



A Ruse by Any Other Name: Comparing Loot Boxes and Collectible Card Games Using Magic Arena

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The convergence of gaming and gambling, known as "gambification", has been a topic of increasing interest in recent years. Loot boxes, i.e., rewards offering randomized content in exchange for money or time, have been a particular focal point. Research has shown links between excessive loot box consumption and problematic consumption behaviors, leading to several attempts to regulate loot boxes. Arguments against regulation have been that loot boxes are conceptually and structurally akin to other unregulated game formats, such as collectible card games. However, this discourse is often without deeper analysis of the mechanics of different products at the center of convergence. Therefore, to add to this knowledge, this article examines the similarities and differences between booster packs in Magic Arena, their physical counterparts in Magic: The Gathering, and loot boxes included in digital games. Particular attention is paid to the ways in which these booster packs compare to loot boxes in terms of consumption patterns, visual appearance, contextual factors, and regulation. Analysis reveals that digital booster packs in Magic Arena differ from both loot boxes and physical card packs, both due to their direct impact on gameplay, and their unique features afforded by the digital environment in which they exist.

CCS Concepts: • **Applied computing** → **Computers in other domains**; Computer games • **Software and its engineering** → **Virtual worlds software**; Interactive games

Additional Key Words and Phrases: Loot Boxes, Gambification, Booster Packs, Collectible Card Games, Convergence, Gaming and Gambling

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1 INTRODUCTION

Gambification refers to the convergence of gambling and gaming, specifically the use of gambling as a tool to promote targeted user behavior [20,39,65,80]; it has become an increasingly prominent phenomenon and is most obviously present in recent developments in gaming ecosystems. Free-to-play business models have increasingly come to dominate the games industry, with many

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digital games embracing design choices that incorporate elements from traditional gambling [39,66,78,80,100,110]. Monetization via random reward mechanisms has begun to permeate both single- and multi-player games as well as premium, AAA games [79,130]. Consequently, gamblification has been used to describe the use of these gambling-like interactions to drive player engagement and monetization of digital games [12,80].

The growing use of gambling, and gambling-like interactions within games goes beyond simple incorporation of randomness or chance, for these characteristics are key components of what makes games fun to play. Indeed, “uncertainty of outcome” is thought to be so important that it has been presented as a defining characteristic of what constitutes a game by both academics and designers [30,44,93]. Concern over the convergence of gambling and games arises from the combination of uncertain outcome and investment and/or reward, primarily to drive both monetization and user engagement [80]. One commonly discussed example of this convergence between gambling and digital gaming is loot boxes; an umbrella term used to describe randomized rewards that offer the player something in exchange for their time and/or money [80,88]. Recent years have seen a significant increase in academic research focused on gambling-like game mechanics [82], especially regarding the ways in which they potentially induce addictive or otherwise problematic patterns of consumption [42]. Recent meta-analyses have demonstrated links between loot box spending, and behavior related to problem gambling and problem video gaming, both of which can manifest as various financial, familial, and social problems [42,43,103].

Physical booster packs in collectible card games (CCGs) often share similarities with loot boxes in digital games, in that both give players a chance to obtain rare or valuable items through an element of chance [131]. It is this similarity which has been used by video game players to criticize attempts to regulate loot boxes [76], and by the industry as a defense of the underlying mechanics [31]. Yet CCGs have not been subject to regulation, and no national governments or authorities consider them to be a form of gambling. The degree to which CCGs can, or cannot, be considered alongside loot boxes is one with potentially significant ramifications given the newfound interest in digital games and the monetization practices they adopt.

The game *Battlefront 2* (Electronic Arts) highlighted the potentially exploitative nature of loot boxes, provoking a huge player backlash which brought the issue to the attention of mainstream media and, subsequently, politicians and regulators [91,100]. Although the issue of loot boxes had been acknowledged by the gaming community for some time, this significant increase in attention acted as a catalyst for a debate which continues to develop. While some players believe that loot boxes and similar in-game items or mechanisms are harmful, both to individuals and to the nature of gaming, others believe they add value to games and offer a way to access content that is fair and equal to all [76]. While some game developers have removed randomized purchases from their games [94], others continue to offer such items, arguing that as the player always receives something for their money it cannot be considered gambling [83]. Indeed, a representative of Electronic Arts argued that loot boxes are actually “quite ethical” and that players enjoy the “surprise mechanics” of random purchases [111]. A common argument against loot boxes constituting gambling is that if such a perspective is valid, then any kind of random event in games should also be considered as such, with CCGs often being cited as examples [76,127].

There has been much discussion over whether gambling-like mechanics, such as loot boxes can, or should be considered as gambling [28,34,49]. Indeed, there has been increasing investigations by regulators, with some authorities having judged that loot boxes and similar gambling-like mechanics should be considered alongside more established forms of gambling

[22,55,89,92]. Various approaches to regulation include the requirement for game developers to disclose the odds of loot boxes [19], review age ratings for games in which they are included [10], or directly ban games that contain specific types of loot boxes [9]. Prior longitudinal studies on simulated gambling-like activities, such as social casino games and mobile gambling games have shown that exposure, especially in adolescence [54], to simulated gambling mechanics and activities can increase potential for real-money gambling later in life [63,70,95]. The relationship, however, is far from simple with some individuals using simulated gambling games as a substitute for real-money gambling [81], while other researchers have raised the potential for such games to attract those who have an existing predilection for gambling [38]. Moreover, it has been highlighted that the monetization of gambling-themed activities through unrestricted transactions can have adverse effects, both at the personal level, such as financial and familial [66,67], and at a broader level concerning game design, as developers are compelled to consistently prioritize the most lucrative monetization models [120].

As one of the first physical collectible card games (CCGs), *Magic: The Gathering* (MTG) is often credited with popularizing the genre and establishing a foundation for many similar games that followed. MTG's parent companies, *Wizards of the Coast* (WoTC) and *Hasbro*, have continued to experience success and financial growth, with both companies posting recent record profits [7,90]. This growth can be attributed to the success of *Magic Arena*, a current free-to-play digital version of the game. While WoTC has not published any numbers on active players of *Magic Arena*, online sources estimate *Magic Arena* to have around 6 to 7 million active players at the beginning of 2023 [2]. Given that MTG, like many other CCGs, use randomized booster packs as a means of collecting cards, *Magic Arena* as a digital game is an ideal platform to examine the potential similarities and differences between booster packs and loot boxes as a game mechanic.

The body of academic work investigating the convergence of gambling and games in general has been rapidly growing in recent years [82], with findings being used to inform debates on the potential regulation, or otherwise, of loot boxes for example [77]. Those opposing regulation have cited the use of randomness and chance in games as support for their position, with specific reference being made to games such as MTG and *Pokémon* [26,98]. Although randomness and uncertainty of outcome are often considered key elements of games, their implementation varies across a range of contexts [30,93]. As such, it is not appropriate to equate them to one another by default. Despite the vibrant debate in gaming communities, and the public position of game publishers, there has been little academic investigation detailing the differences and similarities between physical booster packs, and loot boxes, although the debate has increasingly been acknowledged. One prior work, citing this debate as a justification for the research, has investigated the links between problem gambling and purchasing physical card packs [131]. However, while the work described differences and similarities between loot boxes and CCGs, these differences were not part of the analysis, and no distinction was made between physical and digital versions of CCGs.

