**

In this context, during the pre-testing, the experimental group benefited from innovative instructional methods based on comic strips and animated materials, with continuous monitoring of their performance throughout the learning process. The educational technology, referred to as the technology of an innovative learning environment with visual narratives, emphasizes the practical execution of learning activities by each student, as well as the evaluation of the effectiveness of the instructional process and its outcomes. In contrast, the control group was exposed to traditional teaching methods, and their performance was assessed through a formative evaluation test (mid-semester) and a summative evaluation test (end of semester). To validate the secondary hypothesis, two case studies were conducted: the first with the experimental group and the second with the

control group. Statistical data analysis highlights an improvement in the performance of students in the experimental group, attributable to the emphasis on innovative instructional methods.

**H2. Character illustration used to reinterpret the fundamental principles of classical animation enhances attention to detail and contributes to the critical thinking of art students.**

In the experimental framework, the instructor introduces students to the character Droopy the dog as a reference element from the period in which the principles of classical animation were established. Students carefully analyze the character and then select one of the twelve classical principles to represent in their own drawing. This objective is achieved through the internalization of the *Droopy* character by all students and the visual expression of a single principle in their work. The instructor then selects the most successful drawings and asks students to justify the representation of the chosen principle using a "Reflection Questionnaire on the Fundamental Principles of Classical Animation," in which responses are measured on a Likert scale from 1 (very poor) to 5 (excellent).

The data were statistically analyzed using Microsoft Excel. For each principle, the following indicators were calculated: mode (the most frequently occurring value in the students' responses), median (the middle value in an ordered data set), mean (the average value of the analyzed data set), and standard deviation (a measure of the dispersion of values relative to the mean). The data analysis indicates that students positively evaluated the representation of all principles.

In general, it was proven that correctly created and identified visual elements facilitate memory retention, reduce frustration and cognitive fatigue, and make the process of learning animation principles more enjoyable, relaxed, and memorable. Comparative analysis of responses indicates that the most accurately applied principles are continuous action, squash and stretch, and appeal.

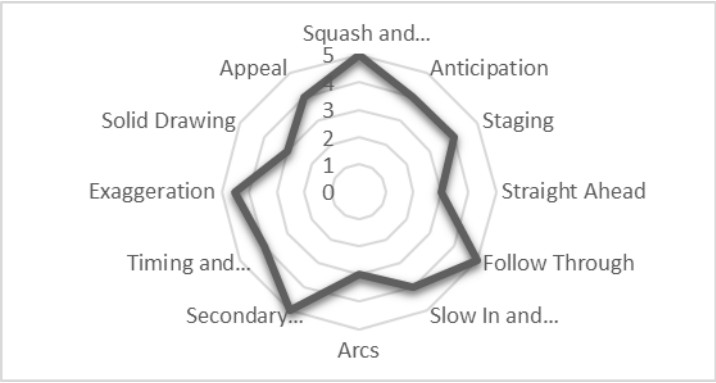


**Fig. 2.3. The most accurately applied principles**

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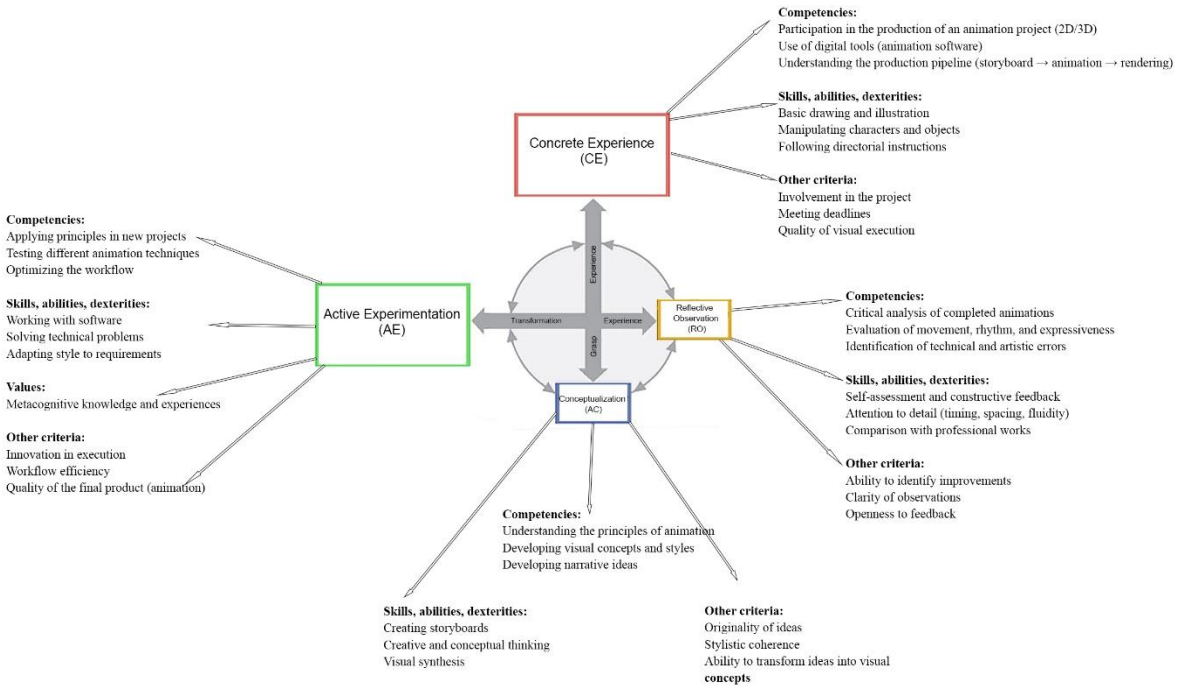
**Chapter 3. "The Didactic Technology for Creating an Innovative Learning Environment through Visual Narratives,"** describes visual literacy as a form of critical analysis

