

Article

Less Is More in Digital Games Too: A Comparative Analysis of Visual Elements of Physical and Digital Versions for Two Tabletop Games

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Abstract: The changing habits of consuming entertainment via digital channels have been well researched in contemporary academic papers, as has the migration of different forms and formats into digital environments. Often these migrations are based on familiarity for facilitating the smooth transition into the new format, with additions specific to the digital channel (e.g., animations, sound effects, 3D perspectives, etc.) that are supposed to enhance user experience. In this paper, we present a comparative study of visual elements used in physical and digital versions of two tabletop games (Monopoly and UNO). Results from a sample of 100 players of both versions show higher overall satisfaction when engaging with the physical version of the games and significantly lower satisfaction with various visual elements in digital versions, such as overall visual perception, colors, and visual appearance of some key elements of the games. On closer inspection, the results show that the tendency to overload user interfaces with an abundance of interactive and visually enhanced features may reduce game enjoyment and overall satisfaction with the game, presumably due to factors such as information overload and cognitive distraction. In conclusion, it seems that the rule “less is more” could also be applied to the digital transition explained in this article.



Academic Editor: Yutaka Ishibashi

Received: 12 November 2024

Revised: 26 December 2024

Accepted: 2 January 2025

Published: 13 January 2025

Citation: Čerepinko, D.; Štefanović, R.; Hajdek, K.; Miljković, P. Less Is More in Digital Games Too: A Comparative Analysis of Visual Elements of Physical and Digital Versions for Two Tabletop Games. *Appl. Sci.* **2025**, *15*, 715. <https://doi.org/10.3390/app15020715>

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Keywords: tabletop games; digitalization; visual elements

1. Introduction

Digitalization of various social interactions is already a well-established and researched process, with authors examining every aspect of human activity, from education [1] to medicine [2], economy [3], and the arts [4], to name but a few. Digitalization is often seen as “structuring of many and diverse domains of social life around digital communication and media infrastructures” [5], and in this sense many authors question which features could be transferred from the analog, physical realm to the digital space and to what extent. One of the approaches to digitalization of existing physical systems of various kinds is familiarity [6,7], and research shows that the user’s familiarity with the system, their knowledge of its rules, and the way different features could be used are important for overall satisfaction with the digital artefact or application. In the transition from the print to the digital medium, it is observed that users maintain their familiar habits, such as reading patterns [8], information organization recognition [9], etc., while adapting to the screen with its numerous advantages and requirements [10,11]. Familiarity is one of the key concepts when introducing people to novel applications of existing practices [12], particularly in digital channels. It taps into their prior understanding of how systems or processes work,

making the experience feel more intuitive and easier and, thus, more satisfying. In this sense, it is understandable that many digitalization strategies rely on familiarity to help users make a smooth transition, enhance immersion, and improve overall satisfaction with the new digital artefact. The digitalization of existing social and in particular tabletop games is no exception.

Game is defined [13] as a recreational activity characterized by organized play through competition of two or more sides with known criteria for determining the winner, and agreed-upon rules. A social game can be defined as a game that emphasizes interaction and collaboration between players, often involving communication, competition, or cooperation in a shared environment. These games typically focus on social experiences, through direct player interaction. They can range from simple party games to more complex, multiplayer online games, but the key element is the social component that encourages people to connect, share, and engage with one another through rules, plays, and culture schemas [14] embodied through the game's mechanics, dynamics, and aesthetics [15], which also include physical materials such as cards, boards, tokens, and other game components. In digital channels, not necessarily in games that already existed in physical form and were digitalized, but in general, use of graphics and sounds is essential for creating an atmosphere "integral to the game" in order to achieve "pleasurable experiences, which can stimulate cognitive and emotional processing" [16]. Game design is already a well-established field of study with focus on various aspects and models such as MDA [15], MDE [17], or MMDE [18] and their application in contemporary game production (e.g., [19–21]). Tabletop games are games played on a flat surface, typically a table, and encompass both board games and card games [19]. The design structure of a game [22] may include various elements such as game structure, turn order and mechanics, player actions, resolution systems, conditions for game end and victory, elements of uncertainty, economic systems, auctions, worker placement, movement mechanics, area control, set collection, and card mechanisms. When designing a game, it is essential to carefully consider the various above-mentioned aspects to ensure that the experience is both engaging and balanced. A thoughtful integration of these elements is crucial for fostering player enjoyment and fun throughout the gameplay.

Recently, researchers have been focusing on player experience (PX) as the overall experience players get from engaging with the game, focusing, among other factors, on familiarity [23] to examine different emotional responses and game satisfaction. Growing possibilities for integration of multimedia formats such as animation and visual effects could enhance PX and bolster the immersion [24], with familiarity as one of the key factors, but some evidence [25] suggest that unnecessary prolongation of the game time, due to, for example, longer animation cycles or superfluous repetition of non-playable sequences, could also decrease players' enjoyment and overall approval of the game.

Some previous studies (e.g., [26,27]) have compared different aspects of physical and digital game versions, focusing on the varying effects these games have on players. Often, these comparisons aim to enhance the learning process, particularly through the use of games in facilitating the acquisition of new knowledge [28,29], with immersion and enjoyment being the most distinguishing features that prevail in physical games when the two versions are compared.

