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Visual, Interactive Narrative in Education:

An Evaluation Instrument for Electronic Learning Resources

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Abstract

This study addresses the critical need for a comprehensive framework to evaluate electronic educational resources for primary school children. It critiques the current superficial assessment of such tools, which often ignores crucial aspects of design, interactivity, and user experience, particularly within the Georgian educational context. The research aims to rectify this by developing a holistic, hybrid evaluation instrument grounded in an interdisciplinary synthesis of game studies, media arts, and educational psychology. Drawing on classical (Huizinga) and contemporary (Juul) game theory, the work establishes a robust theoretical foundation for digital play.

The primary contribution is a practical, four-pillar evaluation instrument designed for multifaceted analysis. The pillars are:

1. Pedagogical Value, ensuring resources are grounded in learning theories like constructivism and support social interaction.
2. Design and Visual Narrative, evaluating the resource's effectiveness as a piece of media art and visual communication.
3. Interaction and Gamification, analyzing the quality of "Meaningful Play" and effective motivational design based on Flow and Self-Determination theories.
4. Usability and User Experience (UX), focusing on intuitive interfaces, emotional engagement, and technical accessibility.

The model's validity is demonstrated through an analysis of nationally distributed Georgian educational resources. Ultimately, this research provides a robust, theoretically-informed tool for educators, designers, and policymakers. It aims to elevate the quality of digital learning by ensuring resources are not only pedagogically sound but also well-designed, intrinsically motivating, and a joy to use.

#Educational Technology (EdTech)
 #interactive narrative #assessment instrument
 #digital pedagogy #primary education
 #georgian education #evaluation framework
 #User Experience (UX) #instructional design
 #learning analytics #game-based learning
 #serious games #gamification
 #media arts #ludology

1. The Nature of Play and Games

1.1. Historical and Philosophical Foundations of Play

Humans have been playing games since time immemorial, indicating the universal and fundamental nature of play. Archaeological evidence supports this, such as ancient Egyptian game boards and pieces for the game Senet dating back to 3500 BC [1]. In his seminal work *Homo Ludens* (1938), Johan Huizinga emphasized the role of play in the development of culture, noting that play is not merely entertainment but an integral part of human civilization. Historical records from ancient Greece also describe various games involving both physical and mental activities. For example, instances from Plato's dialogues (c. 380 BC) show that play, as a cultural phenomenon, has accompanied humanity since ancient times.

1.2. The Distinction Between “Play” and “Game”

In the Georgian language, the word “თამაში” (tamashi) has a dual meaning, referring to both the specific activity (the game) and the process of engaging in that activity (playing). This linguistic nuance is not unique to Georgian. While some languages use similar or identical words, others, like English, make a clear distinction:

- **Game:** A structured activity with rules and objectives.
- **Play:** The process or act of engaging in the game.

This distinction is reflected in various languages:

- **French:** on joue à un jeu – we play a game.
- **German:** man spielt ein Spiel – you play a game.
- **English:** they play a game – they play a game.

1.3. Theoretical Frameworks of Game Definition

The term “game” has numerous definitions, varying across different fields [2]. Game historian David Parlett distinguishes between formal and informal games:

- **Informal Games:** Described as the process of play without pre-agreed rules. Elements of informal play can be observed in the interactions of animals or young children, who use playful elements as a means of communication [3].
- **Formal Games:** Possess a specific structure based on rules and have a defined goal [3].

These games are often based on a form of opposition, where players compete to achieve a certain objective [3].

Philosopher Bernard Suits introduced the term “lusory attitude” to describe the mindset of players. It refers to the voluntary acceptance of artificially created rules and limitations within a game. This voluntary acceptance of inefficient means is what separates a game from a task, where efficiency is paramount [2] [4]. According to Suits, to play a game is “to engage in an activity directed towards bringing about a specific state of affairs, using only means permitted by rules, where the rules prohibit more efficient in favour of less efficient means, and where the rules are accepted just because they make possible such activity” [2]. For instance, using a ladder is forbidden in high jump, and a runner cannot cut across the middle of the track [5].