To address the gaps in current research outlined above, this article presents the results of an app walkthrough into *Magic Arena*, to answer the following research question: **“In what ways are booster packs in collectible card games, both physical and digital versions, similar or dissimilar to loot boxes?”**

This study aims to examine the distinctions between loot boxes and both physical and digital booster packs in collectible card games; it will consider issues such as the potential for loot boxes to be considered gambling or gambling-like, and how their digital or analog environment may impact their consumption and presentation in comparison to booster packs.

This research is expected to provide knowledge with both theoretical and practical implications. First, it will contribute to ongoing discussions regarding the nature of specific mechanics and virtual items used to monetize contemporary digital games. Second, this work offers a pioneering study specifically dedicated to addressing claims that equate digital loot boxes with more established game formats, such as collectible card games. This is achieved through analysis of structural characteristics, utilizing a game that is available in both digital and physical formats. Through such comparison, this study is one of the first to offer meaningful distinctions between physical and digital CCGs. As a result of these discussions, this work will provide meaningful evidence that can be used to inform decisions concerning the potential regulation, or otherwise, of loot boxes and collectible card games. Furthermore, by examining this issue in detail, this work provides information that can be used in campaigns designed to educate and inform those who do not play games, but who have a vested interest in the topic. Finally, this work will contribute to ongoing discussions relevant to the human-computer interaction (HCI) community regarding contemporary pressures on the process and practice of game design, both in respect to the balance between positive player experiences and commercial pressures [1], and highlighting areas of potential legal and ethical concern [36,45,71]. Indeed, the HCI field has been identified as one of the most suitable for facilitating the translation of knowledge generated by scientific enquiry to design practices [11,24].

2 BACKGROUND

2.1 Loot Boxes

Loot boxes are in-game items used to distribute randomized rewards to game players and have become a staple element of many contemporary games [78,88]. The umbrella term of loot box is one which covers a wide range of implementations, with some loot requiring a small payment to open, while others can be opened for free [21]. Furthermore, some games allow players to sell virtual items gained from loot box openings directly in online marketplaces [106]. While allowing the sale or resale of virtual items is specific to individual games and platforms, loot boxes and similar random reward mechanics offer the players a means of obtaining valued game items, whether they be cosmetic or utilitarian, such as in-game items or currencies [88].

The contents of loot boxes are randomly selected from a prescribed pool, with rarer items having lower probability of selection [88]. Contents are determined at the point of opening, meaning that publishers can change potential contents and probabilities at any time up to the point of opening. Players often do not actually own the games they play, instead they own the right to use the games by agreeing to a publisher's End User License Agreement (EULA). Modern EULAs contain terms and conditions which essentially allow the publisher to make any changes to the game, and game items, that they desire [53]. This means that the items received by players can be amended at any time, for example by increasing or reducing availability, thereby manipulating the relationship between supply and demand, and changing the value of items sold via online marketplaces [33].

As loot boxes have become increasingly prevalent in contemporary digital games, concerns have emerged over their potentially exploitative or predatory nature, particularly regarding those that require payment to open. Furthermore, recent meta-analyses have shown links between excessive consumption of loot boxes, and both problematic video gaming, and problem gambling [42,43,85,103].

A further issue surrounding loot boxes and the items they provide to players, is that of the third-party marketplaces and gambling platforms that have been created around them [66]. This phenomenon, known as skins gambling [47] gained increasing attention and, to a certain degree, notoriety in the mid-2010s which, in turn, led to *Valve* issuing several cease-and-desist notices to third-party sites [14]. However, enforcement of these notices has been irregular, and a host of third-party sites, using the *Steam* API, still offer players a place to either sell, or gamble with virtual items obtained from loot boxes [46].

2.1.1 Defining Loot Boxes. While academic and regulatory investigations into loot boxes have been steadily growing over the previous five years, there is no single, commonly agreed upon definition of loot boxes, making categorical classification and comparison problematic. This is, no doubt, due to the diverse range of formats which have been included under the term [21,78,88]. This lack of conceptual clarity has been highlighted as an issue of concern, one with significant practical ramifications [129]. A common approach has been to describe loot boxes as an in-game mechanic for randomly distributing rewards to players, with some researchers referencing structural similarities to gambling, while others focus on the contents [83,100,122]. Unfortunately, such descriptions are not suitable to be used as a framework for examining the structural characteristics of different virtual items to evaluate points of potential similarity and difference. Perhaps the most comprehensive definition is presented by Brooks and Clark [13], as it incorporates the following aspects: randomized rewards, enhanced audiovisual feedback, range of cosmetic or functional rewards, rewards of varying value to players, and the potential to incur financial loss.

Alternative approaches to understanding and quantifying loot boxes have attempted to address the question through developing taxonomies or conceptual frameworks [88]. For instance, Ballou et al. conducted extensive research in this area and identified 32 mechanics distributed among six distinct domains [8]. However, the authors acknowledge that while such a granular model provides a basis for distinguishing among different loot box implementations, evaluating individual loot box-like items in depth is challenging with such a model. Further, many of the model's domains contain items not exclusive to loot boxes. As an example, the domain "point of purchase" contains items relating to how loot boxes are potentially obtained, i.e., whether direct purchase is possible with real-world currencies, or whether there is a currency conversion; neither of these items are exclusive to loot boxes. Since many of the items listed among the domain are not specific to loot boxes, the model itself, while functioning as a mean to understand different implementations among loot boxes, is not sufficient to distinguish between loot boxes, and other non-randomized content, such as virtual items or services. Other works have attempted to deepen the understanding of loot boxes by identifying important themes that emerge from players' personal experiences [56,76]. As with the items and domains identified by Ballou et al., these conceptual frameworks deepen our understanding of how loot boxes are implemented but do not actively serve to define loot boxes. Considering the diverse attempts to understand and describe loot boxes, this work developed the following set of characteristics for evaluating loot boxes, as it draws from both previous research, and the authors' personal experience.

The one aspect upon which all sources agree is that loot boxes are used to distribute in-game items (cosmetic or functional) via a form of random number generation¹, also conceptualized as

¹ The method by which loot boxes allocate rewards is often referred to as "random number generation" (RNG), however, the actual method is a form of pseudo-random number generation [88]. Furthermore, it is acknowledged that the algorithms used to generate these pseudo-random numbers can be manipulated based on individual player data [119].

the element of chance [21,37,41]. Therefore, the first defining characteristic of a loot box is that is:

1. That they are a means of randomly distributing in-game items to players.

Given the context of enquiry, it is no surprise that the relationship between loot boxes and profit/loss is a feature of many recent reports [21,37,41], with some highlighting the fact that loot boxes require payment to open [73], while others focus on the potential value or “tradability” of items received from loot box opening [83]. Value can refer to functional in-game resources which affect the gameplay (credits, currency, attribute/ability enhancements, etc.), or cosmetic items which affect the game aesthetic (emotes, audio clips, graffiti sprays, skins, etc.). The former type holds utilitarian value for players, while the latter holds affective value [6,51]. The value afforded by these items gives rise to the potential for profit or loss to be accrued as a result [37,41]. The second defining characteristic of a loot box is thus:

2. That their contents afford the potential for profit or loss.

A key matter under consideration is the extent to which loot boxes are integrated into the games in which they feature; the degree to which they can be said to constitute an exploitative mechanic and, therefore, one which requires scrutiny [67]. Multiple stakeholders in the games industry have explicitly stated that they define loot boxes as being optional, and that players can decide for themselves whether to use them [69].