Passarelli et al. [30] identified three undesirable player states related to cognitive and perceptual processes: diverted attention, working memory overload, and visual fatigue. Diverted attention occurs when a player's focus is drawn to one element of the game at the expense of another, impairing overall engagement. Working memory overload arises when the amount of information a player must retain exceeds their working memory capacity, potentially leading to missed rules or opportunities. Visual fatigue refers to design flaws

that strain the visual system, such as overcrowding the game board with excessive details, using illegible typefaces, or using inappropriate font sizes, which can hinder the player's ability to process visual information effectively. They also list dysfunctional game features as follows: lack of player aids, components hiding key information, having separate boards or components, little space dedicated to conveying information, violating conventions, unintended affordances, clarity of the symbols used, board or element contrast, small fonts and components, and elements that are too similar to each other.

Given the wide availability of diverse games in both physical and digital formats, this paper aims to examine player experience (PX) and satisfaction with the digital versions of games, primarily focusing on the visual components (e.g., graphic design of the boards, cards, tokens, etc., and their representation in the digital games' user interfaces), using Monopoly and UNO as cases for comparative analysis.

2. Materials and Methods

Prior to selecting the games for analysis, a preliminary survey was conducted involving 107 participants with experience in playing social games. These participants were asked to identify the games they engage with most frequently. In terms of board games, when participants were asked to state their favorite, 37% reported having no preferred game. The most frequently mentioned games were Monopoly (15%), Catan (11%), and Risk (6%). For card games, 28% of respondents indicated that they do not have a favorite, with UNO (27%), Belot (15%), and Rummy (4%) being the most frequently mentioned choices. The preliminary survey further indicated that the majority of respondents (63%) primarily play the digital versions of games on a smartphone. Given the reasons outlined above, the two games receiving the most responses (e.g., Monopoly (Hasbro, Pawtucket, RI, USA) and UNO (Mattel, El Segundo, CA, USA) and their digital versions Monopoly GO and UNO!™) were chosen for analysis in the main section of the research.

Considering that both digital versions of the most favored games are adaptations of their physical counterparts, and that this article seeks to investigate the adaptation of visual elements and their transfer to the digital environment, the following research questions were proposed:

Q1: What are the key differences between the visual elements of the physical and digital versions of the game, and how do they compare to one another?

Q2: Is there a significant difference between these elements?

Q3: Does the amount of time spent playing the game affect the results?

The principal segment of the research consisted of two phases, combining quantitative and qualitative methods to obtain a better overview of the player experience (PX) in line with the recommendations [31]. The first phase involved a visual analysis of a set of graphic elements, based on theoretical assumptions [32], and defined through the synthesis of a literature review of authors with experience in various phases of researching and designing tabletop games [14,19–22]. These elements, applied to Monopoly and UNO, are identified as follows:

1. Visual impression;
2. Text readability;
3. Colors;
4. Illustrations;
5. Quality of game materials (physical editions);
6. User interface design (digital editions);
7. Animations (digital editions);
8. Sound and music (digital editions);
9. Board design (Monopoly only);

10. Token design (Monopoly only);
11. Dice design (Monopoly only);
12. Hotel and house design (Monopoly only);
13. Currency design (Monopoly only);
14. Property cards (Monopoly only);
15. Chance and Community Chest card design (Monopoly only);
16. Size of the cards (UNO only).

In the second phase, according to the theoretical assumptions [33], a survey was conducted by collecting a purposive sample of 100 players with experience in playing both versions of the games Monopoly and UNO (physical and digital), using the snowball method and sending them a questionnaire with 27 questions, 3 of which related to their sociodemographic characteristics (see Table 1) and the rest to their experience in playing the mentioned game versions, developed according to [34].

Table 1. Sociodemographic characteristics of the responders.

Age	Frequency	Percent
<18	3	3.0
18–24	55	55.0
25–30	21	21.0
31–40	7	7.0
41–50	6	6.0
51–65	6	6.0
>65	2	2.0
Total	100	100.0
Gender	Frequency	Percent
M	47	47.0
F	53	53.0
Total	100	100.0
Level of Education	Frequency	Percent
Primary school	5	5.0
High school	36	36.0
University/professional undergraduate study	49	49.0
University graduate/graduate professional study	9	9.0
Specialist or doctoral studies	1	1.0
Total	100	100.0

Of the 24 questions included in the survey, 4 focused on the graphical representation of elements or the additional features specific to each version of the game (1 for the physical version of Monopoly, 1 for Monopoly GO, 1 for the physical version of UNO, and 1 for UNO!™). A Likert scale ranging from 1 to 5 was employed, with 1 representing “strongly disagree” and 5 indicating “strongly agree,” to assess the above-mentioned visual elements. Two questions explored the motivations for playing the game and the respondent’s familiarity with it, specifically in terms of the time spent playing.

The remaining questions focused on other aspects of game design, such as other game mechanisms, dynamics, mechanics, and experience, and are not the primary focus of this article. This questionnaire is part of a larger research study that examines various aspects of games, with game aesthetics being one of the areas of focus. The complete results are currently being analyzed and are expected to be published soon.

Prior to answering the survey, respondents were specifically asked whether they had played both specified versions of the games. Those who answered negatively were excluded from the survey. The survey was administered via an online form.

The questionnaire was evaluated for internal consistency, and the Cronbach's alpha coefficient was found to be 0.973. The survey data were assessed for normality of distribution, and both the Kolmogorov–Smirnov and Shapiro–Wilk tests indicated that the sample follows a normal or near-normal distribution.

Given the sample size [35] (p. 378), a paired sample *t*-test was used to determine whether statistically significant differences exist between responses regarding the same elements in the physical and digital versions.

The results were additionally validated through the application of the Wilcoxon signed-rank test, which produced results consistent with those of the paired sample *t*-test.