or as a competence, explains the correlation between visual literacy competence and the innovative didactic process, presents the methodology of the course *History of Animation* based on David Kolb's model and the methodology of the course *Stop Motion* based on Kolb's revised model, and describes the impact of the educational intervention carried out on the basis of Kolb's model.

The instructional technology for constructing an innovative learning environment essentially consists of the implementation of a didactic model based on Kolb's theory, which conceptualizes teaching activity as a visual, digital, and participatory experience for students. Such an approach provides a methodological framework for developing a learning environment in which comic strips and animated cartoons play a central role. The emphasis of this technology is on the development of learning outcomes, particularly in terms of students' visual literacy skills.

The integration of comic strips and animated cartoons into an innovative learning environment within the instructional process of visual narratives demonstrates the teacher's ability to stimulate interest, curiosity, and intrinsic motivation in art students, fostering their active engagement in the learning process. Accordingly, comic strips and animated cartoons serve as powerful learning tools, supporting the development of students' digital, social, critical, and analytical skills. The pedagogical experiment was conducted in three stages, aligned with the phases



of 2D animation production, following the established methodology for creating comic strips and animations.

*© developed by the author*

**Fig. 3.1. Expanded conceptual model for the design of learning environments based on visual narrative**

*In the initial observation phase*, a pre-test was administered to evaluate students' motivation to learn in an innovative environment, concurrently with the pre-production phase, which involved selecting the theme, establishing pedagogical objectives, creating the foundations for the project scenario and storyboard, selecting techniques, assigning roles, and identifying the necessary resources (teaching materials, educational software, drawing tools). During the intermediate phase, students in the experimental group participated in innovative educational activities. The evaluation phase involved comparing students' outcomes and assessing them based on a methodology inspired by Kolb's experiential learning theory, including the assembly of frames, integration of sound effects and final elements, review and correction of details, presentation of the project to peers and the instructor, collection of feedback, and analysis of individual reflections.

Individual study plays a crucial role in the didactics of visual narratives. It represents one of the essential pillars for developing artistic skills, as it enhances visual perception and critical thinking, facilitates artistic reflection, and strengthens technical competencies, given that visual narratives require abilities in drawing, photography, montage, and digital editing. At the same time, individual study involves not only the accumulation of knowledge but also the development of a distinct artistic voice, which cannot be achieved solely through group activities.

Individual study fosters autonomy and responsibility. In the absence of direct supervision, students are required to analyze their own visual production, compare their experiences with those of others, observe their own progress, and identify areas for improvement. This process of self-assessment contributes to artistic maturation and cultivates a genuine relationship with the creative process. For example, individual analysis of works from the Maus series can lead to an understanding of how images and text complement each other to construct meaning.

The use of artificial intelligence for generating visual narratives, aimed at creating an innovative learning environment, cannot replace the importance of teaching activities in the development of practical skills. This idea is further supported and expanded through the analysis of art students' attitudes, based on the questionnaire "*The Use of Storyboarding and Digital Technologies in the Animation Learning Process*." The analysis of the obtained data highlights that artificial intelligence becomes truly effective when it is integrated in combination with active learning methods. These include expressing personal opinions, preparing papers and presentations

based on predetermined criteria, carrying out creative or practical exercises grounded in the studied topics, as well as viewing and critically analyzing reference films.

The most effective teaching methods include creative or practical exercises, the expression of personal opinions within discussions that emphasize the importance of dialogue, reflection, and critical thinking, as well as the viewing and critical analysis of reference films. The teacher guided students in identifying and exploring new techniques, including those involving artificial intelligence, thus facilitating a learning environment in which students are encouraged to take responsibility for creativity and innovation. A key condition is that the teacher remains open to dialogue and to questions from students. Therefore, a paradigm shift can be observed, in which traditional animation techniques are gradually being replaced by methods of content generation supported by AI.