Given the carefully designed choice architecture of contemporary digital environments [11], and the perceived social pressures [75], the degree to which opening loot boxes can be considered a truly optional activity is one which is a matter of debate. The issue is further muddied with the presence of both cosmetic and functional items as rewards in loot boxes [78]. However, loot boxes were first introduced as an addition to games, one which provided additional game content, i.e., “skins”, to players without materially influencing the core game [57]. Although loot boxes have since incorporated functional content, these items are generally accepted by players as long as they do not confer a significant advantage, and the game can be meaningfully played without them. When loot boxes do provide items which give significant advantage to players, the game is often referred to as “pay-to-win”; indeed, it is this very issue which brought the debate around loot boxes to the attention of mainstream media and politicians after unprecedented criticism from the playing community [109]. In summary, while functional items obtained via loot boxes may affect an individual’s in-game performance, they are not required to meaningfully engage with the core gameplay. When the underlying logic and form of the game is fundamentally affected by such in-game items, they no longer conform to the expectations of players, nor the original concept of loot boxes, and the expectations of players. As such, the third characteristic of a loot box is:

3. That opening them is not integral to the core gameplay experience; the game can be meaningfully played without requiring access to their contents.

There are many ways in which reward mechanics are implemented in contemporary games, with some games providing loot boxes that can be accessed via payments, watching advertisements, or investing time [21,37]. In other games, loot boxes are an optional feature, not required to be interacted with when engaging in the core gameplay session, instead they are awarded or accessed through a separate menu or interface [21,62]. Alternatively, some games provide rewards to players strictly as part of the core gameplay, usually linked to in-game

performance or achievements [21,88]. In such games, rewards are accessed directly as they cannot choose to purchase, or “earn”, rewards through financial payment or other form of investment [21,43]. This is significant as it is the use of direct payment to access loot boxes which research has been highlighted as a key issue in the development of potential problematic behaviors [23,73,77,128], an issue further compounded by the promotion of bundled content and seasonal offers. These promotions, only possible via an interface outside of the core gameplay session, serve to induce fear-of-missing-out and to manipulate scarcity of individual reward items [61]. As such, our fourth characteristic for a loot box is:

4. That accessing/opening them is a separate activity from the core gameplay experience, often via a distinct, tailored interface.

A recent report by the Advisory Board for Safer Gambling delivered to the Gambling Commission of the United Kingdom highlights both the audiovisual stimulation accompanying loot box opening and the potential for unlimited or uncontrolled spending as significant factors as to why monetized loot boxes should not be available for children [41]. In a recent investigation of loot box engagement, researchers observed that the “theatrical” aspect of opening loot boxes played a significant role in the reactions of many participants, highlighting the strong connection between the features of the opening experience and the responses of the person opening the loot box [87]. Prior research supports this position, as the audiovisual presentation of loot boxes and loot box openings has been found to mirror that of slot machines and is associated with potentially problematic consumption [13,60]. Such presentation gives rise to maladaptive cognitions common among gamblers, including “near misses” [25] and “losses disguised as wins” [32] that are exploited in established gambling games [21]. Although physical pack openings involve some sensory experiences, such as the smell of the cards and their arrangement in order of rarity, digital loot boxes offer a much wider range of affective, sensory stimuli, including visual and audio cues, and the potential to fill progress metrics within the game [21,37]. Accordingly, this work proposes that the fifth characteristic of a loot box is:

5. That their openings are accompanied by a high degree of audiovisual stimulation and/or techniques which mirror those employed in games offered by the gambling industry.

This research will focus solely on loot boxes as defined by the five characteristics identified above and will not consider other forms of randomized reward mechanics that are integrated into normal gameplay and do not require or allow payment through a separate interface to access (as outlined in point 4). Even if they bear some similarities to loot boxes, i.e., opening crates or looting monsters during gameplay, they will not be included in our definition.

2.2 Collectible Card Games

Collectible card games involve players battling using a personal deck of cards, each with unique functions and effects, where the rarest cards are often the most powerful [3]. Cards are obtained through two primary means: direct purchase of sealed, randomized packs of cards known as booster packs [131], and purchase of individual cards through an established secondary market, with card values determined by specific function, rarity, and demand [27].

Given that the contents of booster packs for CCGs are randomized, the contents of a booster pack can potentially exceed the cost of purchase when sold on the resale market. However, the contents of a pack are not guaranteed, and it is not uncommon for some of the contents of a booster pack to be of little value [50], even though many CCG booster packs print the odds of receiving different rarities of cards on the exterior packaging. The fact that value is based on a combination of card function and rarity means that rare cards are not always highly valued. For example, in a booster pack of a recent set, *Innistrad: Midnight Hunt*, players may receive a mythic rare with very different valuations, such as either “Consuming Blob” or “The Meathook Massacre”. According to Europe’s largest third-party marketplace, *Cardmarket.com*, at the time of writing, *Consuming Blob* has a 30-day average price of around €0.60 [16], while *The Meathook Massacre* of around €40 [17].

As the value of cards contained within booster packs can vary significantly between each pack, parallels have been drawn with loot boxes, where similar fluctuations of value are observed [49,131]. However, unlike loot boxes and digital booster packs, the contents of physical booster packs are determined at the point of manufacture and cannot be amended or otherwise altered post-production² and once purchased, players own the cards rather than just a license to use them [53].

To date, most research concerning CCGs has been largely concerned with understanding them as games. For example, research has looked at the mechanics of CCGs [101], motivations to play them [107], and the communities found around them [3]. However, there has been limited research into the addictive potential of CCGs in general [15], and the possible conceptualization of booster pack purchasing as problematic gambling [131]. A 2002 study examined the history of lawsuits in the United States in respect to the trading card games, a format closely connected to CCGs [35]. These lawsuits framed such games as a form of gambling, while the study itself noted the potentially problematic behaviors that highly desirable, rare cards, termed ‘chase-cards’ could engender in children [35].

2.3 Comparing Booster Packs and Loot Boxes

Attempts to establish points of similarity and difference between booster packs and loot boxes become blurred when discussing games that feature pack-like openings of virtual goods, such as in the *FIFA* and *NHL* series, and digital card games, such as *Hearthstone* and *Magic Arena* [72,131]. Both *FIFA* and *NHL* in their *Ultimate Team* game modes operate using pack-like boosters featuring football players that players can place on their teams and play with [72]. Arguably, one could define these packs as booster packs, as there is a direct link to the traditional booster packs sold by different sports franchises [96,118]. In digital card games, players often open digital packs akin to physical booster packs, containing cards that the player then acquires [107]. Often digital packs are reminiscent of traditional booster packs, with an opening animation including firework-

² While physical cards cannot be altered after production per se, functional changes to some small, specific elements of cards in the past, have been made after printing (‘errata’).

type effects and a sprawl of goods before the player (see figure 2). This form of enhanced audiovisual presentation is like that of loot boxes, discussed in section 2.1.1, and highlights the affective qualities of digital or virtual items that cannot be present when opening physical items.

While prior research on CCGs exists, only recently have there been quantitative, empirical studies to understand the relationships between CCG booster pack purchasing, and their potential connection to gambling and digital loot boxes. Zendle et al. [131], studied the links between expenditure on physical CCG booster packs, and levels of problem behavior related to gambling. While no statistically significant links were found purchase and consumption could be a determining factor in their evident lack of connection to problematic gambling. Furthermore, the study explicitly states that the authors consider ‘virtual’ packs in games such Hearthstone and FIFA to be loot boxes. Conversely, our study does not adopt such a position, and examines potential differences between all three products.