The lusory attitude involves:

- **Voluntary Participation:** Players engage willingly.
- **Acceptance of Rules:** Players agree to abide by the game's rules, even if they seem illogical outside the game context.
- **Striving for Goals:** Players aim to achieve the game's objectives, which may have no real-world value.
- **Creation of a “Magic Circle”:** The lusory attitude helps create a “magic circle” around the game, a self-contained space where the game's rules and goals are meaningful.

Building on Huizinga's ideas, Roger Caillois described a game as a fictional, non-productive activity bound by rules and limits of time and space [6]. The rules of a game guide players toward actions that are meaningful within the game but may appear nonsensical from the outside [5].

1.4. Play as an Aesthetic and Emotional Experience

At its core, play is an autonomous activity. The classic definition by Huizinga states that play is a voluntary activity where the goal is the activity itself [7]. Frank Lantz expands on this, arguing that when we act within a game, we do

so for the sake of the process, turning the game into an aesthetic form [8]. For Lantz, the true aesthetic experience is primary, and any practical outcome is a secondary benefit. He warns that attempts to “tame” games by explaining them through pragmatic frameworks risk weakening their primary source of power — their “unruly wildness” [8].

The pursuit of pleasure is a primary driver of play. Players engage in the process to experience the unique pleasure a game can offer [2]. This pleasure is complex, encompassing Huizinga’s “tension and joy” as well as Sutton-Smith’s “excitement, power, and initiative” [9] [10]. However, this pleasure is not limited to positive emotions. Caillois identifies “ilinx” or “vertigo” games, which aim for a temporary, controlled disruption of perception, inducing a pleasurable sense of fear, excitement, and shock [11]. Video games, with their technological nature, are adept at generating this wide emotional palette, using “rational thought and instrumental technique to create beauty, pleasure, and meaning” [8].

2. From Games to Video Games

2.1. The “Magic Circle” and the “Half-Real”

Nature of Video Games

The “magic circle” is a fundamental metaphor for the conceptual space of a game, separating it from the real world. The psychological mechanism for entering this space is the “lusory attitude” [2]. This concept becomes particularly relevant when analyzing video games. Jesper Juul terms this phenomenon “half-real”. According to Juul, video games are simultaneously real and fictional: they are based on real rules with which the player interacts, and the outcomes (win/loss) are real. However, the world governed by these rules, such as a dragon that must be defeated, is fictional [5]. Thus, the “half-real” nature of a video game can be seen as a modern, technological manifestation of the “magic circle”.

2.2. The Social Contract of Play

When players engage in a game together, they form a “social contract,” collectively agreeing to abide by the rules that govern their actions [2]. This contract is a collective expression of the lusory attitude, creating a shared, intersubjective “magic circle”. The strength of this contract is most evident when it is broken. Based on their relationship with the rules, players can be categorized as follows:

- **The Standard Player:** Accepts the lusory attitude and follows the rules to win [2].
- **The Dedicated Player:** Seeks expert knowledge of the game, analyzing rules to maximize their chances of winning [2].
- **The Cheat:** Covertly breaks the rules to achieve the game’s recognized goal (winning). The cheat rejects the rules but not the game itself or its magic circle [2].
- **The Spoilsport:** As termed by Huizinga, this player completely rejects the social contract and the lusory attitude. Their goal is not to win but to destroy the game for everyone, thus placing themselves outside the magic circle [9].

2.3. Jesper Juul’s “Classic Game Model”

Jesper Juul proposes a “classic game model” consisting of six elements:

1. **Rules:** Games are rule-based.
2. **Variable, Quantifiable Outcome:** The outcome is variable and measurable (e.g., through a point system), and it depends on player decisions and chance.
3. **Valorization of Outcome:** Different potential outcomes have different values (positive or negative).
4. **Player Effort:** The player invests effort to influence the outcome.
5. **Player Attachment to Outcome:** The player is emotionally invested in the result, feeling happy with a positive outcome and sad with a negative one.
6. **Negotiable Consequences:** The game’s outcome may have no real-life consequences.