The use of artificial intelligence for generating visual narratives requires not only technical skills but also a shift in mindset and in the way learning processes are approached within curricular frameworks. The fact that more than one-third of the total number of students responded “possibly, yes” (38.9%) and “no” (22.2%) indicates that these students are not sufficiently familiar with AI technology or do not yet perceive its benefits for their chosen profession. Students are aware of the limitations of artificial intelligence and acknowledge the value of human artistic intervention. Their critical attitude suggests that AI functions as a learning partner, integrated into complex educational and technological processes.

The experimental research conducted during the second stage of the pedagogical experiment was based on the study of innovative methods that can be applied in the Stop Motion course. The research sample consisted of two groups: (a) the experimental group – students enrolled in the Stop Motion course who experienced the innovative learning environment based on visual narrative, and (b) the control group, in which the teaching process was carried out using traditional methods. During the first stage, it was observed that students in the experimental group achieved better results.

The most notable innovation lies in the development of students’ research skills, which enable them to apply the methods and techniques learned in the academic environment to professional contexts. This is achieved through conducting a mini-research project based on the reference book History of Animation by Maureen Furniss, followed by the substantiation and deepening of new ideas through searches in Google Scholar and ERIC. A necessary and sufficient condition for the mini-research to be considered valid is that it must be original, completed individually, and free from reproduction or paraphrasing. Subsequently, students are involved in

computerized assessments carried out using Google Forms or Quizizz and integrated into Google Classroom.

To ensure the sustainability of the assessment method, the grading system for the course has been improved. Thus, the final course grade consists of 60% from the final exam and 40% from the cumulative score of ongoing academic activities (assignments, tests, and mini-research projects). A particular emphasis was placed on evaluating the quality of this process from the students' perspective, especially regarding their ability to engage in reasoned communication and their attitude toward innovation, as reflected in interactive debates.

**H3: *If* the methodology of the History of Animation course is designed based on David A. Kolb's model, then students are likely to gain a better understanding of the evolution of animation and develop critical thinking skills, as well as the ability to apply theoretical knowledge in practice.**

The hypothesis was demonstrated through the conceptualization of a new curriculum for the "*History of Animation*" course, developed by incorporating a non-traditional didactic model, referred to as the experiential learning model. This model describes a linear sequence of stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation. From our perspective, experiential learning cannot be fully realized based on strictly linear models of thinking.

The curriculum of the „*History of Animation*" course includes ten practical and creative exercises, titled: H*andcrafting a Zoetrope; Creating a cut-out composition inspired by Georges Méliès – The Astronomer's Dream* (1898); *Designing a character in the cut-out technique based on J. Stuart Blackton's Humorous Phases of Funny Faces* (1906); *Exercise inspired by Émile Cohl; Self-portrait in the style of Lotte Reiniger* (1920s–1930s); *Designing the female prototype of the character Popeye*; *Drawing iconic characters from memory – MICKEY MOUSE*; *Redrawing an iconic character (e.g., Droopy, 1943*) and illustrating it using one of the 12 selected principles of animation and *A day in the life of a student at FAVD.*

A storyboard on a social theme aims to develop visual expression skills. The quantitative summary of the average responses indicates that the most effective exercises for creating an innovative learning environment are Droopy, the social theme exercise, and creating a cut-out composition inspired by Georges Méliès. This is because these activities allow students to understand techniques for clearly conveying movement or the specifics of a social message.

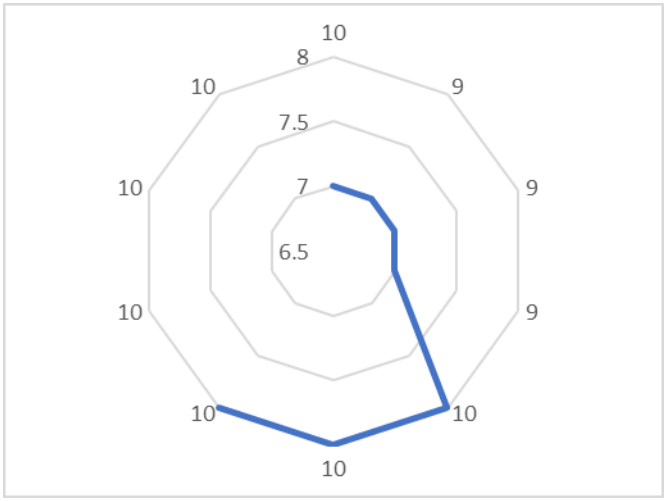



**Fig. 3.2. The prevalence of the social theme and classical animation principles**

*© developed by the author using Microsoft Excel*

Visual arts students show a greater appreciation for traditional comic strips and animation compared to creative reinterpretations. These data demonstrate that students engaged in an innovative learning environment structured according to Kolb's model, and they reflect a deeper understanding of the evolution of animation. This is because they learned through active experience and reflection, and animation is a field that benefits greatly from the application of these principles.