These distinctions between physical booster packs and digital loot boxes were further highlighted by a report from the Norwegian Consumer Council on loot boxes [37]. First, digital platforms and games that sell loot boxes often make use of “deceptive designs” (p. 13) that exploit cognitive or behavioral biases and vulnerabilities, such as fear of missing out, and sunk cost fallacy to incentivize and prolong spending. Second, the report mentions “opaque algorithms and skewed probabilities” (p. 16) that take advantage of the virtual space to, for example, potentially alter probabilities based on user data. Third, “aggressive marketing” (p. 18) is often used, as games are transformed into advertising platforms, using pop-up notifications and prominent banners to push players to consume excessively through, for example, limited offers. Fourth, using “in-game currencies and hidden pricing” (p. 19), games can abstract and hide the actual costs of in-game content, such as loot boxes. Fifth, the overall “high cost of freemium and potential for endless grinding” (p. 20) is noted, as games that offer loot boxes are often marketed as ‘free-to-play’, however without paying for content, players can be at a disadvantage, or face time-gated constraints during their game sessions. Finally, the report notes the potential “risk of losing content” (p. 21), as players rarely gain actual ownership of the content they purchase, and normally game developers retain the rights to alter or remove any content as they wish.

2.4 Booster packs and Loot Boxes as Gambling

The nature of physical booster packs and loot boxes, as defined in section 2.3, are similar in general outline; both offer the players randomly selected items that have the potential to be worth more in secondary marketplaces than the costs of opening. It is unsurprising therefore, that parallels have been drawn with established gambling activities such as slot machines and other electronic gaming machines [28,84]. However, the legal status is more muddled with a handful of regulators considering that specific forms of loot boxes constitute gambling [100,119], while no regulators have yet categorized CCGs as gambling.

Approaching the issue from a psychosocial perspective, following an extensive review Williams et al. [112] define gambling as constituting five different elements:

1. A person is staking money or something of material value.
2. The purpose of making the stake is to win additional money and/or material goods.
3. The prize consists of additional money or material goods.
4. The stake is lost, or the prize is won depending on the outcome of an event that will occur.
5. The outcome of the event is ‘uncertain’.

Many different definitions for gambling have been presented previously, with Griffiths’ earlier work [48] proposing a set of elements which, in addition to those presented by Williams et al., included the two following additions:

6. Winners gain at the sole expense of losers.
7. Losses can be avoided by not taking part in the gamble.

Both physical booster packs and loot boxes arguably share many of these criteria from both definitions: 1) both involve an exchange of something of material value, 2) the purpose of opening both is often to gain something of value, 3) items have value, whether in terms of the secondary market or in terms of value to the player, 4) the loss of stake or “winning” of the item is determined by future events, and 5) the outcome of these events is unknown and chance-based. Additionally, 7) losses can be avoided by simply not purchasing the loot box or booster pack. However, while digital loot boxes do not meet the sixth point, arguably physical booster packs do, as there is a limited number of physical booster packs available in circulation.

It seems physical booster packs meet all the criteria to be considered gambling according to the above-mentioned psychosocial definitions, whereas loot boxes which require payment to open meet six of the seven. Although not part of these definitions, it is noteworthy that several reports focused on loot boxes have explicitly distinguished loot boxes from physical booster packs according to several criteria, namely related to the virtual environment loot boxes exist in, as they can offer a vastly different experience compared to physical booster pack openings [21,37,41].

Attempts to regulate loot boxes as gambling have been made by various national regulatory bodies across the world, with those of Belgium [9] and the Netherlands [22] featuring most prominently in discussions. However, doubts have been raised regarding the efficacy of these specific regulations [121]. In addition, it has been noted that pan-European regulation presents its own challenges, as member states have come to different conclusions on the nature of ‘loot boxes’, and as exclusive focus on loot boxes may eventually result in the neglect of other problematic game designs, and monetization methods [21]. Currently, a range of bodies are conducting ongoing investigations and consultancies while, at the same time individual politicians are proposing primary legislation targeting loot boxes, highlighting the increasing awareness of these issues in more mainstream channels [22,55,99,102].

3 METHODS

To answer the presented research question, our study deploys a method closely related to the application walkthrough method [74] to assess the relevant game mechanics of Magic Arena. This study follows examples set by previous research, where specific games and platforms were analyzed using methods closely resembling both the walkthrough method [58], and interface study [124,125].

The app walkthrough method was chosen as the primary methodology for the following reasons: 1) it allows for intensive analysis of Magic Arena through directly engaging with the platforms' interface and various design elements; and 2) through this intensive observation and analysis, we can determine the nature of booster packs in Magic Arena, and the role they play in both playing the game, and in the in-game economy.

The data for this study was primarily collected through interaction with the Magic Arena client by the main author. This involved a significant amount of time spent playing the game and observing and participating in various aspects of the economy, supplementary content ("mastery pass"), and ongoing in-game events. As Light et al. suggest in their description of the walkthrough method, "the walkthrough technique of stepping through the app incorporates elements of ethnography through observation and generating field notes" (p. 887). To further analyze and understand the different aspects of the game platform, such as design choices and individual game mechanics, this study utilizes a form of content analysis tailored for video games [97]. The observations resulting from this analysis are divided into five distinct categories in the following chapter: gameplay, card collection methods, the seasonal pass, game economy, and a comparison of booster packs in Magic Arena to both physical booster packs and loot boxes.

4 THE CASE OF MAGIC ARENA

4.1 Gameplay of Magic Arena

Based on the core gameplay of Magic: The Gathering, Magic Arena is essentially a digital translation of the physical card game; while the same game rules apply to both versions, variations in gameplay situations arise due to the availability of different cards in the physical and digital versions. In a typical game of Magic, players use a deck of cards featuring various creatures, spells, and abilities to defeat their opponent. Each player has a limited number of resources, or 'mana', represented normally by land cards, which they can use to cast spells and summon creatures. Players can use this mana to play cards from their hand, with each card having a specific mana cost. The goal of the game is usually to reduce your opponent's life total to zero before they can do the same to you.

MTG is often separated into two main formats, limited, and constructed [104]. In constructed, players use their collection of gathered cards to create a deck and play, whereas in limited, the players create their deck from a pool of cards opened from packs during the setup of the limited game mode. Besides a variety of different formats in Magic Arena, the game also offers rotating events in which players can participate and compete, for example the 'Arena Open' [115]. Arena Open is a two-day event, with a maximum prize reward of \$2000 for each player who can manage to win a total of 12 best-of-three matches across the two days.

Both the inherent randomness of a draw-based card game, and the land-mana system employed (essentially requiring a player to draw specific cards to play the game), means that some games of Magic can be decided solely according to who has the better draws. According to MTG Elo Project, a website that hosts match data of professional MTG players starting from the late 1990s [86], only a handful of pro players in the world have achieved a win rate of over 65% from the pro matches they have played. Thus, events such as the Arena Open that require a win rate of over 80% to qualify for monetary prizes, arguably depend heavily on luck in addition to skill. These types of high-risk, high-reward events are arguably reminiscent of skill-based gambling games, such as poker. However, unlike poker, Magic Arena requires that players supply their own decks, given the significant influence of chance in acquiring the cards needed to

construct decks it is not unreasonable to conclude that players who spend more on booster packs to acquire cards are at a significant advantage. As this pay-to-win/compete factor is stacked on top of gameplay and events that are heavily influenced by chance, it can create additional issues in attempts to increase the game's professional popularity.

