

# Framework for Designing and Evaluating Game Achievements

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## **ABSTRACT**

This paper presents a framework for evaluating and designing game design patterns commonly called as “achievements”. The results are based on empirical studies of a variety of popular achievement systems. The results, along with the framework for analyzing and designing achievements, present two definitions of game achievements. From the perspective of the achievement system, an achievement appears as a challenge consisting of a signifying element, rewards and completion logics whose fulfilment conditions are defined through events in other systems (usually games). From the perspective of a single game, an achievement appears as an optional challenge provided by a meta-game that is independent of a single game session and yields possible reward(s).

## **Keywords**

Online games, game design, game achievements, game rewards, marketing, game ontology, motivation, gamification

## **INTRODUCTION**

Despite the rapid diffusion of achievements, badges and trophies into a variety of digital games and services, the phenomena around them have gained relatively little academic attention. Some industry studies have found that games with achievements generate more revenue and receive better critical reception (EEDAR 2007). A powerful example of the adoption of achievements is Microsoft’s Xbox Live platform: all games published there are required to have achievements. Clearly there are benefits related to achievements.

However, there are also potential problems. Game platform operators build up pressure for game developers to come up with achievements (even against their own will). This happens often when the game is already in post-production. Obviously, this can have an impact on the quality of the achievements for that particular game and further to the

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whole gameplay experience (see e.g. Björk & Holopainen 2005 and Jakobsson 2011 on “grind achievements”). In addition to hastily designed achievements, some game designers (Carvalho 2009, Hecker 2010) have expressed justified doubts whether achievements, however well-made they be, actually obscure the core game experience and shift playing motives to ruthless achievement hunting.

Hecker (2010), in his Game Developers Conference talk, specifically pointed to possible negative motivational effects stemming from game achievements. Literature on intrinsic motivation would indeed seem to doom expected extrinsic rewards as detrimental to intrinsic motivation, via diminishing the perceived autonomy of the individual to carry out given activities (see e.g. Deci, Koester & Ryan 1999 for a comprehensive meta-review of intrinsic and extrinsic rewards). The reduction in autonomy can lead to reductions in creativity and performance and can further diminishes the desirability of the given activity in the long run. However, it is not yet clear which kinds of achievements and rewards associated with them might be intrinsic or extrinsic and how they would affect the gameplay experience.

Montola et al. (2009) applied achievements to a photo sharing application and found that users were concerned they would create unproductive usage patterns and confusion about the goals and rewards in the system. However, some users appreciated achievements and found them motivating. As Antin & Churchill (2011) also point out, the differences in attitudes towards achievements could be explained by the variance in achievement design.

Badges and achievements as a game design pattern bear close resemblance to marketing tools, such as loyalty stamp cards, where people accumulate stamps or badges (see Nunes & Drèze 2006). As Hamari and Lehdonvirta (2010) note, many firms are in fact thinking marketing and customer relations more and more in gaming terms. From this perspective, achievement systems can also be seen as a part of the companies’ customer loyalty programs (see Hamari & Järvinen 2011, Huotari & Hamari 2011), add-on services that span through larger product portfolios creating lock-in effects (see e.g. Shapiro & Varian, 1999) to a family of products by awarding customers with product family specific points and rewards. This notion also could explain why studies have found achievements boosting game rating and revenues.

This development of enhancing (non-game) services with game mechanics has also been referred to as “gamification” (Huotari & Hamari 2011, Deterding et al. 2011)<sup>1</sup>, which has been an increasingly growing trend during the last couple of years. Achievement features have been one of the most commonly implemented game design patterns in gamification. For example, Foursquare, which is regarded as one of the services that initiated the new wave of gamification<sup>2</sup>, is very much based on people unlocking badges by visiting a variety of “real world” locations. Foursquare has been often regarded as the blueprint of a service that gamifies other activities and therefore many of the concurrent gameful applications have also implemented achievements, which are used to direct player behaviour and decision making towards beneficial activities (Hamari 2011), that range from user retention (Hamari & Järvinen 2011) to greener energy consumption (see e.g. McGonical 2011). Therefore, the study of achievements and game mechanics in general seems to have a larger importance: their impact is not only limited to the realm of games.