During the analysis of the visual elements, it became evident that some results required further clarification or in-depth investigation. Consequently, additional analyses were conducted on responses from the main questionnaire regarding the game mechanics or dynamics related to the specific visual elements. This was done to determine if different types of interactions might have contributed to deviations from the expected outcomes. The findings from these additional analyses are presented in textual form, without the introduction of new tables. Immersion in the game is a complex variable that integrates various aspects of gameplay. As such, it is included in the results in Tables 5 and 8, which evaluate overall immersion in both the physical and digital versions of the game. However, immersion is excluded from Tables 6 and 9, as this study focuses solely on the visual elements of the game. Since immersion in the digital version is largely influenced by the user interface, statistical analyses were conducted to compare the physical and digital versions. Any significant differences identified are discussed and explained in the text.

3. Results

The findings (see Table 2) reveal that visual appeal emerges as the most significant factor influencing respondents' decisions to play a game. Following visual appeal, the amount of available time for gameplay is the next most important consideration, with other factors also contributing to the decision-making process.

Table 2. What is the most appealing reason to play a game?

Reason to Play a Game	N	Minimum	Maximum	Mean	Std. Deviation
Price	100	1	5	3.31	1.203
Visual impression	100	1	5	3.97	1.039
Number of players	100	1	5	3.45	1.175
Playtime	100	1	5	3.58	1.084
Complexity	100	1	5	3.36	1.124
Competition	100	1	5	3.32	1.145
Collaboration	100	1	5	3.49	1.040
Language (CRO or ENG)	100	1	5	2.07	1.289
Valid N	100				

Intriguingly, collaboration was rated slightly higher than competition, suggesting a preference for cooperative scenarios over competitive ones among sampled players. In contrast, game complexity was not highly rated as a decisive factor in players' choices. Despite the varying levels of complexity among the games tested, additional statistical analysis did not reveal significant differences in respondents' preferences regarding complexity based on their sociodemographic attributes. Furthermore, no statistically significant differences were observed in responses based on sociodemographic characteristics for any of the offered reasons, indicating that these factors did not influence players' decision-making processes.

Considering that the frequency of play may influence familiarity with the game and, consequently, the responses, the frequency of play was also examined (Table 3).

Table 3. How often do you play the games (all versions)?

Frequency of Playing	Frequency	Percent	Valid Percent	Cumulative Percent
Several times a year	36	36.0	36.0	71.0
Several times a month	14	14.0	14.0	85.0
Several times a week	15	15.0	15.0	100.0
Every day	35	35.0	35.0	35.0
Valid N	100			

When compared to the visual elements of the game, no statistical difference was found in relation to the frequency of play.

Given that visual appeal emerged as a significant factor in game selection, a comparative analysis previously conducted to identify the key similarities and differences between the physical and digital versions of both games is the focus of this section.

3.1. Monopoly

The results of this analysis for Monopoly are presented in Table 4. As can be observed, the digital version incorporates many of the key visuals from the physical version, from color scheme to key features of visual identity, creating a sense of continuity and familiarity.

Table 4. Comparative analysis of visual elements of Monopoly.

Monopoly Physical Version	Monopoly Digital Version	Key Differences
Visual impression		
Main factors that influence visual impression in board games are color scheme, iconography and typography, imagery and artwork, materials of the components used in the game, and board layout and symmetry.	Besides the factors present in the physical version of the game, in the digital version, the most important factors that influence it are 3D graphics and animation, visual effects, user interface, and customization.	The evolving nature of the digital game allows improvements and changes in the visual design elements of the game as well as the addition of new options for customization.
Text readability		
Important factors for text readability are font styles, text size, contrast, spacing and alignment, text hierarchy, and use of icons with text.	The digital version uses a combination of various typefaces, most of them being sans serif types like in the original.	The digital version allows optimization of text for screen readability and the ability to zoom, making small text more readable when needed. There is the possibility to choose different color contrasts to make the text more readable.
Colors		
Monopoly uses a wide range of colors in its design, but the most noticeable ones are the 8 colors used for the property sets, which are brown (formerly dark purple), light blue, pink (magenta), orange, red, yellow, green, and dark blue. The order of colors is also the order of value of the corresponding property color set (brown being the least valuable and dark blue being the most valuable).	The colors in the digital version of the game are generally the same as in the original to keep consistency.	The colors in the digital version are more vibrant and do not fade over time as there is no physical wear like in the original printed colors. The brightness of the screen can also add to the different viewing experience. Special effects and animations further enhance the colors and visuals, making them more striking. There is the option to customize various parts of the game, in which case some of the colors can be changed.
Illustrations		
The most recognizable illustration in Monopoly is the character of Rich Uncle Milburn Pennybags, also known as the Monopoly Man or Mr. Monopoly, who is prominent in the game design and gives the game a distinct identity. Most illustrations in Monopoly are simple and minimalist with the exception of the Chance and Community Chest cards, which are sprinkled with small, often humorous illustrations of the Monopoly Man in scenarios related to the text on the cards.	Illustrations in the digital version of the game are mostly designed in the same or similar style as the ones in the original game, but given the nature of the digital version there are many more features that it takes advantage of in the context of illustrations.	The digital version has dynamic illustrations which can be more detailed and are often interactive. Another feature of digital illustrations is their consistency; they will not wear over time like physical components of the original game. The illustrations in the digital version are also more thematically flexible; they can easily be updated and changed to fit the different versions of the game, without the need to add new components to the game.

Table 4. Cont.