**H4. *If* the teaching methodology of the Stop Motion course incorporates Kolb's revised model, *then* students are likely to develop practical skills, creative thinking, and the ability to complete an animation project from pre-production to post-production more effectively.**

The methodology of the Stop Motion course is based on an innovative learning environment with visual storytelling. The teaching activities involved seven teams, each consisting of 37 members, who performed various roles: storyteller, storyboard artist, character designer, director, 2D/3D animator, video editor, and sound editor. Another method employed is project-based learning, in which students create a short film with a duration of at least 30 seconds and a maximum of 1 minute and 30 seconds. The project is carried out in teams, with each participant assigned a strictly defined role. Each team has the opportunity to select one of the Stop Motion techniques. Summative assessment was conducted through the analysis of the short film, based on the criteria of the teacher.

The results of the Stop Motion course were evaluated using the questionnaire Reflections on the Stop Motion Animation Course (2024 edition), which focuses on students' self-assessment of their experience within the pedagogical experiment in relation to the learning process. The questionnaire, consisting of 16 questions, showed that the majority of students rated the experience as excellent,

emphasizing the development of teamwork skills and the creation of sets and characters. Students' interest was concentrated on learning through action and direct experimentation, and the practical workshops were considered effective in promoting reflective observation and hands-on exercises. The most challenging stage was frame-by-frame photography. Visual methods were essential for clarifying ideas. Overall, the course was found to be useful, practical, and motivating, provided that the teaching design emphasizes teamwork and time management.

Comic strips and animation represent complex visual tools that combine images, text, sequential narrative, and dynamics, providing an ideal framework for experiential learning, including collaborative learning and assessment methods. These forms of visual storytelling can be transformed into innovative and interactive learning environments that require cooperation, negotiation of meanings, reflection, coordination of efforts, and collective decision-making.

The most effective methods are collaborative learning and collaborative assessment. The visual narrative construction project method incorporates elements of problem-based learning. To implement this method, it is essential to follow the stages of identifying the problem, defining the theme and objectives of the course project, planning the project as a strategy and tactics, carrying out the practical activities of the project in a team, and finally presenting, self-assessing, and evaluating the project using a peer-to-peer assessment approach.

### 3.4. The impact of the educational intervention based on Kolb's model

The teaching methodology developed based on Kolb's experiential model, as well as the methodology constructed according to the revised version of this model, aimed to stimulate a teaching process for developing visual literacy competence within an innovative learning environment. This process follows four interdependent stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation.

The impact of the educational intervention on the experimental group was analyzed at the post-test stage using the questionnaire Peer Assessment – Stop Motion Project (confidential), developed in Google Forms. Peer assessment is a formative evaluation method in which participants in a shared activity evaluate each other's performance or the products created within the activity, based on predetermined criteria such as creative ideas and proposals, actual work contribution, creation of sets/characters, editing and sound, organization, and communication.

The statistical data obtained for the task "Evaluate each teammate's contribution according to the presented criteria" are shown graphically in Figure 3.3.

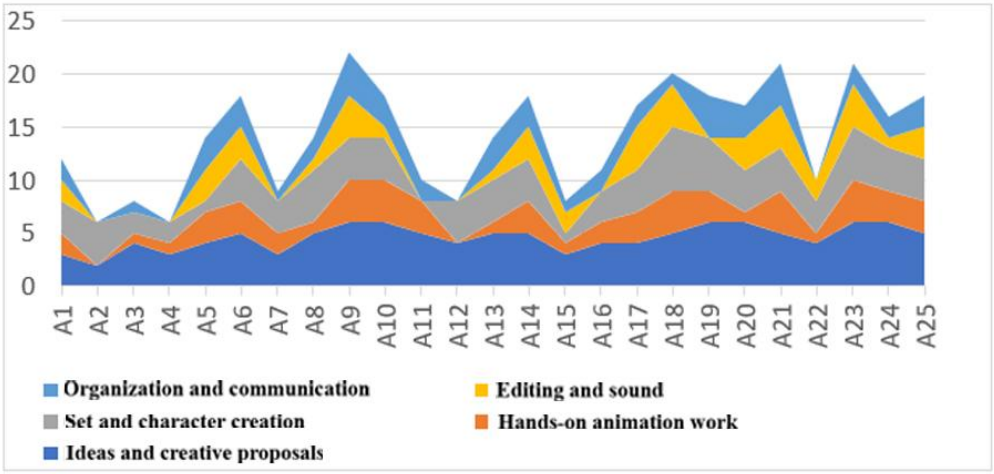



**Fig. 3.3. Graphical distribution of responses to the task "Evaluate each teammate's contribution according to the presented criteria."**

The analysis of the educational intervention, according to Kolb's model, shows that practical experience specifically enhances responsibility. In cases involving narrowly defined roles, situational factors emerge, such as protecting group cohesion, avoiding negative evaluations, and resistance to social pressure. Most students engaged in active experimentation, but remained at the level of personal observation without fully progressing through all the stages of experiential learning theory.