Before we can systematically analyze dynamics emerging from the interplay between achievements, games and services, we need to have an understanding from which

components achievement comprise of. The goal of this paper is to present a framework describing the mechanic-level structure<sup>3</sup> of achievements. This paper, however, will not make further claims in the discussion about the effects of achievements to the gameplay experience. This paper proceeds as follows. In the next chapter we review previous definitions of achievements. The third chapter describes sources of data and cases explored in the study. Based on our observations, the fourth chapter outlines elements and components of an achievement. Based on the previous section, the fifth chapter summarizes the framework of an achievement and further develops a definition of an achievement based on the constructed framework. Finally the sixth chapter discusses implications and further research directions.

## PREVIOUS DEFINITIONS OF ACHIEVEMENTS AND ARRIVING TO A NEW ONE

The name “achievement” has become somewhat of an industry standard due to big game platforms, such as Xbox Live and Steam adopted it. For example, “badges” and “trophies” are also commonly used in referring to the same game design pattern. Jakobsson (2011) traces the history of game achievements back 30 years to physical fabric patches that were sent to players who managed to prove their interesting feats by taking photographs of their television. Despite this, it has only during recent years become a common meta-game feature.

According to Montola et al. (2009), achievements are *optional sub-goals* in a *secondary* reward system (achievement system). Björk (2011), in his continuing work on describing game design patterns, defines achievements as “goals whose fulfilment is stored outside the scope of individual game sessions”. Jakobsson (2011) sees achievements as quests in a system where players collect virtual rewards which are separated from the rest of the game.

Common to the definitions is that achievements are in way or the other perceived as separate from the core game. Montola et al. (2009) imply the separateness by stating that the goals are optional in the sense they do not affect the progress of the player in the core system. Björk (2011) arrives to the separateness of the game and the achievement system via the pervasiveness of the achievement meta-game compared to the core games being played. Jakobsson (2011) sees achievement systems as reminiscent of Massively Multiplayer Online games (MMO) and achievements in them as quests. However, the relationship between achievements and core game has not been elaborated further.

We argue that seeing achievement as *optional* or *secondary* can be problematic. If a player is specifically attempting to accumulate all the available badges in the achievement system, then they are hardly neither *optional* nor *secondary* even if they would be optional in respect to the progress in the core game. From our view, this highlights an important point: achievement systems should be viewed as games of their own. Jakobsson (2011) also subscribes to this idea. This idea is elaborated further in the fifth chapter of this paper.

However, these separate games clearly have some kind of a relationship. Microsoft (2011) in describing achievements to players (in Medler 2009) manages to capture an essential point about this relationship: “Achievements are **game-defined goals** that are stored and displayed in your gamer profile”. We suspect that the “game-defined goals” here means that achievements’ fulfilment conditions are met through events in other systems and thus other games define when and how the achievement has to be unlocked.

However, the goals themselves are defined within the achievements system in the form of the task description given to the players.

In addition to goals or tasks, the above definitions specifically mention rewards and also their separateness from the games being played. However, in addition to the reward of the badge, our empirical work shows that achievement can award the players with rewards that are usable in the game as well, in contrast to having only rewards that are related to accumulating achievements and unlocking badges.

By analysing and combining the previous definitions, we can arrive to the following interpretation: Achievements are *goals* in an *achievement/reward system* (different system than the core game) whose fulfilment is defined through activities and events in other systems (commonly in the core game). With this initial definition of an achievement in mind, we proceed to the empirical part of the paper that analyses achievements with an aim to break them down into analytical components.

## APPROACH AND DATA

Our objective was to study what game achievements are and from what components they comprise of, to build a framework of achievements for design and evaluation. We used a mixed methodology approach in analysing achievements. Our analysis was of theory-driven and bottom-up in nature, where we gathered data by reviewing several achievement systems, conducting participatory observation and interviewing experts as well as players. This data was then validated and combined with game research literature on game design.

The foundation for our data collection was over 1000 hours of participant observations of playing 9 games<sup>4</sup> that have achievements in the *Steam* platform ([www.steamcommunity.com](http://www.steamcommunity.com)), which facilitates the use of achievements for some 100 games at the time of writing. From these nine games, the authors have completed 475 achievements out of the 720 available at the time of writing. The authors did also intentionally “hunt” for achievements and complete them in bigger groups. We found that being familiar with the games to which the achievements were related to was essential for understanding the inner workings of achievements’ completion logic, which was required to make the analytical abstractions between the different components of an achievement.