4.2 Card Collecting in Magic Arena

In Magic Arena, players can acquire cards via three main methods: 1) opening booster packs, 2) crafting individual cards by spending a currency known as 'wildcards', and 3) participating in limited events (i.e., draft and sealed)

Opening booster packs from specific sets is one of the main ways players acquire cards in the game, as each sixth, and 30th, opened booster pack nets the player a rare, and a mythic wildcard, respectively. Overall, there are four levels of rarity in the game: common, uncommon, rare, and mythic rare. Common cards are the most plentiful and generally have the lowest power level, while mythic rare cards are the scarcest and tend to have the highest power level. Wildcards can be spent to craft an individual card of the same rarity as the wildcard. Notably, Magic Arena has offered temporary deals in the past to purchase rare and/or mythic rare wildcards directly with real currencies through the in-game shop, thereby assigning a specific monetary value to these cards [59].

Additionally, cards can be acquired through specific limited modes, such as draft, where players circulate three booster packs between seven other players (or computer opponents), and each round, pick one card from the pack and pass it on to the next player. If the draft event was not specifically a 'phantom draft', the picked cards are added to the player's collection after the event is finished. However, entering the current premium draft where card collecting is possible costs approximately €7,5-10 of in-game currency. With a 50%-win rate the player has an approximately even return in terms of gained value; the maximum number of wins from this event (~77% win rate needed) rewards players with approximately €20-26 worth of packs and in-game currency combined, more than doubling their stake.

An important characteristic of the Magic Arena platform in comparison to its physical counterpart is the lack of any type of card trading between players (see table 2). The secondary market of Magic the Gathering, i.e., trading and selling of cards via third-party marketplaces, is a significant part of the game economy and a staple way of acquiring cards for many [27]. As Magic Arena lacks this part of the economy, and acquiring cards happens predominantly via opening boosters to acquire both cards and wildcards, the constant consumption of what are essentially loot boxes can exacerbate problematic behaviors. Notably, while there have been special offers to purchase wildcards directly in Magic Arena, they have been limited both by the number of wildcards available for purchase per player, and the time constrained availability of the offers [59].

4.3 Seasonal 'Mastery' Pass of Magic Arena

As with many contemporary free-to-play games, Magic Arena also employs a seasonal pass, these are also commonly known as battle passes [58]. Seasonal passes in contemporary games are multifunctional: they are used as a monetization tool, a way of delivering random rewards to players, and keep players engaged through a progression system [58,124]. The seasonal pass in Arena is known as the "set mastery pass" [116], and it offers players tiered rewards and a sense of progression, resetting when a new set is released. Figure 1 highlights the presentation of the

pass in Magic Arena. The upper row is the standard free-to-play tier, open to all players, and the lower part is the ‘premium’ tier, which players can access by spending approximately €17-22 worth of gems. Rewards from the pass ranged from cosmetic items to booster packs to random rare and mythic rare cards.



Fig. 1. Magic Arena ‘Mastery’ pass for the set *Phyrexia: All Will be One*. February, 2023.

Progress through the pass is made by earning experience points (XP), gained from daily quests, weekly wins, and special events. A recent mastery pass for the set Dominaria United, for example, had a total of 80 levels (66 for the non-premium) of rewards [116]. The pass began on the 9th of September 2022 and lasted until November 18th 2022. This gave the players 11 weeks to gain 80 000 XP to reach all the levels of rewards for the premium side (1000 XP for a single level). To unlock all the premium rewards without making additional purchases, players would have needed to earn 80 levels worth of XP during the 11-week pass period. By estimation, during this time, players were able to gain a total of 99 000 steadily available XP from quests (77 quests, each worth 500 XP), weekly wins (c. 165 wins, each worth 250 XP), and through daily wins (25 XP each, up to 10 wins a day). So, while the steadily available amount of XP was more than needed to complete the pass, players would still have to devote their time to weekly play sessions to gain at least 80% of the available XP to complete the premium side of the pass. As the mastery pass of Magic Arena is currently the only method of steadily acquiring additional booster packs without supplementary purchases, for players who do not spend money on the game, keeping up progress with the pass is a necessity for card acquisition, and subsequent competition in many of the game’s formats and events. And, as much of the pass rewards revolve around gaining additional cards through booster packs and random individual card rewards, there is an inherent need even for paying players to keep up with the progression if a player wishes to grow their collection further. This need for weekly gameplay sessions to gain the required amounts of XP can engender cognitions such as fear of missing out, and sunk cost fallacy, particularly if a player has spent money on the pass. Recent research has pointed out a need to address these seasonal passes and

similar game mechanics both as a form of gamblified content [124,125], and as potentially addictive, especially among adolescents [18].

4.4 Economy of Magic Arena

Magic Arena operates on a standard free-to-play (f2p) model [4], meaning that it maximizes player engagement through advertisement, timed events, and daily deals to ensure ongoing monetization of players [52]. As with many other f2p games Magic Arena has a two-tiered currency system [68], in this case: gold and gems, either of which can be used to enter events and to purchase both booster packs and wildcards. Gold is the standard currency of the game, it is earned through completing daily quests, progressing in the mastery pass, or won by competing in events. Gems are the premium currency of Magic Arena and can be purchased directly with real money in the in-game store with varying ratios (150-200 gems to €1). Besides direct purchase, players can acquire gems by progressing in the mastery pass and by competing in different in-game events. Wildcards can be acquired by opening booster packs, and to lesser extent, by progressing in the mastery pass.

A normal booster pack of a specific set costs approximately €1 worth of gems at the time of writing. Opening a booster pack nets the player 5 common cards, 2 uncommon cards, and 1 rare or mythic rare card. Each card of a specific rarity slot can be randomly replaced with a wildcard of that rarity. In addition to acquiring cards, each opening of a pack progresses a wildcard wheel: for each 6 packs opened, the player receives an uncommon and a rare wildcard, and for each 30 packs opened, a mythic rare wildcard (see figure 2). Thus, the wildcard wheel essentially functions as a pity-timer [123], rewarding the player a minimum number of specific wildcards per pack opened. Thus, one guaranteed rare wildcard from pack openings costs around €6-8, and 1 mythic rare around €30-40. As new cards and sets are constantly being added, WotC has been releasing information on the reward distribution in Magic Arena, including odds for the chances of upgrading the rare card in a pack to a mythic rare [113].



Fig. 2. Booster pack opening in Magic Arena. The wildcard wheel is displayed in the top right corner. February, 2023.

Contrary to the physical version of the game where gameplay and card acquisition can happen without engagement with WotC or Hasbro, the Magic Arena platform is restricted to the terms and conditions set by the parent companies. Notably, in events where real prize money is involved players under 18 cannot take part. However, although Magic Arena currently has a PEGI rating of 13+, there are no practical controls which restrict access to individuals under that age.

This is where Magic Arena disconnects most heavily from its physical counterpart (see table 2); while MTG as a physical card game distributes randomized booster packs for purchase, the ability to purchase specific cards via the secondary market allows players the possibility to participate without purchasing randomized booster packs. In contrast, Magic Arena does not currently offer any permanent way to purchase individual cards, and card acquisition is primarily accomplished via opening booster packs. This point gains increased significance as, on occasion, Magic Arena players have been required to compete in events such as the Arena Open using only cards from their own collection [114], enforcing the need to purchase booster packs if they wish to remain competitive.