Juul argues that video games have changed this classic definition, as their rules are determined by software and require specific hardware [12]. In this view, “hardware” can be a computer, physical objects, or even the human brain [12].

2.4. Defining the Video Game

The term “video game,” which emerged in the 1970s, comes from the Latin *videre* (“to see”), highlighting its visual nature on a screen. The term “computer game” arose later with the spread of personal computers. While “video game” is a broader term that includes computer games, the two are often used interchangeably, as their core essence is interactive entertainment via audio-visual devices.

According to Juul, video games differ from traditional games in two key ways [12]:

1. **Automation of Rules:** The computer manages the rules, allowing for much more complex systems than a human could remember. This frees the player from the responsibility of enforcing rules, which are often learned through the process of play [12].
2. **Detail of the Fictional World:** Video games often feature elaborate fictional worlds that capture player interest.

This distinction has led some researchers, like Boluk and LeMieux, to argue that the video game industry has misled the public by equating video games with traditional games, reducing them to mere consumer products [8].

3. A Brief History of Video Games

The history of video games is not a single evolutionary line but a convergence of different technological trajectories. It began in the 1950s with early computer development:

- **Early Experiments:** One of the first creations was Tennis for Two (1958) by William Higinbotham, a simple tennis simulation on an oscilloscope screen. In 1952, Sandy Douglas created OXO, a version of tic-tac-toe, as part of his PhD at Cambridge on the EDSAC computer. While earlier, OXO was often excluded from the “first video game” title because it lacked real-time moving graphics. In 1962, MIT students created Spacewar!, the first widely distributed video game, which became popular in research labs. These early games were all founded on the principle of competition.
- **Arcades and Home Consoles:** While a commercial arcade version of Spacewar! was unsuccessful, Atari’s Pong (1972) was an immediate

commercial hit in public venues like bars. These coin-operated machines were known as “arcade games”. In the same year, the first commercial home console, the Magnavox Odyssey, was released, allowing people to play games on their televisions. Its game library consisted mainly of sports and shooter simulations, but also included new genres like gambling simulations.

- **Personal Computers and the Internet:** The 1980s saw the rise of personal computers, and by the 1990s, advances in hardware and the availability of the internet spurred the growth of the industry, leading to network and mobile games.
- **An Alternative Line of Development:** Alongside graphical games, a different trajectory emerged with text-based games. In 1978, Roy Trubshaw and Richard Bartle created Multi-User Dungeon (MUD), a game where players controlled characters and interacted via text commands. MUDs gave rise to a new genre of shared virtual worlds, some of which were role-playing games, while others allowed players to create new objects and spaces, actively participating in the world’s formation. This development was heavily influenced by the tabletop RPG Dungeons and Dragons and the fantasy works of J.R.R. Tolkien.

4. Narrative, Classification, and Serious Games

4.1. The Role of Narrative:

Ludology vs. Narratology

There is an ongoing debate about the role of narrative in video games. Some scholars argue that story is integral, while others see it as secondary to the gameplay itself [5]. Early video game studies were often framed by a debate between two perspectives:

- **Narratology:** Views games as a form of storytelling.

- **Ludology:** Views games as a unique form of human activity, focusing on the study of rules and play (from the Latin *ludus*, meaning game).

The term “ludology” was popularized by Gonzalo Frasca in his 1999 article “Ludology Meets Narratology” and is often seen as a counterpoint to narrative analysis in game studies [5]. While some games like Tetris (1985) are purely abstract and require no story, others use narrative elements like backstories, cutscenes, and dialogue to provide context and motivate player actions [7] [13]. The emergence of the “Narrative Designer” as a profession underscores the growing importance of storytelling in interactive media.

4.2. Classification of Video Games

There is no single, universally accepted system for classifying video games. Classification is often subjective and depends on the purpose, whether for marketing or academic research. Tobias and Fletcher [14] suggest two common approaches: by platform and by genre:

- **Platforms:** Include Personal Computers (PC), consoles (PlayStation, Xbox), mobile devices, and arcade machines, with VR/AR headsets as a recent addition.
- **Genres:** Include Action, Adventure, Role-Playing (RPG), Strategy, Simulation, Puzzle, and Sports games. Many games are hybrids of multiple genres, complicating classification [14].