Because we aimed to build a general model of achievements, we also explored achievements from *Xbox Live* ([www.xbox.com/live](http://www.xbox.com/live)), *Kongregate* (a mini-game portal - [www.kongregate.com](http://www.kongregate.com)), *Habbo* (a social virtual world - [www.habbo.com](http://www.habbo.com)), *Call of Duty: Modern Warfare 2* (the most sold video game of 2009 - [www.modernwarfare2.com](http://www.modernwarfare2.com)), *World of Warcraft* (the biggest subscription MMORPG [www.worldofwarcraft.com](http://www.worldofwarcraft.com)) and *Foursquare* (location based social network/meta-game service - [foursquare.com](http://foursquare.com)). Even though games and services in question are diverse in nature, ranging from social networks to first-person shooters, the achievements related to them proved to be notably similar – so much so that we were not able to find differences in the structure of achievements based upon the different genres or platforms.

In addition to the participant observation, we conducted expert and player interviews on to ensure data saturation. The aim of the interviews was to provide us with broader perspective – from gamers, game designers and game researchers.

The observations and the analytical abstraction made based on them were further compared with previous literature on game design, including for example, Salen & Zimmerman (2004), Björk & Holopainen (2005), Schell (2008) and Sicart (2008). This step ensured the theoretical and terminological comparability to previous game design literature. We found that instead of achievements being a single game mechanic, they are a collection of different game mechanics the majority of which have been described in previous literature. In the following section the connections to previous literature are made in more detail.

## **COMPONENTS OF AN ACHIEVEMENT**

We start by analyzing how the achievements are presented to the users – the visual parts of an achievement. We then analyze what parts and rules in the game design level constitute the logic of completing achievements and what game design aspects are used in defining the requirements for completing achievements. Finally we examine what different kinds of rewards completing achievements can yield to players. All achievements examined had these three components, the rewards being perhaps the most elusive of them. The reader is encouraged to preview the resulting model in the summarizing chapter 5 before moving deeper into this section of the paper.

### **Signifier<sup>5</sup>**

Achievements have a visible part that conveys information about the achievement. This signifying element, in all achievements in the investigated systems, consisted of a name, an icon/badge and of a description that describes what the player has to do and what she will receive in return. The element consists of design patterns related to presenting information to a player as categorised by Björk & Holopainen (2005), a part of what Brathwaite and Schreiber (2008) refer to as the *game view*, which define what information player can know. The signifier element is the part of the achievement that is presented to player.

Signifying elements of an achievement are what makes it unique and what separates it from other achievements. There can easily exist several achievements with identical other elements, but not with identical name, visual and description. The signifier element plays a crucial role in creating the feel of the achievement meta-game, the game comprised only of collecting achievements. (See Moore 2011 for an aesthetic analysis of signifiers of achievements in *Team Fortress 2*.)

### *Name*

Most achievements have a unique name which sets them apart from other achievements. Names are usually somewhat connected to the lore and overall feel of the game, e.g. military-themed *Call of Duty: Modern Warfare 2* has achievement-like titles with names like “Topgun”, “Armed and Dangerous” and “High Caliber”. The name sets a theme for the achievement, and usually hints at the completion logic in one way or another.

### *Visual*

Use of a visual component (i.e. a badge) in the achievement presentation seems oftentimes to have even more emphasis than the name component. For example, in *Foursquare*, achievements are primarily presented with the visual part. All *Steam* achievements have a simple square icon that represents the theme of the achievements. In the achievement Hard to Kill in *Team Fortress 2*, this visual is the picture of the skull in front of a star (Figure 1).



**Figure 1:** The visual component of the Hard to Kill achievement in *Team Fortress 2*.

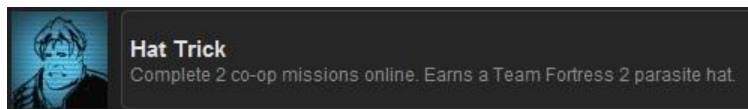
The visual can be seen to be a complementary component to the name of the achievement, as they both commonly convey the theme of the achievement. In some systems, achievements are called badges, which directly hint towards an object that has a visual element.