4.5 Booster Packs as Loot Boxes?

The MTG franchise is the most appropriate venue for examining the potential similarities and differences because it offers gameplay in both physical and digital realms. Furthermore, it is one of the most popular and well-established forms of collectible card games, a format which has been directly referenced by both players and industry representatives as an argument against regulating loot boxes [76]. Table 1 compares the physical and digital versions of Magic to an established digital game containing loot boxes, *CounterStrike: Global Offensive* (CS:GO), to answer the question of whether booster packs in CCGs can be considered loot boxes. CS:GO was chosen as a point of comparison as it is a game which is intimately connected to discussions concerning the ongoing convergence of gaming and gambling, both in terms of loot boxes and the wider, gamblified ecosystem [106].

By examining these attributes, we can determine that digital booster packs in Magic Arena meet four of the five loot box characteristics. First, the booster packs are chance based, even though the odds for acquiring different card rarities are known. Second, purchasing a booster pack in the game costs either gold or gems; as purchasing a booster pack is the only consistent means of acquiring new cards, if players do not receive useful, and therefore valuable cards, their initial investment is lost. However, as noted in the table, there is no marketplace between players in the game, or any way to accrue value from the contents outside of the game, as with CS:GO and similar games. In fact, Magic Arena contains two specific mechanisms which obscure this loss; in addition to the wildcard wheel described in section 4.4, any common and uncommon duplicate cards received are added to the player's "vault" which, when full, awards the player 1 mythic rare card, 2 rare cards, and 3 uncommon cards [113]. However, the amount contributed to the vault by each copy of common and uncommon cards beyond the fourth (measured in percentage, can be opened when it reached 100%) is minimal (0,1% progression for 1 common, 0,3% for 1 uncommon). As such, both the wildcard wheel and the vault are presented in such a way to suggest that players are gaining items of value, but in practical terms the "value" afforded by these mechanisms are negligible, and far less than the cost of purchasing a booster pack. Three, while Magic Arena can offer booster packs for the player to open for free via special promotions or the free tier of the mastery pass, in practical terms the time needed to accrue a collection that would allow players to meaningfully compete with other players is prohibitive. Four, while opening booster packs is done via a separate, tailored interface, they are not an "optional" extra,

as players need to open booster packs to play most of the game modes competitively, and to learn the intricacies of the game. As the level of your overall competitiveness in the game with other players is in many formats directly influenced by the size of your card collection, players who spend more on the game are at a clear advantage. Finally, the opening of booster packs in Magic Arena is accompanied by an audiovisually stimulating experience (figure 2). Opening a single pack has a feature reminiscent of the ‘near-miss’ [25,128], as the rare or mythic rare slot in a pack is, at first, hidden to the player, and they must click on the card to reveal it. Furthermore, as with slot machines that provide payouts less than the cost of play, providing players of Magic Arena with cards of no meaningful value is an example of “losses disguised as wins” [32,103]. Finally, the game employs features such as the wildcard wheel (see figure 2), and a new ‘golden pack’ [117] mechanic, which can both induce feelings of sunk cost in players [5,66]

Table 1. Comparison of loot boxes, digital booster packs, and physical booster packs.

Definitions (section 2.1.1)	Loot boxes in CS: GO	Booster packs in Magic Arena (digital)	Booster packs in MTG (physical)
1. <i>“That they are a means of randomly distributing in-game items to players.”</i>	Yes	Yes	Yes
2. <i>“That their contents afford the potential for profit or loss.”</i>	Yes	Yes, however, there is no secondary marketplace in the game, and contents from booster packs cannot be transferred outside of the game	Yes
3. <i>“That opening them is not integral to the core gameplay experience; the game can be meaningfully played without requiring access to their contents.”</i>	Yes	No. While opening packs is distinct from the main game, many game formats cannot be played without cards that are obtained mainly from opening boosters.	No. While there is a secondary market for individual cards, allowing direct purchase, the cards originally enter circulation through booster pack opening.
4. <i>“That accessing/opening them is a separate activity from the core gameplay experience, often via a distinct, tailored interface.”</i>	Yes	Yes	Constructed formats: Yes Limited formats: No
5. <i>“That their openings are accompanied by a high degree of audiovisual stimulation and/or techniques which mirror those employed in games offered by the gambling industry.”</i>	Yes	Yes	No

As evident from table 1, physical booster packs predominantly adhere to three of the five characteristics of loot boxes (1st, 2nd, and 4th), although this is dependent upon which game mode

is being played. First, as with loot boxes and digital booster packs, they are a means of distributing randomized content, and second, the contents have an inherent profit or loss opportunity, as individual cards can have a higher value among secondary markets than the initial cost of the booster pack, or conversely that the contents were less valuable than the price of purchase. Regarding the third and fourth features, opening physical booster packs can be both integral, and separated, depending on the game format being played. Constructed formats in MTG can be played without access to booster packs, as secondary markets exist that allow the purchase of single cards. As a caveat, however, while some players may gather a collection through purchase of individual cards, virtually all those cards have been previously accessed by someone else via booster packs. Conversely, in limited formats, commonly played in tournaments, pack opening is integrated into the game setup itself. This act of opening individual card packs done by players during the limited format setups is not present in the digital Magic Arena limited gameplay, as players have immediate access to the already opened card pool. Finally, unlike both loot boxes in CS: GO, and digital booster packs in Magic Arena, opening physical booster packs are neither accompanied by the same degree of audiovisual experiences (see table 2), nor reminiscent of slot machines and other online casino games.

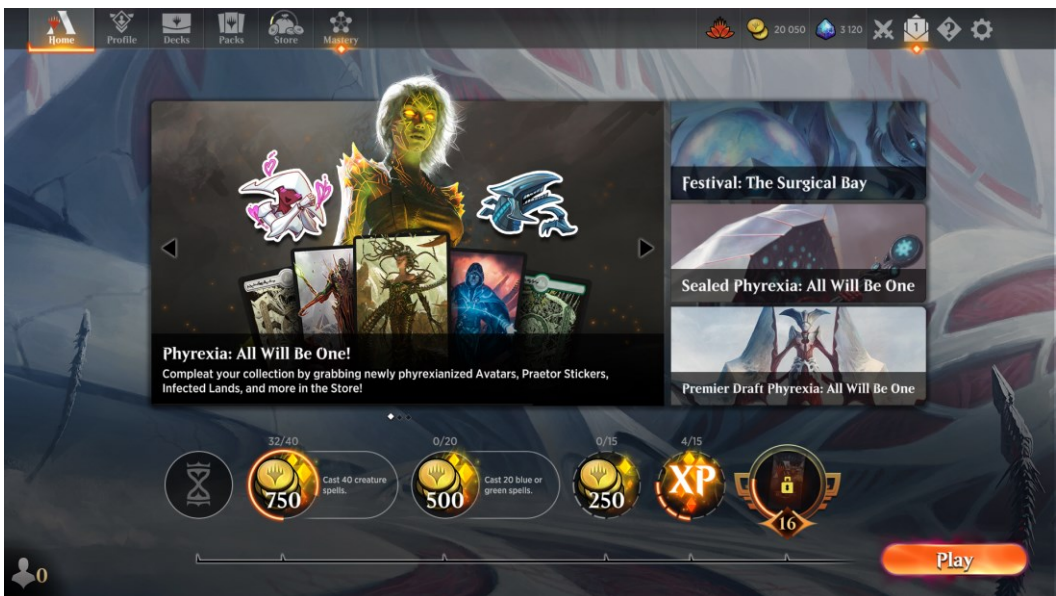


Fig. 3. Main screen of Magic Arena. February, 2023.