Monopoly Physical Version	Monopoly Digital Version	Key Differences
Board design		
Monopoly has a square game board with 40 spaces and 8 distinct color-coded property groups. There are certain special spaces positioned between the property spaces laid out in a balanced manner. The design is symmetrical, which makes it visually clean and easily recalled. The center of the board typically only has a large logo of the game and is designed simply to keep the focus on the edge of the board, where all the gameplay occurs.	The design of the game board in the digital version of Monopoly is mostly kept the same as the original, but is improved with features that are only available in the digital version of the game. It is designed to be dynamic and animated to enhance the visual experience. Some elements can also be interactive. The board has 3D elements to further enhance the visual appeal and make the gameplay more immersive.	Players have the ability to customize game boards, choose different themes, or even change the layout, color schemes, and visual elements of the game board, making their experience more personalized. The digital version allows for more details that can be closely viewed by zooming to certain areas of it. The properties on the board that are owned by a certain player have a specific color and shape related to the player shown next to them.
Token, dice, hotel, and house design		
They come in a variety of shapes. The tokens are traditionally made of metal, giving them a solid feel and a certain weight. Monopoly uses two six-sided dice (D6) with standard features. Houses and hotels are represented by small, lightweight, plastic pieces which represent property development. Monopoly houses are traditionally colored green while hotels are colored red, which makes them easier to quickly differentiate.	The digital version of Monopoly keeps the same aesthetic of the player tokens as the original. They are animated 3D models made to look like the tokens from the physical version. Their movement is animated and the details of the objects can be viewed by zooming in. The dice in the digital version are animated and have added visual effects. The houses and hotels are generally very small when placed on the board but can be viewed closely when zooming in on the game board. They can be customized, but by default they appear the same as in the original.	The tokens in the digital version are customizable, which allows the players to change their appearance. The rolling dice experience is handled through animation and random number generation. The houses and hotels are automatically placed. The pieces are animated to emphasize the building of houses and hotels. Before they are placed on the board, they are not visible anywhere on the screen.
Currency, property card, and Chance and Community Chest card design		
Monopoly money is divided into a color-coded system of banknotes. The design of the banknotes is minimalist. The denomination number is displayed prominently in the center of each bill, with smaller numbers in the corners for quick reference. They are printed on thin, lightweight paper. Some modern versions have replaced physical bills with electronic banking systems. Property cards are small, rectangular cards that are easy to hold, arrange, and stack, making them optimal for quick reference. They are color-coded, as each property belongs to a color group. Special properties such as utilities and railroads do not have color groups. Besides the color at the top, they feature the name of the property, rent values, development costs, and mortgage value in a hierarchical format. The property cards and Chance and Community Chest cards are made from thin but sturdy cardboard or thick paper. Special editions of the game can have thematic variations of the cards.	The digital version of Monopoly currency has the ability to be more detailed and varied and can offer the option for players to customize the design. When displayed, currency is animated and has visual effects that make it more dynamic when used. At times, it is very simply designed and only briefly shown on screen, and at other times it is shown in more detail, appears larger on screen, and stays on screen for slightly longer. The depiction of the currency can depend on the different settings and customization of the game. The property cards are virtual instead of physical and are less often displayed on screen, which also affects the ability to interact with them at any point in the game. The design is generally the same as in the original, but enhanced with animations and can be customized. The design of the Chance and Community Chest cards is mostly the same as in the original. Illustrations on the cards are colored and can be customized.	As the transactions are automated in the digital version, currency is often sidelined to the point that it is only displayed by numbers going up or down. The property cards are handled automatically instead of physically, so they do not have to be shown on screen at all times. Players can instead view what they own by the special markings of a specific color and shape that are present on the game board and can view the cards when interacting with the properties. In certain versions of the game, the Chance and Community Chest cards can be completely removed from the game, such as in the quick mode of gameplay where their spaces are replaced with empty spaces that are skipped over to speed up the gameplay.
Quality of game materials (physical edition-exclusive)		
In Monopoly, this includes board material, playing pieces, cards, currency, houses and hotels, dice, and packaging. The board is typically made out of thick cardboard or particle board and is designed to be foldable, allowing for easy storage and transport. The playing pieces are generally made from metal, which adds a satisfying tactile experience to their use during gameplay. The various types of cards used in the game are usually made from thick, durable cardstock, and many editions even feature a coated finish to make them resistant to wear. The currency in Monopoly is usually made from thin paper or, more rarely, from cardstock. The houses and hotels are usually made from plastic, which is lightweight and durable. This contrast to the heavier metal tokens also influences the tactile feel of gameplay. The dice used in Monopoly are typical plastic dice that do not have distinct features. Packaging design is often neglected, but it is also an important aspect of game design. The Monopoly box is made from sturdy cardboard with plastic inserts for storing all the game components. Some special editions and thematic editions may feature different materials.		

Table 4. *Cont.*

Monopoly Physical Version	Monopoly Digital Version	Key Differences
Animations and sound and music (digital edition-exclusive)		
Animations are a central part of the digital game’s design. They represent any and all dynamic elements that are visible on the screen at any point in the game. They are one of the key features of the digital version of Monopoly and immensely enhance the visual appeal and player experience. Key features that are animated include dice rolls, token movement, property and monetary transactions, event cards, player actions and interactions, game progression, and special events. As many aspects of the game can be customized, this can also reflect on the animations and change them in certain scenarios. Sound and music are distinct features in digital games. This is an entirely new experience for the players as it provides them with a unique auditory experience that is not present in the physical version of the game. Key features include background music, sound effects, event-specific sounds, audio feedback for player actions, environmental (ambient) sound, and customizability. Players can customize the sounds and music that are active in the game and their volume, and depending on the selected options and game modes, different thematic sounds can sometimes be present.		

