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# Productive gaming

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**Abstract.** Video games can be appropriated for productive purposes. Commercial games and game engines are often used for video productions, and game development companies provide development kits and modding environments to gaming communities and independent developers. With gamification, game principles are deployed in non-game contexts for benefits beyond pure entertainment. Most approaches are more focused on using games and their design elements rather than the process of playing. We propose a video game category wherein productivity is achieved by playing video games, and present a forthcoming productive game as an example.

**Keywords:** Serious games; media production; video games; play

## 1 Introduction

We propose a new video game category for video games that yield productive results by being played: *productive gaming* transforms playing activities into creative processes, facilitating creations with validity beyond game virtualities. In the language of McLuhan and Nevitt, who conceived the concept for electronic technology in 1972, we allow gamers to become *Prosumers* [1], i.e., consumers turned into producers.

The proposed video game category increases the value propositions<sup>1</sup> of video games. Implicitly, “*all games express and embody human values*” [3]. However, with the exception of serious games [4], the explicit gain of playing video games beyond pure recreation is disputable: as Malaby points out, play dissociates from everyday life by being consequence free and pleasurable and, especially, dissociates from work by staying within a *magic circle* [5]. Caillois divides play and productivity, and implies that game play must not become productive or be conducted in pursuit of profit, otherwise it becomes corrupted [6]. Consequently, the conjunction of play and productivity makes the introduction of specific framework conditions necessary. These are described as a set of attributes that apply to video games that enable productive gaming. However, we refrain from giving an ultimate definition to describe productive gaming. The reasoning behind this approach is given by Wittgenstein, who argues that “*elements of games, such*

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<sup>1</sup> “[...] a game’s value proposition is in how it might make its player think and feel and fun is the ultimate emotional state that they expect to experience as a consequence of playing.” [2]

as play, rules, and competition, all fail to adequately define what games are” [7], and by Sutton-Smith, who considers the description and definition of play and games in non-paradoxical terms almost impracticable [8].

Games facilitating productive gaming are serious games with additional characteristics:

- productivity is a subject matter of the game, not to be enforced as game goals, but enabled as goals of the meta game.
- Consistently, productivity is not reflected in victory conditions, creational objectives are set and determined before or during play sessions by the players themselves, who retain unrestrained artistic freedom.
- Creation processes are aligned towards (and do not break) the game flow.
- Gameplay results are perceivable without the game and, ideally, even without knowledge of the game.

These nominal characteristics describe a non-exclusive video game category with emphasis on the game-play. Consistently, productive gaming requires games that provide mechanisms to start and realize creative processes, but also constructive-minded players.

In this paper, we describe related work with a concise disambiguation in section 2. In section 3, we provide a more detailed introduction to productive gaming. We then present Forever loops (section 4), an ongoing project that facilitates productive gaming for the creation of audio-visual compositions. In section 5, we discuss our findings and conclusions and present suggestions for future work.

## 2 Related work

We differentiate from similar concepts using the previously introduced productive gaming characteristics. A related concept can be found in the industrial use of construction games, e.g. the utilization of *Lego* [9] for architectural prototypes, or using *Minecraft* [10] (in creative mode) as a 3D modeling environment. In both cases, productivity is a subject matter. The main distinction originates from the objectives. The industrial use of construction games typically involves predefined ambitions given by constituents, whereas in productive gaming the players themselves determine creational objectives before or during play. Another approach can be found in human-based computation games, or games with a purpose, where “*people playing computer games could, without consciously doing so, simultaneously solve large-scale problems*” [11]. Here, human game interaction is used to acquire labeling data for specific meta game goals, such as the analysis of gene sequences in *Play to Cure: Genes in Space* [12]. By being played, results with validity beyond the game virtuality are achieved. However, the creational goals usually are fixed by the developers and cannot be influenced by the players. A different, yet very popular concept is the utilization of game engines and modifications for media productions, e.g. *Machinima* communities using suitable computer games for video productions. Here, results typically are perceivable

without the game and yield audio-visual makings. Nevertheless, productivity is achieved by using games rather than playing games. Finally, we dissociate productive gaming from gamification (i.e., the use of game design elements in non-game contexts [13]) because the latter usually aims at goal-oriented play: “*Finally, academic as well as industry critiques of gamified applications have repeatedly emphasized that these focus almost exclusively on design elements for rule-bound, goal-oriented play (i.e., ludus), with little space for open, exploratory, free-form play (i.e., paidia)*” [14]

### 3 Productive gaming

A game example facilitating productive gaming can be found in *Sim Tunes* [15]. It resembles a drawing game in which players populate a canvas with up to four virtual bugs of different color. These AI-controlled bugs traverse the displayed virtual space and trigger music playback. Specific pixel colors represent different musical notes that are played by the instrument according to what is assigned to the bug. In terms of our proposed characteristics, *Sim Tunes* does not employ victory conditions, i.e., players set their own objectives and produce audio-visual creations by playing the game.