4.3. Serious Games

A crucial classification is based on purpose. The term “serious game” refers to games designed for purposes beyond pure entertainment, such as education, training, or social awareness [15]. The term was coined by Clark C. Abt in his 1970 book *Serious Games* to describe the use of games for employee training. A key feature of serious games is the seamless integration of learning com-

ponents, using the inherent appeal of games to make the educational process more engaging.

Research has shown their effectiveness. A meta-analysis by Wouters et al. [16] of 38 studies found that serious games significantly improved learning outcomes compared to traditional methods, especially when combined with other instructional materials. A study on the game *Mijn naam is Haas*, designed to build vocabulary in 4-7-year-olds, showed significantly faster vocabulary growth in classes that used the game [17]. Despite their potential, serious games often face challenges, such as lower budgets and development teams with less game design experience compared to their commercial counterparts [15].

5. Electronic Educational Resources as Games

Interactive learning resources can be considered a subset of video games. If video games are defined as interactive digital systems with rules and goals [2], then educational resources are simply those specifically oriented toward learning goals. They use engaging elements from games — such as challenges, rewards, and interactivity — to enhance the learning process. Classic examples like *Oregon Trail* (history) and modern platforms like Kahoot! and Duolingo increase student engagement, motivation, and learning outcomes by integrating game mechanics.

6. Research Methodology and Proposed Evaluation Instrument

6.1. Research Questions and Methods

The research is guided by a primary question: What determines the effectiveness of an electronic educational resource, considering pedagogical methods, visual narrative, interactive elements, and user interface?. This is explored through sub-questions focusing on analysis (strengths/weaknesses of Georgian resources), synthesis (creating evaluation criteria), and validation (testing the instrument). The methodology includes:

- **In-depth interviews** with primary school teachers, special education teachers, parents, and students.
- **Observation** of students interacting with educational games.
- **Comparative analysis** of popular video games and educational resources.

The framework is informed by the work of Hirsh-Pasek et al. [18], which identifies five pillars of educational apps: they should be active, engaging, meaningful, socially interactive, and oriented toward a clear learning goal.

6.2. The Conceptual Framework for the Evaluation Instrument

The central outcome of this study is a conceptual framework for evaluating electronic educational resources. This hybrid model is presented as a detailed table and is organized into four main categories, each with specific criteria, guiding questions, and a theoretical basis.

Category 1: Pedagogical Value

- **Learning Goal:** Is the educational objective clear and explicit? Based on Hirsh-Pasek, et al. [18].
- **Active Learning:** Does the resource require cognitive effort and strategic thinking, not just passive observation? Based on Constructivism [19].
- **Engagement:** Is the interface free of distractions? Is the task interesting enough to maintain focus? Based on Cognitive Load Theory [20].
- **Meaningful Learning:** Does the content connect to the child's existing knowledge and real-world experiences? Based on Meaningful Learning Theory [21].
- **Social Interaction:** Does the resource support collaboration or sharing? Based on Social Development Theory [22].

Category 2: Design and Visual Narrative

- **Visual Design Principles:** Does the design use hierarchy, contrast, and balance effectively? Based on Gestalt Psychology [23].

- **Visual Narrative:** Do visuals explain concepts or are they merely decorative? Is there a logical visual sequence? Based on Visual Communication Theories [24].
- **Typography and Readability:** Is the font size and style appropriate for the target age? Is text used sparingly? Based on readability research [25].