The primary differences are evident in the manner in which players interact with various game elements; in the digital version, physical interactions are replaced by animations, enhanced by sound effects, as direct manipulation is not possible. Additionally, the digital version offers customization options for certain game elements and provides the ability to adjust the player’s perspective.

As indicated in Table 4, the visual experience of the game can be significantly altered through various improvements and adjustments to its design elements, thanks to the available customization options. These features allow players to tailor the game’s appearance according to their preferences, ensuring that each gameplay experience is unique. Text readability is influenced by the optimization of fonts and text sizes for different screens, along with the player’s personal choice of color contrast. Colors are typically more vibrant and are affected by the screen settings, though they can also be customized. The digital version of the game features dynamic and often interactive visuals, offering thematic flexibility and the potential for updates or changes. Players can personalize several aspects of the game, thereby creating a more individualized experience. In addition, players can unlock various game boards by advancing through levels, further enhancing the game’s playability. Customizable tokens, dice, hotels, and houses are often animated, adding another layer of interactivity. These elements may also serve as collectible items that reflect players’ progress. Finally, aspects such as currency, property cards, and Chance and Community Chest cards are interactive and adaptable, with variations based on the specific version of the game being played.

However, the results of the player satisfaction survey regarding specific visual elements reveal that, in most cases, players assign higher ratings to the physical version of the game (Table 5). Even with the addition of multimedia features, the immersive experience in the digital version aligns with this trend.

The only elements rated slightly more favorably in the digital version compared to the physical version are the tokens. As detailed in Table 4, the primary distinctions include the fact that the tokens offer customization options based on player preferences. However, further statistical analysis revealed no significant differences in respondents’ satisfaction with these elements between the digital and physical versions. It is also significant to note that animations, as a feature exclusive to the digital version, were ranked second highest among all the digital features examined.

That being said, the results of the paired sample *t*-test (Table 6) indicate that respondents exhibit a statistically significant preference for the overall visual impression of the physical version of Monopoly, as well as for the currency and property card design.

Table 5. Satisfaction with elements of design for Monopoly.

Elements of Design (Physical)			Elements of Design (Digital)		
	Mean	Std. Deviation	Mean	Std. Deviation	
Visual impression	3.78	0.969	3.27	1.251	Visual impression
Text readability	3.88	1.058	3.58	1.419	Text readability
Colors	3.83	1.016	3.62	1.203	Colors
Illustrations	3.71	1.103	3.77	1.336	Illustrations
Board design	4.01	0.969	3.65	1.093	Board design
Token design	4.02	1.121	4.19	0.981	Token design
Dice design	3.26	1.096	3.15	1.287	Dice design
Currency design	3.52	1.096	2.69	1.490	Currency design
Property cards	3.65	1.056	3.04	1.341	Property cards
Houses and hotels	3.29	1.149	2.96	1.248	Houses and hotels
Chance and Community Chest card design	3.34	1.045	3.15	1.190	Chance and Community Chest card design
Immersion	3.23	1.165	2.92	1.017	Immersion
Quality of the material of the play equipment	3.53	0.955			
			3.23	1.336	User interface quality
			3.85	1.377	Animations

Table 6. Statistically significant results from the paired sample *t*-test for Monopoly.

		Paired Differences					<i>t</i>	df	Sig. (2-Tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Visual impression (physical vs. digital)	0.500	1.140	0.224	0.039	0.961	2.236	25	0.035
Pair 2	Currency design (physical vs. digital)	0.731	1.458	0.286	0.142	1.320	2.556	25	0.017
Pair 3	Property card design (physical vs. digital)	0.500	0.860	0.169	0.153	0.847	2.964	25	0.007

The visual presentation of the digital version is enhanced by 3D graphics and a range of audio–visual effects, with gameplay occurring through a user interface that may become overloaded with visual information. In contrast, currency exchange is often represented solely as a numerical change in the player’s bank balance, and property cards can be challenging to read, making it difficult to quickly access key information or recall their value. Further statistical analysis revealed that the average ratings for purchasing properties were significantly higher for the physical version of Monopoly compared to the digital version ($M = 0.462$, $SD = 0.905$). This difference was found to be statistically significant ($t = 2.601$, $df = 25$, $p = 0.015$). Subsequently, the ratings for building houses and hotels were observed to be, on average, higher in the physical version of Monopoly compared to the digital version ($M = 0.423$, $SD = 0.809$), and this difference was also found to be statistically significant ($t = 2.668$, $df = 25$, $p = 0.013$).

In addition, considering the theoretical assumptions outlined in the first section regarding potential player dissatisfaction with animations and visual effects [29,30], which

may lead to prolonged downtime and overall gameplay duration, although animation sequences in the digital version of Monopoly are relatively fast, the average ratings for playing time were checked and appear to be lower for the physical version of Monopoly compared to the digital version ($M = -0.308$, $SD = 1.463$); however, this difference was not statistically significant ($t = -1.072$, $df = 25$, $p = 0.294$). Average downtime scores were lower for the physical version than for the digital version as well ($M = -0.115$, $SD = 1.033$), but this difference also did not reach statistical significance ($t = -0.570$, $df = 25$, $p = 0.574$).

3.2. UNO

The results of the comparative analysis for UNO are displayed in Table 7 and, similar to Monopoly, the digital version retains the essential components of the visual identity of the physical version. Notable differences include a slight modification of the color scheme, along with the addition of animation and sound effects. A key distinction lies in the mode of play. In the physical version, players engage directly with one another, making strategic decisions while incorporating verbal and non-verbal communication as essential components of gameplay. In contrast, the digital version is played through a user interface, which removes direct human interaction and communication.