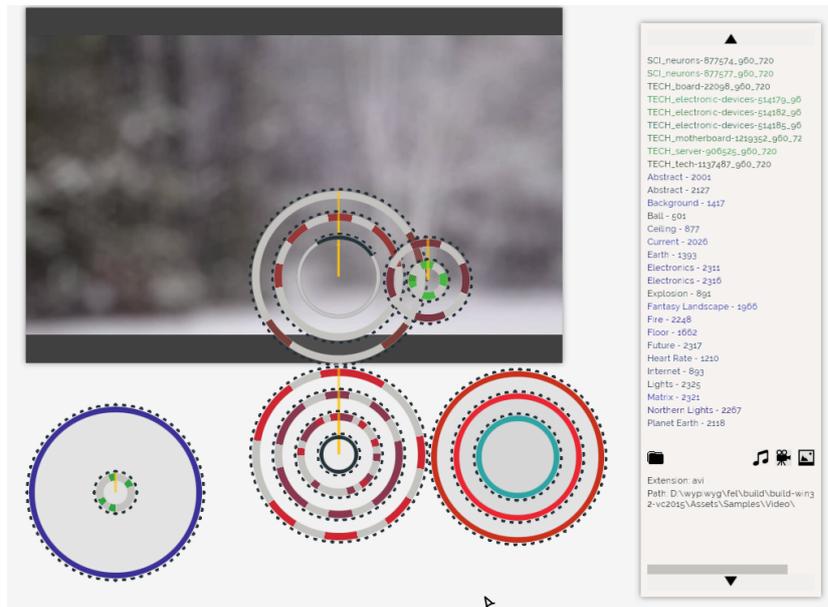
In general, productive gaming is closer to free form (*paidia*) than to more structured (*ludus*) playing and takes advantage of the games also being simulations: “[...] *Espen Aarseth has argued that [...] simulation is what drives most “serious games” [...]. In simulations, and I quote, “knowledge and experience is created by the player’s actions and strategies”. Aarseth calls for recognition of simulation as “a major new hermeneutic discourse mode, coinciding with the rise of computer technology, and with roots in games and playing.*” [16]

The proximity to simulations makes a clear distinction from productivity software necessary. Barr describes the main differences as follows: “*First, the motivations for playing video games differ from productivity application use. Specifically, players play games for their own sake, while they generally use productivity applications to achieve some other task. Second, video game interfaces are not neutral, presenting carefully designed narratives and complex graphics to the player. Third, video games frequently dictate goals to players, while productivity applications generally facilitate user goals. Finally, video game designs purposefully involve conflict and constraints on the player, while productivity applications are designed to minimize them.*” [17] Juul and Norton consider game obstacles and challenges as the distinguishing features of games as opposed to usability for productivity software [18]. For our purposes, the capability of seducing users into a lusory attitude [19] is the distinctive feature, i.e., play requires a proper mindset and engagement, which is established upon and complements game rules [20]. Concerning both the level of engagement and the level of game structure, productive gaming involves substantial oscillation effects on the *paidia-ludus* continuum [21] and play structure flexibility. During play sessions, users experiment and play with the simulations without pre-defined goals, and then apply their discoveries and new techniques to their performances.

In this context, the notion of serious storytelling must be contemplated, as well as its relation between serious games and productive games. Serious storytelling refers to “*storytelling outside the entertainment context, where the narration as artefact is impressive in quality and relates to a matter of importance and seriousness.*” [22] A narrative, i.e. the “[...] *chain of events related by cause and effect occurring in time and space and involving some agency*” [23], is important for both serious storytelling and productive gaming. Serious storytelling constitutes a broader concept with several application scenarios, including serious games, but also eLearning, qualitative journalism, virtual training environments, or forensics. Productive gaming on the other hand builds upon serious games and at the same time concerns only a subset.

## 4 Forever loops

Forever loops by Marlene and Ulrich Brandstätter is a productive gaming project that produces audio-visual compositions. The underlying simulation involves an interface that primarily comprises graphical gears, as shown in Figure 1.



**Fig. 1.** Forever loops screen-shot. A gear train comprising multiple interconnected gears is playfully arranged and programmed by a user. The canvas in the upper left corner gives a visual representation of the audio-visual composition. The window to the right is required for media selection.

Relevant mechanisms are based on real-world gears and their machinery, which is well known and understood by most people. Users begin with a fundamental understanding of the system mechanics, which quickly evolves into impressive skills regarding (musical) composition and performance. Concerning productivity, the virtual gears can be interfaced with audio-visual material, including sounds, images, and videos. Playback of the media goes hand in hand with playfully arranging gears and gear trains with their respective programming.

Game play results include musical compositions, video remixes, slide shows, VJ acts, and even performances. In contrast to other productivity games, including the aforementioned Sim Tunes, players can import and are encouraged to use personal media material. On top of this, satisfactory results can be exported as a video file at user request, which can then be viewed without the game and even without knowledge of the game.

Users are encouraged to experiment with the underlying physics of the gear simulation, and to use their findings to produce new compositions at their own pace. A central aspect of our approach is the rejection of the notions of winning or losing. From a design perspective, it is common for video games to blur the borders between interface and game play [18]. Here the gear wheels and their mechanics become the central interface, and are tightly interwoven with the game-play.

## 5 Conclusion

To some extent, video games are already used for productive purposes, e.g., supporting the modification of existing games, asset export and import capability, or video capture support, which are popular game features that facilitate usage scenarios beyond pure entertainment. Specific video game genres, such as active games, educational games, and art games, attempt to offer additional benefits. The proposed new video game category specifically describes video games that facilitate productivity by being played. Productive games as described in this paper are biased towards free-form play and can be considered as a specialization of serious games. Another approach towards productive gaming is the segregation of victory conditions and productivity, i.e., results correlate with and are affected by game progression, as they can actively be influenced by the player. Creative freedom is more limited, whereas the underlying game genre can be chosen more arbitrarily.

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