The visual icon or a badge commonly has two states, the unlocked faded or a greyed-out badge which, once completed, turns into a colored one that signifies that the achievement has been completed. This, however, might not be the case if an achievement system does not allow players to see available achievements beforehand; such is the case in *Foursquare*.

#### *Description*

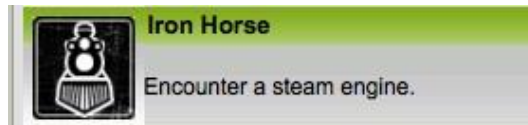
Achievements most commonly have a description which attempts to capture what is required from the player to complete the achievement (the completion logic) and what will result from completing it. In accordance with classification of game rules by Salen & Zimmerman, the description on an achievement contains *operational rules*, rules that describe what the player has to do (2004, p. 146-147).

The description component may also include information about the consequences of completing an achievement, as in what the player is awarded with (Figure 2), be it points in the achievement system or an in-game item.



**Figure 2:** “Hat Trick” -achievement in Alien Swarm rewards the player with an item to another game in the same achievement system.

It is important to distinguish between the description (the operational) and the actual completion logic (foundational) behind the achievement from both perspectives of a designer and a player. It is difficult to capture the completion logic comprehensively in a short description or the developer can even attempt to obscure the description to increase the difficulty of unlocking the achievement. If description is vague enough, it functions more as a teaser: the Iron Horse achievement in *Alan Wake* (Figure 3) tells the player that there exists a steam engine in the game, and nothing more.



**Figure 3:** “Iron Horse”-achievement in *Alan Wake* contains virtually no hints on how to complete the achievement.

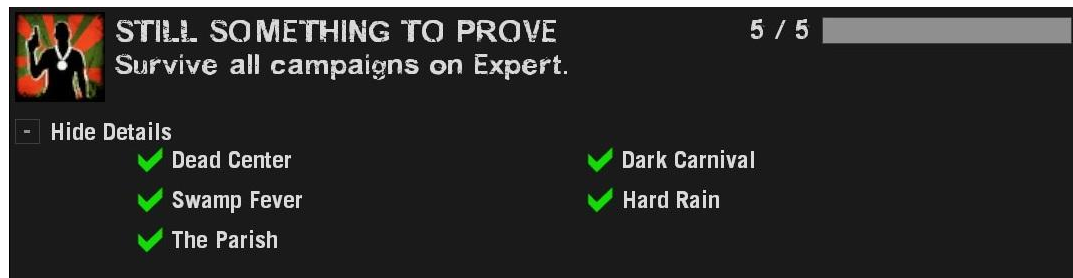
In any case, to comprehend the description on an achievement requires knowledge about the game and its rules before a player can have an understanding of the activities that have to be carried out to complete an achievement. For these reasons, the design of the description and the completion logic are separate and require separate analytical components for design and analysis of achievement.

### Completion Logic

Completion logic is the second element of an achievement. It defines what is required from the player and from the game state for the achievement to be completed. The completion logic is the set of foundational rules (Salen & Zimmerman, 2004), and separate from the description that is shown the player.

The element consists of four components: 1) an action or an event, a *trigger* 2) *pre-requirements* for the game setting, 3) *conditional* requirements for the gamestate which determine whether the action or the event will be counted towards a given achievement, and 4) a *multiplier*, the amount of times the composition of the three previous component have to satisfy the defined requirements.

It is also common for an achievement to have a set of several completion logics that can have different requirements for the player or to the gamestate. For example, the achievement “Still something to prove” in Figure 4 below, has five separate completion requirements concerning the selection of campaign for the game session. The different requirements a completion logic can have are described in the following sections.



**Figure 4:** “Still Something To Prove” -achievement in *Left 4 Dead 2* consisting of five separate completion logics.

### Trigger

The first component of the completion logic element answers the question of what change is required to the gamestate in order to unlock the achievement. In other words, it defines what a player has to do or what system-invoked event must take place.