Table 7. Comparative analysis of visual elements of UNO.

UNO Physical Version	UNO Digital Version	Key Differences
Visual impression		
Visual impression relies on the design of the game mechanics and the types and number of cards that are present in the game. Main factors that influence visual impression in card games are color scheme, iconography and typography, imagery and artwork/illustrations, symmetry, and card materials.	The digital version of UNO tries to keep the same visual impression as the original while improving upon it with features that are exclusive to digital games. In the digital version, the most important factors that influence it are 3D graphics and animation, visual effects, user interface, and customization.	The evolving nature of the digital game allows improvements and changes in the visual design elements of the game as well as the addition of new options for customization.
Text readability		
UNO uses a sans serif font for its cards and a custom wordmark for its logo. The closest font used for the logo would be Cabin Bold with some artistic additions. The font used for the cards is Helvetica Bold.	All text, numbers, and symbols are optimized to be easily readable on screens, and the game has a responsive UI that scales their sizes based on the screen. The font for the cards is the same as in the original, Helvetica Bold. The other textual elements also use a similar sans serif font.	The digital version adds text that explains the actions of certain cards during gameplay, text that shows player names and scores, and instructional text in certain cases, and allows for accessibility adjustments such as colorblind options and different languages.
Colors		
UNO uses 4 main colors that most of the cards are divided into: red, green, blue, and yellow. In addition to these colors, it also uses black as the prominent color of special cards that feature all of the 4 colors on them. All cards have a white outline around the edges, and white is also used as the color for the numbers and symbols and the circle around the center number/symbol. Black is used as a shadow under the numbers and symbols to make them stand out and be more visible. The back of the cards is simply designed; it consists of a black background with a white outline around the edges, and in the center there is the UNO logo, which consists of a red ellipse and 3D yellow-black stylized letters. Special versions of the game may have variations in the colors used.	The colors in the digital version of UNO are by default the same as in the original, but there are also options for customization and colorblind-friendly options.	There are some other added colors to various elements of the game, but the game tries to keep the consistency of dominantly using a reddish-orange color for most elements and using the colors that are present on the cards for some of the menu elements. The text color is white. The digital version of the game offers a variety of different game modes and variations featuring different color schemes.

Table 7. *Cont.*

UNO Physical Version	UNO Digital Version	Key Differences
Illustrations		
The cards are designed so that there is a large illustration in the center and smaller illustrations on the top left and bottom right corners of the cards. The bottom right illustration is flipped by 180 degrees to make it easier for the numbers and symbols to be quickly read no matter which side the card is facing. The game features illustrations of numbers 0-9 and several symbols: two arrows in opposite directions (reverses the order of playing), a mirrored forbidden symbol (skips the next player), two blank rectangles (forces the next player to draw two cards), an ellipse with four colors (picks the next active color), and four colored cards, each in one of the four base colors (forces the next player to draw four cards). Different versions of the game feature different and additional illustrations.	The digital version of UNO keeps the same illustrations on the cards as in the original but adds more illustrations to the menus to make them more visually attractive and also adds illustrations during the gameplay to make it more engaging. As there are various game modes and themes, there are also additional or varied illustrations that are present in them.	Illustration is added to the user interface in various instances of gameplay.
Size of the cards		
Regular UNO cards are roughly 8.7 cm × 5.6 cm (3.4" × 2.2") with rounded corners.	The digital version of UNO uses a responsive size of cards that scales according to the screen of the device that is being used. The size of the cards can sometimes also scale a bit according to the number of cards that the player currently holds.	Cards are displayed in the bottom of the screen in a line and can easily be seen all at the same time. When it is the player's turn, the cards slightly zoom in so the player can see them better when picking which card to play. Due to the screen size, certain card positions may result in lower visibility of the played cards, especially those in the middle of the center stack.

As presented in Table 7, the visual impression in the digital version is influenced by 3D graphics, animations, visual effects, user interface design, and customization options, which are driven by a distinct set of immersion factors, given that the primary mode of interaction occurs via a screen. Moreover, the digital version includes text elements that explain the actions of specific cards during gameplay, display player names and scores, provide instructional text when necessary, and offer accessibility features such as colorblind modes and multiple language options. The digital version of UNO retains the same card illustrations as the original, but enhances the visual appeal by adding more illustrations to the menus. Furthermore, additional visuals are introduced during gameplay to increase engagement. Different game modes and themes incorporate additional or altered illustrations, contributing to the overall visual variety. While the game introduces some new colors for various elements, it maintains consistency by predominantly using the existing physical color scheme. However, due to its customization capabilities, the digital version of the game provides a range of game modes and variations, each featuring distinct color schemes. The cards are adapted to the screen's capabilities and are not interactive in the same way as in the physical version of the game.

The results for players' satisfaction with various visual elements of the game for UNO (see Table 8) reveal a pattern consistent with the one observed for Monopoly, with overall ratings being higher for the physical version than for the digital version of the game.

The only exception in this case is the evaluation of the user interface quality, which was rated slightly higher compared to the quality of the material of the play equipment. However, this difference in ratings was not statistically significant. It is worth noting that the animations score ranks second highest among all digital elements assessed in the survey, surpassed only by the color scheme, which attained the highest score. Further statistical

analysis identified statistically significant differences in three segments (Table 9), mirroring the results observed for Monopoly. In this instance, however, the differences were found to be significant specifically for visual impression (the same as in Monopoly), colors, and card size.