Category 3: Interaction and Gamification

- **Quality of Interaction:** Is feedback immediate and clear? Do player actions have a direct and meaningful impact on the outcome? Based on The Media Equation [26].
- **Gamification:** Are rewards (points, badges) tied to learning achievements, or do they become a distraction? Based on Gamification theory [27] [28].
- **Motivation and Challenge:** Does the difficulty adapt to the player's skill level to maintain a balance between frustration and boredom? Based on Flow Theory [29].
- **Type of Motivation:** Does it foster intrinsic motivation (satisfaction from mastery) or rely on extrinsic rewards? Does it support autonomy, competence, and relatedness? Based on Self-Determination Theory [30].
- **Meaningful Play:** Is the relationship between action and outcome clear and immediate? Do player choices have a discernible impact on the system? Based on Rules of Play [2].

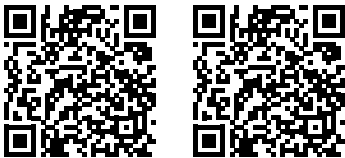
Category 4: Usability and User Experience (UX)

- **Usability Heuristics:** Does the interface provide system status visibility, user control, consistency, and error prevention? Is it intuitive? Based on Nielsen's 10 Usability Heuristics [31].
- **User Experience (UX):** What is the overall emotional and perceptual experience of using the resource? Based on User-Centered Design [32].
- **Technical Accessibility:** Does it work across different devices? Does it cater to users with special needs? Based on Web Content Accessibility Guidelines (WCAG).

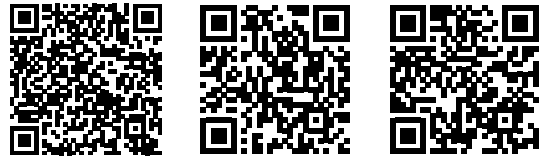
7. The Georgian Context

In Georgia, many children enter first grade with existing knowledge of foreign languages or math, often acquired independently through digital resources. Since 2010, the government has provided a personal netbook to every first-grader in public schools, pre-loaded with educational resources created by the Ministry of Education. The author of this study has been directly involved in the creation of many of these resources, including:

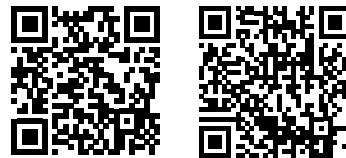
- **“ვსწავლობთ თამაშით” (Learning Through Play):** A resource for grades I-IV, created in 2019 in collaboration with UNICEF, covering multiple subjects. (Windows 64-bit, Windows 32-bit)



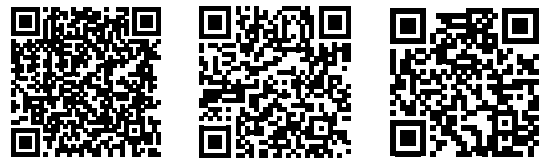
- **“ინტერაქციული ანბანი” (Interactive Alphabet):** An app for learning the Georgian alphabet, created in 2018 by GeoLab. (Android, iOS, Windows)



- **“სიტყვობანა” (Word Builder) and “მარცვლობანა” (Syllable Builder):** Sequels to the alphabet app, created by the Ministry of Education in 2020 and 2021, respectively. (Word Builder: iOS, Windows; Syllable Builder: Android, iOS, Windows)



Syllable Builder: Android, iOS, Windows)