The need to participate in activities involving visual narratives is not consciously recognized by the majority of students, and comic strips are variably appreciated, ranging from "interesting" to "neutral," being seen primarily as a tool for exercising creativity and stimulating introspection. Nevertheless, the success of this approach depends on the teacher's competencies and the specific subject matter taught. Comic strips facilitate learning and foster artistic development, catalyzing creativity and inspiration.

Practical activities and creative exercises using comic strips and animation contribute to the creation of an innovative learning environment. The teaching methodology developed based on Kolb's experiential model, as well as the methodology constructed according to the revised version of this model, aimed to stimulate a teaching process for developing visual literacy competence within an innovative learning environment. This process follows four interdependent stages: concrete experience, reflective observation, abstract conceptualization, and active experimentation.

Animation becomes a learning environment when it incorporates creativity, active learning, teamwork, critical thinking, and accessibility. The analysis of the cognitive, metacognitive, affective, and social dimensions of an innovative learning environment depends on the learner's

engagement in the following stages: concrete experience (learning through action), reflective observation (analysis of knowledge and metacognitive experiences), abstract conceptualization (correlating previous experiences with general principles), and active experimentation in group projects. In art pedagogy, this objective is achieved through the understanding of theory and the application of theoretical knowledge via cognitive, metacognitive, affective, and social learning strategies.

## GENERAL CONCLUSIONS AND RECOMMENDATIONS

The doctoral thesis Comic Strips and Animation as an Innovative Learning Environment aims to explore and substantiate the epistemological foundations for the use of comic strips and animation as innovative learning media from the perspective of school pedagogy across educational levels and disciplines. This aim was pursued through the following research objectives:

a) *exploration of the epistemological foundations* for development and dissemination of comic strips and animation as an innovative learning environment, through the analysis of the historical development of basic concepts, technologies, and their impact on visual literacy;
b) *study of the diversity of pedagogical theories* for the instructional design of innovative learning environments, with an emphasis on visual literacy, including the identification and analysis of the most relevant theories based on which the model, hypotheses, and corresponding pedagogical approach will be constructed;
c) *design, development, and validation of the didactical model* of visual narrative as an innovative learning environment for students in the visual arts, through experimental studies supporting the sustainable integration of these visual media into the curriculum.

**Research Hypothesis:** *If* comic strips and animation are used as an innovative learning environment in the training of animation students, *then* they will more effectively develop conceptual learning, critical thinking, creativity, and practical skills.

The exploration of epistemological foundations from philosophical, psychological, pedagogical, cybernetic, and managerial perspectives allows for the observation of a new educational paradigm, marking the transition from pedagogy centered on static images to a transformative pedagogy focused on changing participants' thinking, perceptions, and attitudes in the instructional-educational process. The definition of the learning environment has evolved from the concept of a school educational environment to that of a learning environment, reflecting a more complex approach centered on the student's learning process and their involvement in evaluating the quality of the environment. The innovative learning environment integrates various

technologies, including educational technologies, which support the instructional process, facilitate the acquisition of competencies, and are multimodal. However, the nature of this environment, with or without visual narratives, changes according to the evolution of educational technologies, continuously adapting to new digital tools and teaching methods.

Comic strips represent an innovative learning environment because, as a form of visual narrative, they allow for overcoming linguistic barriers and stimulate students' positive emotions, imagination, and creativity. In the Republic of Moldova, comic strips have been known since the 1960s, particularly through comic books illustrated by Sergiu Puică and through cartoons published in the magazines *Chipăruș / Крокодил* and *Alunelu*l. However, to analyze the long-term impact of comic strips, including in Moldova, it is important to note that while the principles of comic strip creation have remained the same, the characteristics of the medium have changed over time.

Animated cartoons represent a form of visual art and entertainment that uses moving images, typically created through drawing or digital animation, to tell a story or convey a message, often with educational impact. The main differences between comic strips and animation relate to format, presentation mode, the illusion of movement, and storytelling approach. Comic strips generally use a continuous story told through static images, whereas animation conveys the narrative through sequences of animated frames, often culturally diverse.

Theoretically, the paradigm of visual learning is based on the idea of learning through visual stimuli (behaviorist theory) and on the principles of cognitive constructivism. In practice, to validate the secondary hypotheses, the specificity of the courses History of Animation, History of Video Games, and Stop Motion was studied, along with the constraints of Kolb's theory and the particularities of a learner-centered learning environment (non-linearity, active learning, collaborative environment, project-based learning method).

Subsequently, the teaching model of visual narrative environments was developed, on the basis of which the experimental approach and the technology of the innovative learning environment with visual storytelling were designed. The technology comprises three phases: pre-production, production, and post-production.

The instructional design of an innovative learning environment is based on four fundamental hypotheses validated experimentally: comics and animated films facilitate conceptual learning; character illustration, used for the reinterpretation of the fundamental principles of classical animation, stimulates attention to detail and contributes to the development of critical thinking among arts students; if the methodology of the *History of Animation* course is designed according to David Kolb's model, students will gain a deeper understanding of the evolution of animation and will develop both critical thinking and the ability to apply theoretical knowledge in practice; and the

integration of Kolb's revised model into the instructional methodology of the *Stop Motion* course will contribute to a more effective development of practical animation skills, creative thinking, and the ability to produce a complete animation project, from pre-production to post-production.