Table 8. Satisfaction with elements of design of UNO.

Elements of Design (Physical)			Elements of Design (Digital)		
	Mean	Std. Deviation	Mean	Std. Deviation	
Visual impression	4.27	0.832	3.98	0.886	Visual impression
Text readability	4.43	0.835	4.19	0.824	Text readability
Colors	4.59	0.634	4.51	1.203	Colors
Illustrations	3.98	1.027	3.98	1.165	Illustrations
Card sizes	4.38	0.773	3.77	1.192	Card sizes
Immersion	3.53	1.238	2.92	1.017	Immersion
Quality of the material of the play equipment	3.82	0.955			
			3.86	1.060	User interface quality
			4.28	0.854	Animations
			3.63	1.047	Sounds and effects

Table 9. Statistically significant results from the paired sample *t*-test for UNO.

		Paired Differences					<i>t</i>	df	Sig. (2-Tailed)
		Mean	Std. Deviation	Std. Error Mean	95% Confidence Interval of the Difference				
					Lower	Upper			
Pair 1	Visual impression (physical vs. digital)	0.341	0.794	0.124	0.091	0.592	2.754	40	0.009
Pair 2	Colors (physical vs. digital)	0.244	0.582	0.091	0.060	0.428	2.682	40	0.011
Pair 3	Card size (physical vs. digital)	0.561	0.976	0.152	0.253	0.869	3.681	40	0.001

As immersion in the digital version received the lowest rating among all the constructs evaluated, additional testing was conducted. The statistical analysis revealed that, on average, immersion ratings were higher for the physical version of UNO compared to the digital version ($M = 0.341$, $SD = 1.015$), with this difference being statistically significant ($t = 2.154$, $df = 40$, $p = 0.037$). Further investigation also showed that ratings for player interaction were significantly higher for the physical version than for the digital version of UNO ($M = 0.805$, $SD = 1.145$), with this difference also reaching statistical significance ($t = 4.501$, $df = 40$, $p < 0.001$).

4. Limitations of This Study

This paper is part of a larger research project, the results of which are still undergoing full analysis and interpretation. As such, the findings presented here focus specifically on the transfer of visual elements from physical to digital versions of the games, without providing in-depth insights into other aspects of the games (such as mechanics or dynamics). The design of the research, as well as the formulation of the questions, were sometimes

intentionally constrained to investigate the subject (e.g., transfer of visual elements in the case of this paper) in as much detail as possible, while avoiding respondent fatigue and non-completion. The study also assessed general familiarity with the games, but did not examine the overall player experience, the learning curve for each version, or the time spent playing the physical versus digital versions separately. The sample was purposive, with respondents voluntarily participating without compensation and completing an online questionnaire. This may raise concerns regarding their motivation or sincerity.

The results of the visual analysis of both game versions, presented in Tables 4 and 7, provide an understanding of the key differences in the visual aspects of each version. Given that customization allows for countless variations in the game's appearance and depends on how players tailor their versions according to their individual interests and aesthetic preferences, a detailed explanation of each difference would fall beyond the scope of this paper. Therefore, the tables highlight the principal differences and facilitate analysis at a conceptual level.

5. Discussion

The results, as expected and presented in Table 2, emphasize the significant role of visual appeal in the decision to engage with a game. This can be explained by the role of visually compelling elements in enhancing player immersion, where more attractive visuals facilitate greater ease of engagement, a conclusion that corroborates prior research on the influence of visuals on player experience [16]. Importantly, this trend highlights a shift in focus from other game design elements, positioning the visual component as one of the key factors influencing PX, and suggesting that its influence may outweigh other aspects traditionally emphasized in game design such as game structure, the complexity of the gameplay, or rivalry. However, this effect may be less pronounced in the case of card games, where direct human interaction seems to play a more significant role than visual elements, as the results indicate. While we do not intend to underestimate the role of other elements, we hypothesize that, given the similarity of the remaining game components, the visual impression may serve as a decisive factor in the decision to engage with the game.

However, a comparative analysis of the visual elements of Monopoly revealed that the user interface incorporates numerous additional visuals, which, while contributing to the overall atmosphere, do not always serve the gameplay itself. As indicated in Tables 5 and 6, the visual impression is higher for the physical version of the game. A comparison of these results with those in Table 4 reveals that the visual experience of the digital version can be significantly modified through various adjustments to its design elements, such as customization options, 3D graphics, animations, and other dynamic features. These elements, which are not present in the physical version, contribute to a more variable visual experience in the digital version, whereas the physical version maintains a consistent visual appearance. This consistency may enhance recognizability and foster a greater sense of familiarity in the physical version, which, in turn, may contribute to a higher level of satisfaction with its visual impression. Such elements may lead to diverted attention or visual fatigue, potentially resulting in a decline in player experience (PX). The findings of this study align with previous research on the impact of visual stimuli on user engagement and cognitive load [30]. In contrast, the design of the digital property cards, which differs from their physical counterparts, omits several key pieces of information that are immediately visible in the physical version. This information in the digital version can be accessed through additional interactions. As illustrated in Table 4, the property cards do not remain visible on the screen at all times. Instead, players can identify their owned properties through specific color and shape markings on the game board, with the option to view the cards when interacting with the properties. These omissions can further be

characterized as dysfunctional, in line with the argument put forth by [30], which asserts that the absence of crucial information undermines the overall PX.