Overall, many of the features of loot boxes described in the report by the Norwegian Consumer Council [37], (section 2.4), are also evident among Magic Arena booster packs, and the Magic Arena client. A form of the “deceptive design”, and the “endless grind” can be observed in the implementation of the mastery pass (see figure 1), as there is an artificial need to continuously complete weekly wins and daily quests to progress. “Aggressive advertisement” is also present (figure 3), as the game client endlessly advertises both daily deals and timed events for the players to spend their currencies on. Evidently, players are encouraged to spend as much time on the game client as possible. This can often translate into increased spending on booster packs out of the necessity to gather a collection to compete. Additionally, players are encouraged to spend

currencies on both the mastery pass to access even more booster packs, and on events with high-risk, high-reward stakes. Finally, the game utilizes player data to adapt the probabilities of players receiving valuable cards and currencies through such mechanics as the wildcard wheel track (see figure 2), or the recently introduced the “golden pack” [117] track that necessitates direct purchase of packs.

Table 2. Summary of primary differences between physical MTG, and Magic Arena

Characteristics	Physical MTG	Magic Arena
Secondary market	Yes	No
Trading between players	Yes	No
Mechanics necessitating daily and weekly gameplay	No	Yes
Adaptive based on player data	No	Yes
Audiovisually enhanced pack opening	No	Yes

5 DISCUSSION

The presented work utilizes the app walkthrough method [74] to investigate points of difference and similarity between loot boxes and booster packs featured in collectible card games, both in physical and digital formats. In addition, a review of both regulatory and academic sources allowed the identification of several key characteristics which can be used to identify loot boxes and booster packs and evaluate their potential status as gambling. These characteristics facilitated direct comparison between loot boxes, physical booster packs and digital booster packs.

Our findings indicate that both booster packs (physical and digital) and digital loot boxes contain an element of chance and can be deemed as constituting gambling according to psychosocial, if not legal, definitions. However, significant differences exist regarding the presentation of digital and physical booster packs and, consequently, the potentially problematic impact they have on players. These findings provide evidence which calls into question the position that because loot boxes and CCGs share similar structural characteristics, they are not meaningfully different from one another. Furthermore, differences exist between physical and digital implementations of CCGs, with digital versions having more features which can be considered as being either manipulative or exploitative. This has implications both for the ways in which these monetized in-game mechanics are regulated, and, therefore, the choices that must be made during the design process. These choices must be informed not only by commercial needs and legislative requirements but by ethical and moral considerations regarding the potential for the game mechanic to encourage or facilitate potentially problematic consumption behavior in players.

Overall, physical booster packs are presented in a more transparent manner, with players able to make an informed decision based on prices of booster packs, and the availability of secondary markets to purchase individual cards. In contrast, loot boxes and digital booster packs are presented in more opaquely, with players often subjected to deceptive design, aggressive marketing, obfuscated spending via in-game currencies, and the potential use of player data to skew odds [1,36,45,131]. Alongside this, digital booster packs are reminiscent of loot boxes in that they employ psychologically stimulating, audiovisual effects to accompany openings (see figure

2) as well as techniques utilized in established gambling activities such as slot machines [60]. Seasonal passes in contemporary digital games, such as Magic Arena's 'mastery pass', may also enforce potentially problematic behavior patterns. Our findings also reinforce the suggestion that digital environments play a key role in engendering potentially problematic behaviors by utilizing mechanics that take advantage of maladaptive cognitions, as noted by the Norwegian Council report [37], and other researchers [1,45,131]. As such, members of the HCI community, whether concerned with the design of video games or other digital services and products, should be aware of how these common monetization techniques are perceived by regulators, whether in respect to existing legislation or proposals currently under consideration [71].

This research found that digital booster packs in Magic Arena function similarly to loot boxes. Essentially, they are a means of distributing randomized content to players, with the potential of loss of initial stake, if the player receives undesired cards from the purchased pack. However, as our analysis noted, the digital booster packs differ from loot boxes in games, such as Counter Strike: Global Offensive, in that the contents are not directly transferable to real-world value as no secondary marketplace exists. The second important distinction of booster packs in Magic Arena from loot boxes in CS: GO regards the fact that they are an integral aspect of the game, it cannot be meaningfully played without access to the contents of the packs. While there can be players who are not actively participating collecting cards, and effectively only play the game through draft events where collections do not play a role, these events have an entry free to participate in, and there is no guaranteed 'free' option to solely play draft modes. Additionally, as Magic Arena has, in the past, offered events that will let the player compete for actual monetary prizes via events other than limited [114], the importance of these booster packs is heightened, as they are the primary means for obtaining cards which are required to play the game and, therefore, used to compete in these events and to win prize money. The industry's consideration of loot boxes as an optional addition to the main game [69], and which employ "surprise mechanics" common to many games [43], also highlights an important conceptual point regarding the language used to discuss these digital items. The term loot box is an umbrella term derived from aesthetic qualities of these game items and is used to refer to a range of different, game-specific implementations, as such it can be said to be lacking in conceptual clarity [21]. In an attempt to address this issue, prior research has proposed "Random Reward Mechanisms" (RRMs) be used in place of loot boxes [88]. This approach has been criticized as adopting "RRM" would mean that loot boxes which require no payment to open, and whose contents cannot be exchanged, would also be included in the definition, even though such implementations are not generally considered problematic. Instead, it has been proposed that when discussing paid loot boxes specifically, the term "Randomised Monetisation Method" be used [120]. While both approaches have value and attempt to bring much needed clarity to discussions around loot boxes, neither adequately address the issue of "payment" via formats which are not explicitly financial yet incur a cost to the player. Furthermore, neither approach addresses the degree to which these mechanisms are embedded within a game, i.e., the degree to which players are required to engage with them to be able to meaningfully play.

Acquiring cards is, by definition, the key to playing collectible card games, as they are the basis upon which the games are built, and the game cannot be played without them. This is the fundamental characteristic which separates booster packs in CCGs from loot boxes in video games, irrespective of whether the rewards in loot boxes are cosmetic or functional. That both booster packs and loot boxes use (pseudo) random number generation to allocate rewards provides an outward appearance of equivalence, however, the similarity ends when the need to

use these items is considered. Loot boxes were first developed to monetize games by providing additional content to players [57], as they extended the core game into new areas, primarily through collectible cosmetics, but also with functional items. If these functional items serve to materially affect the balance of the game, in effect introducing a “pay-to-win” dynamic into the game, they are no longer extensions of the game, but instead become items without which the game cannot be meaningfully played. Therefore, this work proposes that, rather than focusing solely on the degree to which randomized monetization mechanics are embedded in economic terms, consideration should also be paid to the degree to which accessing such mechanics is a requisite part of the core gameplay. Following this logic, employing the term loot boxes in reference to games such as FIFA Ultimate Team, or Hearthstone should be avoided as they both require players to use content that can only be obtained via (pseudo) randomization. This may, at first, appear to be a semantic distinction, but it has important ramifications for the design of such systems, requiring designers to make moral and ethical decisions about the way in which content is promoted to players, the timeframe in which such content remains relevant to the game, and what value is returned to players when they receive duplicates of content they have already received.