The instructional design of an innovative learning environment is based on four fundamental hypotheses validated experimentally: comics and animated films facilitate conceptual learning; character illustration, used for the reinterpretation of the fundamental principles of classical animation, stimulates attention to detail and contributes to the development of critical thinking among arts students; if the methodology of the *History of Animation* course is designed according to David Kolb's model, students will gain a deeper understanding of the evolution of animation and will develop both critical thinking and the ability to apply theoretical knowledge in practice; and the integration of Kolb's revised model into the instructional methodology of the *Stop Motion* course will contribute to a more effective development of practical animation skills, creative thinking, and the ability to produce a complete animation project, from pre-production to post-production.

The validation of the hypotheses through statistical data allows the assertion that instructional design based on Kolb's model or the extended model constitutes a demanding yet methodologically sound approach, demonstrating superior effectiveness compared to traditional teaching strategies. Data for the validation of the second hypothesis were collected through a Reflection Questionnaire on the Principles of Classical Animation using a Likert scale (1–5).

The data analysis shows a positive trend in the application of classical animation principles. All principles were applied effectively, and the characters were considered coherent and credible. Droopy was perceived as attractive and expressive. The hypothesis is supported by the collected data: high mean values and statistical consistency. Character illustration facilitated observation and analysis of details, which are essential for the application of animation principles.

The subsequent hypothesis was validated through the instructional design of a process for creating an innovative learning environment in which ten practical exercises with a creative aspect were implemented. Students' opinions regarding the quality of their completion were then assessed. It was demonstrated that students not only understand the conceptual foundations and historical development of animation creation but also develop knowledge, skills, and visual literacy competencies, including observation and critical analysis, in innovative learning environments. For validation of the hypothesis, a learning environment was designed emphasizing collaborative learning, peer-to-peer assessment, and case study analysis. The evaluation of the model was conducted using data from the online questionnaire, which supports the practical value of the experiential learning model.

## RECOMMENDATIONS:

1. Theoretical courses with a visual focus (e.g., History of Animation, History of Video Games) should be pedagogically designed based on Kolb's experiential learning model to facilitate reflection in critical thinking and to stimulate creativity.
2. Practical courses with a visual focus (e.g., Stop Motion) should be pedagogically designed based on Kolb's extended experiential learning model to facilitate the development of soft skills, such as argumentative communication, collaborative assessment, and the creation of the final product in relation to digital competencies.
3. Visual narrative environments are well-suited for project-based activities, teamwork, and interdisciplinary or transdisciplinary approaches. These contexts are valuable for developing collaboration skills, responsibility, and creative problem-solving abilities.
4. The sustainability of innovative learning environments can be ensured through the organization of thematic courses, workshops, and programs focused on creating visual narratives, as well as through pedagogical methodology based on Kolb's experiential learning model and its extension, applicable to learning environments in which projects are developed.

Comic strips and animation can be used to develop visual literacy competence across all educational programs, as these innovative learning media contribute to the interpretation of visual messages and the development of critical thinking.

# BIBLIOGRAPHY


1. YILDIRIM, M., ŞIMŞEK, U. A Study on the Use of Creative Comics and Cartoons in a Social Studies Course: A Mixed Methods Research Design. *Journal of Social Sciences & Humanities*, 2025, 33(2), 827-849.

2. VAN DER SLUIS, H. Visual narratives in higher education: a scoping review of comic, manga, graphic novels and cartoons as educational tools. *Journal of Learning and Teaching in Higher Education*, 2025, 18(1), 86-108.

3. UNESCO Strategy on Technological Innovation in Education (2022–2025). Chişinău, 2024 [cited 5.01.2024]. Available: https://unesdoc.unesco.org/ark:/48223/pf0000378847

4. European Education Area. Digital Education Action Plan (2021-2027). Chişinău, 2024 [cited 2.06.2024]. Available: https://education.ec.europa.eu/focus-topics/digital-education/plan.

5. ATCHIA, S., GUNOWA, M. Use of concept cartoons within the conceptual change model to address students' misconceptions in biology: a case study. *Journal of Biological Education*, 2025, 59(1), 162-180.

6. MORGAN, H. Using Political Cartoons to Promote Learning and Motivation. *The Social Studies*, 2025, 1-8.

7. VON BERTALANFFY, L. The history and status of general systems theory. *Academy of management journal*, 1972, 15(4), 407-426.

8. KUNZLE, D. The first Ally Sloper: the earliest popular cartoon character as a satire on the Victorian work ethic. *Oxford Art Journal*, 1985, 8(1), 40-48.

9. RASMET, R. R., SHAAFI, N. F., SHARIF, S., NASIR, S. M., SALLEH, M. F. The Impacts of Comic-Based Learning on Student Engagement in Primary Education: A Systematic Literature Review. *Citra Journal of Innovative Education Practices* (2025), 1(1), 26-39.