The same principle applies to the currency cards and their associated interactions. As described in Table 4, transactions are automated in the digital version, where currency is often relegated to being represented solely by increasing or decreasing numbers. The absence of the tactile sensation of currency “changing hands” may be a significant factor contributing to reduced player satisfaction with the exchange, as demonstrated in Tables 5 and 6. In this sense, a “pile of money” also provides immediate visual feedback, signaling success to a player who continues to win.

The results point to the need for a reconsideration of the approach to games’ visual element design, with a greater focus on prioritizing information over atmospheric effects when the player’s perspective is in any way constrained and their attention is subjected to competing stimuli. This is also in line with other earlier findings presented in the introduction to this paper.

In the context of card games, particularly those with limited strategic or tactical options (not implying that UNO lacks strategic depth), research findings suggest that the visual design should prioritize supporting the social dynamics of the game, particularly player communication, as this has a significant impact on the overall player experience, as outlined in earlier research [21–25].

As shown in Table 7, the visual impression in the digital version of UNO is shaped by 3D graphics, animations, visual effects, user interface design, and customization options. The results shown in Tables 8 and 9 indicate that the visual impression is significantly higher for the physical version than for the digital version. This may be attributable to the presence of numerous visual elements that could divert players’ attention from the gameplay. Colors also emerge as a significantly distinct element in Table 9, likely due to the increased number of color options available to players. Furthermore, the results in Table 8 reveal a higher degree of variability in responses related to colors in the digital version of the game, which may indicate more polarized opinions on the color scheme (either highly positive or highly negative). This implies that additional research is welcome to better understand these differences. As outlined in Table 7, the screen size may limit the visibility of played cards due to certain card placements, which could help explain the results presented in Tables 8 and 9. This limitation may suggest a deficiency in the user interface design, where animations and effects are prioritized. However, given that animations received the highest ratings of all observed elements in the digital version, it appears that while animations are generally well received, their placement or space usage within the interface may require optimization.

Further analysis indicates that the quality of the user interface is rated relatively high (Table 8), suggesting that users generally perceive it favorably. The lowest-ranked element in the digital version (Table 8) was immersion, which, when compared to the physical version, revealed a statistically significant difference. Given the relatively positive evaluation of the user interface design, the most substantial difference between the two versions lies in an area beyond visual aesthetics: the absence of tools for direct player communication.

The lack of face-to-face communication reduces key elements of fun—an essential characteristic of social games [16,24]—such as narrative, player teasing, provocation, humor, and other relationship-building and emotionally engaging forms of social interactions. This element significantly contributes to the appeal of these games and situates them within a unique social context, particularly in terms of immersion. Furthermore, if properly incorporated, it could reduce downtime or optimize other time-dependent aspects of the game mechanics.

In addressing the limitations of this research, it is essential to acknowledge that the results are derived from survey data reflecting players' overall perceptions of specific aspects of the examined games. These perceptions were subsequently analyzed in relation to the fundamental differences in the visual design of various game elements. Consequently, it is difficult to ascertain the precise impact of differing levels of personalization of these elements on the observed outcomes.

To achieve a more nuanced understanding of how visual element personalization affects gameplay, a more comprehensive experimental study would be required. Such an investigation would need to isolate individual elements and their varying degrees of personalization, a scope that extends beyond the current study. Nonetheless, the findings presented here could serve as a solid foundation for future research in this area.

Finally, the issue of identity representation emerges as a relevant consideration when interpreting the results. Although research indicates no statistically significant difference, there is evidence to suggest that players derive some enjoyment from the ability to customize tokens. While identity representation was not the focus of this study, it is important to acknowledge the substantial body of literature supporting the notion that more modifiable options for digital identity construction could enhance player engagement.

6. Conclusions

To conclude, it is important to highlight that development teams behind the digitized versions of the two games analyzed in this study have exhibited profound expertise, as evidenced by the positive ratings across the various categories examined. Consequently, the results presented should not be interpreted as critiques of their work, but rather as constructive insights for other designers and game developers seeking to refine existing digital adaptations and design new tabletop game interfaces—particularly with regard to player communication and identity representation. Implementing such improvements could enhance the overall player experience. Yet, an advisory note should be made: The ability to do something does not necessarily imply that it should be done.

As Eric Zimmerman aptly observes, “a game is a language” [22] (p. xxv), and the visual components discussed in this paper can be considered as “words”, each carrying varying degrees of aesthetic appeal and communicative value. While the number of these components may vary, the findings of this study suggest that less is often more. The results of the study indicate that, when making design choices, it is more effective to prioritize a smaller number of high-quality visuals—especially those that convey critical information, facilitate player interaction, or support the representation of player identity—over a larger quantity of visuals that lack compelling rationale. In Zimmerman’s metaphor, a few well-chosen “words” can have a more profound impact than an entire novel composed of average language.

Author Contributions: Conceptualization, D.Č. and R.Š.; methodology, D.Č., K.H. and P.M.; formal analysis, D.Č. and R.Š.; data curation, P.M.; writing—original draft preparation, R.Š.; writing—review and editing, D.Č. and K.H.; funding acquisition, K.H. All authors have read and agreed to the published version of the manuscript.

Funding: This research was funded by the University North Grant for Research UNIN-TEH-23-1-5.

Institutional Review Board Statement: This study was conducted in accordance with the Declaration of Helsinki, and the Assessment of the Ethics Committee of University North (Assessment nr. K: 602-04/20-03/17/MIK/12 on 20 March 2017).

Informed Consent Statement: Informed consent was obtained from all subjects involved in this study.

Data Availability Statement: The raw data supporting the conclusions of this article will be made available by the authors on request.

Conflicts of Interest: The authors declare no conflicts of interest.

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