References

1. Bell R. C., Board and Table Games from Many Civilizations, Courier Dover Publications, 2008.
2. Salen K., and Zimmerman E., Rules of Play: Game Design Fundamentals, The MIT Press, Cambridge, MA, 2004.
3. Parlett D., The Oxford History of Board Games, Oxford University Press, 1999.
4. Suits B., The Grasshopper: Games, Life and Utopia, University of Toronto Press, 1978.
5. Juul J., Half-Real: Video Games between Real Rules and Fictional Worlds, MIT Press, 2011.
6. Caillois R., Les jeux et les hommes: le masque et le vertige, Gallimard, 1967.
7. Esposito N., A Short and Simple Definition of What a Videogame Is, in DiGRA 2005 Conference: Changing Views: Worlds in Play, 2005.
8. Lantz F., The Beauty of Games, MIT Press, 2023.
9. Huizinga J., Homo Ludens, 1938.
10. Sutton-Smith B., The Ambiguity of Play, Harvard University Press, 1997.
11. Caillois R., Man, Play, and Games, University of Illinois Press, 2001.
12. Juul J., A Certain Level of Abstraction, 2004.
13. Juul J., Half-Real: Video Games between Real Rules and Fictional Worlds, MIT Press, 2005.
14. Tobias S., and Fletcher J. D., eds., Computer Games and Instruction, Information Age Publishing, 2012.
15. Tobias S., and Fletcher J. D., Computer Games and Instruction, Information Age Publishing, 2011.
16. Wouters P., van Nimwegen C., van Oostendorp H., and van der Spek E. D., A Meta-Analysis of the Cognitive and Motivational Effects of Serious Games, “Journal of Educational Psychology” Vol. 105, No. 2, 2013, pp. 249-265.
17. Schuurs U., Mijn naam is Haas. Een onderzoek naar de effectiviteit van een serious game voor de woordenschatontwikkeling van jonge kinderen, Master’s thesis, Utrecht University, 2012.
18. Hirsh-Pasek K., Zosh J. M., Golinkoff R. M., Gray J. H., Robb M. B., and Kaufman J., Putting Education in ‘Educational’ Apps: Lessons From the Science of Learning, “Psychological Science in the Public Interest” Vol. 16, No. 1, 2015, pp. 3-34.

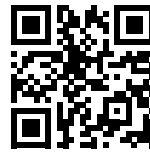
- **Interactive Books:** A series of 12 interactive books by Georgian children’s authors, funded by Tbilisi City Hall in 2022 as part of the “Tbilisi – World Book Capital” project. (Links to all 12 books are available in the original document).
- **“მხიარული მათემატიკა” (Fun Math):** An app for learning basic math concepts, created by the Ministry of Education in 2022. (Android, iOS, Windows)



- **Educational Chatbots:** Chatbots designed to help students develop safe online communication skills. (Link)



- **Subject-Specific Resource Suites:** Comprehensive web resources for subjects like Computer Technology, Music, and Art, created by the Ministry of Education in 2019. (Link)



These resources serve as the practical basis for analysis and application of the proposed evaluation instrument.

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- Piaget J., *The Origins of Intelligence in Children*, International Universities Press, New York, 1952.
- Sweller J., *Cognitive Load During Problem Solving: Effects on Learning*, “Cognitive Science” Vol. 12, No. 2, 1988, pp. 257-85.
- Ausubel D. P., *Educational Psychology: A Cognitive View*, Holt, Rinehart and Winston, New York, 1968.
- Vygotsky L. S., *Mind in Society: The Development of Higher Psychological Processes*, Harvard University Press, Cambridge, MA, 1978.
- Koffka K., *Principles of Gestalt Psychology*, Harcourt, Brace & World, New York, 1935.
- Arnheim R., *Art and Visual Perception: A Psychology of the Creative Eye*, University of California Press, Berkeley, 1974.
- Lonsdale M. D. S., *Typography and Readability*, in *The Encyclopedia of Child and Adolescent Development*, Wiley, 2019.
- Reeves B., and Nass C., *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places*, Cambridge University Press, Cambridge, 1996.
- Kapp K. M., *The Gamification of Learning and Instruction: Game-based Methods and Strategies for Training and Education*, Pfeiffer, San Francisco, CA, 2012.
- Chou Y., *Actionable Gamification: Beyond Points, Badges, and Leaderboards*, Octalysis Media, 2015.
- Csikszentmihalyi M., *Flow: The Psychology of Optimal Experience*, Harper Perennial Modern Classics, New York, 2008.
- Deci E. L., and Ryan R. M., *The ‘What’ and ‘Why’ of Goal Pursuits*, “Psychological Inquiry” Vol. 11, No. 4, 2000, pp. 227-68.
- Nielsen J., *10 Usability Heuristics for User Interface Design*, 1994, <https://www.nngroup.com/articles/ten-usability-heuristics/> [access: 29.08.2025].
- Norman D., *The Design of Everyday Things: Revised and Expanded Edition*, Basic Books, New York, 2013.