10. TIPA, V. Magia filmului de animație. Etape, tehnici, personalități ale animației moldovenești. Chișinău: Epigraf, 2020 (Tipografia Bons Offices). ISBN 978-9975-60-379-9.

11. McCLOUD, Scott. Reinventing Comics: How imagination and technology are revolutionizing an art form. New York: Harper Perennial, 2000. Print. Chişinău, 2023 [citat 15.11.2023]. Disponibil: https://archive.org/details/reinventingcomic0000mccl

12. ADAM, J. The narrative sequence: history of a concept and a research area. In *Colloque international*. Chişinău, 2022 [citat 15.11.2022]. Disponibil: https://serval.unil.ch/resource/serval:BIB_11BB1746D849.P001/REF.pdf

13. DISNEY, Walt. Animated cartoon. *Health Education Journal*. 1955, 13(1), 70-77.

14. XIAOYN, Zhang, BEXCI, Manual Selvaraj. Enhancing educational outcomes through visual pedagogy: the role of perceptions and engagement in multiliteral classrooms. *An International Journal of Art & Higher Education A Refereed Research Journal*, 2024, 13(1), 139-143.

## LIST OF THE AUTHOR'S PUBLICATIONS ON THE THESIS TOPIC

**1. Articles in Scientific Journals:**

1.1. ***In journals included in the National Register of Scientific Journals (with category)***

1.1.1. **RAILEAN, S.** Banda desenată ca mediu inovativ de învățare / The comic strip as an innovative learning medium. În Revista *Moldoscopie,* 2025, pag.144-150 https://ibn.idsi.md/ro/vizualizare_articol/236131 (cat.B)

1.1.2. **RAILEAN, S.** Evoluția narațiunii vizuale: banda desenată și desenul animat între istorie și transformare digitală / The evolution of visual narrative: comics and animation between history and digital transformation. În Revista Științifică de Pedagogie și Psihologie, În: *Univers Pedagogic*, nr. 4, 2025, pag. 78-83, https://ibn.idsi.md/ro/vizualizare_articol/241447 (cat.C)

1.1.3. **RAILEAN, S**. Contextul mediului inovativ de învățare în era comunicării audiovizuale și a digitalizării. În: *Univers Pedagogic*, 2026, nr. 1(89), pag. 72-77. ISSN 1811-5470. DOI: https://doi.org/10.52387/1811-5470.2026.1.11 (cat.C)

**2. Articles in the Proceedings of Conferences and Other Scientific Events**

2.1. ***In the Proceedings of Scientific Events Indexed in the SCOPUS Database***

**2.1.1. RAILEAN, S., SIMAC, A.** From instructional design to social learning design: A paradigm shift in animation education. *International Conference on Virtual Learning*, 2026, ISSN 2971-9291, ISSN-L 1844-8933, vol. 21, pag. 275-286. https://doi.org/10.58503/icvl-v21y202624, București

2.2. ***In the Proceedings of International Conferences***

2.2.1. **RAILEAN, S., SIMAC, A.** The innovative animation strategies as a tool for transformative pedagogy / Strategiile inovatoare de animație ca instrument pentru pedagogia transformativă. În *Higher Education: Traditions, Values, Perspectives* (International Scientific Conference, 19-20 September 2025, Chișinău, Vol. 1, pp. 292-299). Chișinău: UPS „Ion Creangă". https://doi.org/10.46727/c.v1.19-20-09-2025.p292-299, Vol.1. 2025. Chișinău. ISBN 978-9975-48-317-9

2.2.2. **RAILEAN, S.** Animation in educational innovation: historical, hybrid and global perspectives. În: *Materialele conferinței științifice internaționale* Design, Visual Art & Creativity: Modern Trends and Technologies : Proceedings of IVth International Scientific and Practical Conference (12th of December 2025) / Zaporizhzhia National University. Zaporizhzhia : ZNU, 2025, DVAC'2025 - Proceeding Vol. 3, pag. 21-24, DOI : 10.5281/zenodo.17937846, https://zenodo.org/records/17937846

2.3. **Conference Abstracts**

2.3.1. **RAILEAN, S.** Istoricismul bandei desenate și a desenului animat în educația școlară / The historicism of comics and cartoons in school education, Pag. 21-21 Conferința Moldavian-Polish-Romanian Internațional Scientific Congress "Education, Policies, Society", Chișinău, Moldova, 13-15 martie 2023 https://ibn.idsi.md/ro/vizualizare_articol/208935

## ADNOTARE

**Stela Railean, Banda desenată și desenul animat ca mediu inovativ de învățare, teză de doctor în științe ale educaţiei, Chișinău, 2026**

**Structura tezei:** introducere, trei capitole, concluzii generale şi recomandări, bibliografie din 150 titluri, 18 anexe, 75 de figuri, 13 tabele. Rezultatele obținute sunt publicate în 6 lucrări științifice.