Physical booster packs, such as those found in MTG, remain a point of discussion whether they constitute gambling. While they meet many, if not all, of the points present in the psychosocial definition of gambling, the questionable addictive potential of physical card packs has been viewed as the primary reason why they are excluded from relevant regulatory investigations, as in The Netherlands [105]. Indeed, research has shown that spending on digital loot boxes is associated with problematic gambling behavior [126–128], yet physical card packs did not display the same association, suggesting that digital platforms play a key role in engendering problematic behavior [131]. As an example, the audiovisually stimulating, casino-type opening sprawl of loot boxes, and the speed and accessibility digitality offers can inherently be more prone to cause problems, akin to gambling behavior. In the case of Magic Arena, the potential problems of booster pack consumption are heightened, as the loot box-like digital booster packs in the game can encourage several maladaptive cognitions directly linked to the development of problem gambling behaviors, such as “near-misses” [25], “losses disguised as wins” [32], and “sunk cost fallacy” [5,37]. As these factors are specifically engendered by the digital environment, and thus are not an issue in relation to physical pack consumption, it highlights arguments as to why regulators do not view physical booster packs as having the addictive potential of digital loot boxes. This interpretation is consistent with research from the field of gambling studies which has found that digital versions of scratch-cards and instant-win lotteries are more problematic than their physical counterparts [29]. Indeed, online environments afford increased ease of access to digital products and services than to physical ones, greater event frequency, and the rapid reinvestment of any “winnings”, thereby giving rise to increased potential for problematic consumption behaviors to develop [40,131]. Additionally, the above-mentioned issues are potentially exacerbated by the existence of secondary markets, whether embedded in the game or existing outside of it. If the contents acquired through loot boxes can be easily and effortlessly sold to other players via marketplaces, it can potentially engender even further problematic behavior, as players can chase valuable items for resale purposes through gambling on loot boxes. Conversely, however, secondary markets, or any form of trading between players, in addition to facilitating card acquisition without needing to rely on randomized content would also allow for extended social interactions beyond gameplay. Strengthening the social connectedness of players is one way to encourage a stronger sense of community which, in turn,

affects player engagement, performance and wellbeing, all of which are significant topics of concern for both the industry and the HCI community [108].

Finally, although Magic Arena markets itself as a free-to-play game, our analysis of the game client reveals that gathering a competitive collection will require free-to-play players to play the game for years, logging in every few days to complete quests, or alternatively making direct purchases for large amounts of randomized booster packs. While Magic Arena does occasionally provide free packs through various routes, the constant pressure to play to complete quests and progress on the mastery pass, along with the excessive number of high-rarity cards needed to compete at a high level, mirrors the criticisms of the "pay-to-win" and "pay-to-skip" controversy surrounding the release of *Battlefront 2* [64]. This shows that, despite the claim of being a free-to-play game, Magic Arena still incorporates many of the same pay-to-win mechanics that have been widely criticized in other games. As such, Magic Arena makes use of design practices to drive monetization which have been criticized, both within the HCI community and beyond, as being unethical and exploitative [1,36,45,67]

5.1 Limitations and Future Research

As a method, the app walkthrough has some limitations [74], with researchers stating: "while walking through an app can provide a sense of user engagement, the walkthrough does not directly collect and analyse user content, activity or attitudes" (p. 896). As the data collection in our study is solely based on interaction with the Magic Arena client, it excludes potential useful sources of information that exist outside of the game client. To further understand the issues at hand, future research could investigate popular discussion forums of these games. As an example, content analysis of both user discussion, and user generated content on these forums could yield valuable comparable data, regarding attitudes and perceptions of both the issues with the digital platform of Magic Arena, and the discussion on physical booster packs, and their potentially problematic acquisition method.

Additionally, while some research has been conducted on the motivations behind purchasing game-affecting content [39] and loot boxes that contain game-affecting rewards [127], future research could focus more closely on the specific motivations related to the purchase of gambling-like, game-affecting content. It is possible that these studies on motivations may shed light on whether the desire to compete in a game by purchasing digital booster packs outweighs the desire to profit from their contents in secondary marketplaces, as can be the case with games such as *FIFA Ultimate Team*. Overall, these types of studies could provide valuable insights into the potential addictive and harmful effects of such content on players.

Our analysis shows that the packs in Magic Arena cannot be easily categorized as either loot boxes or traditional, physical card booster packs. Throughout this research we have used the term "digital booster packs" as it is one derived from the gaming community. However, given the context-specific connotations of this term it may be beneficial for future research to investigate the precise characteristics of these, and similar, digital items to develop a conceptual framework and consistent terminology. Such work would allow meaningful discussion and avoid the potential pitfalls of a generic, catch-all term that are evident with the use of "loot boxes", an issue that has recently been highlighted as being a significant problem in the field [129]. Such research could incorporate items from games such as Magic Arena, *Hearthstone* and *FIFA Ultimate Team* that offer players the option to directly purchase randomized content to improve their competitive standing, as these games contain items which are aesthetically akin to loot boxes, but which may incorporate functional differences. Indeed, this research highlights that there are

fundamental differences in the conceptualization, implementation, and the potential effect on players between loot boxes, and digital booster packs.

6 CONCLUSIONS

This article has examined both similarities and dissimilarities between physical and digital booster packs, and digital loot boxes. Using Magic Arena, a contemporary digital version of Magic the Gathering, we have examined how booster packs in the game conform to definitions of loot boxes gathered through analysis of recent research and regulatory policies regarding loot boxes. Identifying the core characteristics of loot boxes enabled direct comparisons with both physical and digital booster packs which are featured in the Magic franchise. Comparing these different forms of randomized content distribution, we note that digital booster packs in Magic Arena are considerably closer to loot boxes than they are to their physical counterpart. Specifically, our results show that booster packs in Magic Arena, as with loot boxes, exploit the affordances of digital platforms to encourage increased spending, prolonged engagement, and maladaptive cognitions associated with gambling. However, unlike many loot boxes, booster packs in Magic Arena are not optional; they contain items necessary for gameplay, which function as an essential 'pay-to-win' mechanic.

Overall, our findings suggest that there is enough evidence to view physical booster packs as being distinct from both digital loot boxes and digital booster packs, thereby questioning the position that loot boxes should not be regulated as they are akin to other, unregulated game mechanics. This is not to say that we believe loot boxes and CCGs should, or should not, be regulated, but rather that the direct equivalency of loot boxes and booster packs in CCGs is a fallacy. The regulation of digital items should focus on the marketing of randomized monetization methods and increasing information transparency, especially in environments frequented by younger or more vulnerable players. Additionally, there is a need to address the role marketplaces play in these digital games; Magic Arena lacks a secondary market, and therefore a means to accrue individual cards without purchasing booster packs, meaning that players are essentially required to take part in gambling-like activities. However, the existence of secondary marketplaces gives additional value to the contents of booster packs and loot boxes, thereby increasing the potential for financial profit or loss. It is, therefore, the combination of these separate elements that requires further investigation, both from academic and regulatory perspectives. Finally, this work contributes to a growing body of research which is focused on building a meaningful and usable taxonomy of monetization strategies in contemporary video games, specifically those which employ (pseudo) randomization as a core mechanic.

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