**Cuvinte-cheie**: banda desenată, desen animat, mediu inovativ de învățare, pedagogie transformativă

**Scopul lucrării**: explorarea și argumentarea fundamentelor epistemologice a benzii desenate și a desenului animat ca medii inovatoare de învățare.

**Obiectivele cercetării**: a) explorarea fundamentelor epistemologice ale elaborării și diseminării benzii desenate și a desenului animat ca medii inovatoare de învățare, b) studiul diversității teoriilor pedagogice de proiectare didactică a mediilor inovative de învățare și c) validarea modelului didactic al narațiunii vizuale ca mediu inovativ de învățare pentru studenții de la arte vizuale.

**Noutatea şi originalitatea științifică**: identificarea, definirea și validarea modelului pedagogic de utilizare a benzii desenate și a desenului animat ca mediu inovativ de învățare.

**Rezultatele obținute** care contribuie la soluționarea unei probleme științifice importante sunt: a) fundamentarea utilizării benzii desenate și desenului animat ca mediu inovativ de învățare, b) elaborarea modelului didactic al narațiunii vizuale (banda desenată și desenul animat în baza Teoriei lui Kolb) și c) validarea modelului prin toate trei etape ale experimentului pedagogic și prin analiză critică interpretativă cu implicarea activă a studenților, fapt care a evidențiat eficiența acestuia pentru dezvoltarea competenței de alfabetizare vizuală.

**Semnificația teoretică** constă în consolidarea fundamentului științific privind statutul benzii desenate și al desenului animat ca medii inovatoare de învățare. Cercetarea oferă un cadru epistemologic clar pentru înțelegerea benzii desenate și a desenului animat ca mediu inovativ de învățare pentru exersarea cunoașterii individuale și a mediilor colaborative.

**Valoarea aplicativă** constă în elaborarea și validarea unui model didactic de integrare a benzii desenate și a desenului animat într-un mediu inovativ de învățare. Modelul propus poate fi aplicat în activitățile didactice din învățământul general, profesional și superior, în special în disciplinele artistice, sociale și în proiectele STEM /STEAM.

**Implementarea rezultatelor științifice** a fost realizată în cadrul cursurilor „Istoria animației” și „Stop Motion” de la Universitatea Pedagogică „Ion Creangă”, în cadrul seminarelor tematice organizate la Universitatea din Florida (SUA), precum și în procesul de elaborare a curriculei, cu accent pe proiectarea și validarea mediilor inovative de învățare bazate pe narațiuni vizuale.

## ANNOTATION

**Stela Railean, Comics and cartoons as an innovative learning environment,**

**PhD thesis in educational sciences, Chisinau, 2026**

**Structure of PhD thesis**: introduction, three chapters, general conclusions and recommendations, bibliography of 150 titles, 18 annexes, 75 figures, 13 tables. The results are published in 6 scientific papers.

**Keywords:** comics, cartoon, innovative learning environment, transformative pedagogy

**The purpose** is to explore and argue the epistemological basis of comics and cartoons as innovative learning environments.

**Objectives**: a) exploring the epistemological basis of the development and dissemination of comics and cartoons as innovative learning environments, b) studying the diversity of pedagogical theories of didactic design of innovative learning environments and c) validating the didactic model of visual narrative as an innovative learning environment for visual arts students.

**Scientific novelty and originality**: identifying, defining and validating the pedagogical model of using comics and cartoons as an innovative learning environment.

**The obtained results** that contribute to solving an important scientific problem are: a) the epistemological substantiation of the use of comics and cartoons as an innovative learning environment, b) the development of the didactic model of visual narrative (comics and cartoons based on Kolb's Theory), and c) the validation of the model through all three stages of the pedagogical experiment and through critical interpretative analysis with the active involvement of students, which highlighted its efficiency for the development of visual literacy competence.

**The theoretical significance** is in consolidating the scientific foundation a regarding the status of comics and cartoons as innovative learning environments. The research provides a clear epistemological framework for understanding comics and cartoons as innovative learning environments for practicing individual knowledge and collaborative environments.

**The applied value** consists in the development and validation of a didactic model for integrating comics and cartoons into an innovative learning environment, adaptable to educational stages and levels. The proposed model can be applied in teaching activities in general, vocational and higher education, especially in artistic, social disciplines and in STEM /STEAM projects.

**The implementation of scientific results** was within courses "History of Animation" and "Stop Motion" at the "Ion Creangă" Pedagogical University, within the thematic seminars organized at the University of Florida (USA), as well as in the curriculum development process, with an emphasis on the design and validation of innovative learning environments on visual narratives.

**RAILEAN Stela**

# BANDA DESENATĂ ȘI DESENUL ANIMAT CA MEDIU INOVATIV DE ÎNVĂȚARE

**533. 01 – PEDAGOGIE UNIVERSITARĂ**

Rezumatul tezei de doctor în științe ale educației

**Chișinău, 2026**

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