Many achievements have a (somewhat) clearly defined action the player has to carry out in order to complete the achievement. Sicart (2008) describes game mechanics as

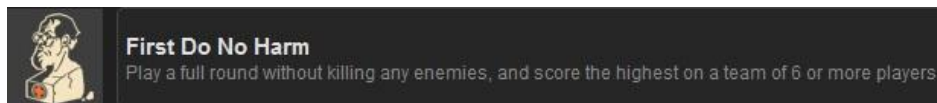
“methods invoked by agents, designed for interaction with the game state“, and follows Järvinen’s (2008) approach of understanding mechanics as verbs, such as run, take cover, shoot etc. Sometimes the action in an achievement maps directly to such mechanics. For example, “Race For The Pennant” -achievement in *Team Fortress 2* requires the player to **run** 25 kilometres, which in practice translates to pressing any of the movement keys for as long as the player character has moved 25 kilometres in the game.

However, usually achievements require a somewhat more complex set of actions. Schell (2008, p. 140-141) uses the term resultant action to describe actions available to players that are not part of the rules per se, but more of an emergent set of actions a player is using to achieve a goal. For example, a “kill” action in most games requires the player to undertake several movements, aiming, shooting etc actions to complete the resultant action of killing. In Figure 5, the challenge involves carrying out 25 resultant actions of killing gnomes without conditions and 5 bound by a condition of being enraged.



**Figure 5:** “Gnomes No More Badge” -achievement of *Larry and the GNOMES* game in *Kongregate* platform.

There are, however, also achievements that don’t require a specific action from the player, but rather an event initiated by the game system. For example, ending of a round by a time limit is such an event. Therefore, the achievement “First Do No Harm” (Figure 6) in *Team Fortress 2* lacks a triggering player-invoked action. The end of the round, a system-invoked event, acts as the trigger. The activities of a player in ensuring the completion of the achievement then consists of making sure the conditions (being a medic, having no kills, being the first player in the score list) are satisfied when the round ends (See for example “Ultra-Powerful Events” in Björk & Holopainen, 2005, p. 194). Hence, achievements have two kinds of triggers: player-invoked *actions* and system-invoked *events*.



**Figure 6:** “First Do No Harm” -achievement in *Team Fortress 2*.

However, not all events are triggered by the game system. The end of a round in a multiplayer game, for example, can also be due to another player reaching the winning conditions. The actions of other players in multiplayer games are reasonably perceived as events for another player when designing achievements.

To summarize, in the case that the trigger is an event, the achievement unlocking process involves playing in a way that the conditions match the ones given in the achievement task when the event happens. In the case of player-invoked action, the player first makes sure the conditions match and then triggers the action herself.



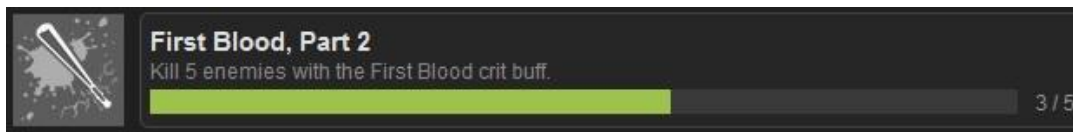
### Pre-requirements

*Pre-requirements* are requirements for the game setting (see for example “setup session” in Björk & Holopainen, 2005, p. 11-12) that cannot be affected (for example through game mastery) during a game session. Such pre-requirements can be the selection of a correct game<sup>6</sup> (Figure 5), game mode, difficulty (Figure 9), character class or playing during a correct season (Figure 7).

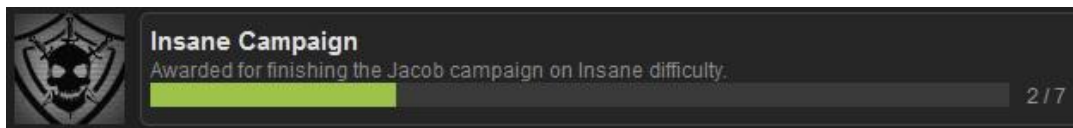


**Figure 7:** “Candy Coroner” -achievement in *Team Fortress 2* with a pre-requirement of playing during the Halloween season.

There are two different types of pre-requirements: 1) the actions, events and/or conditions for an achievement exist only in a certain game setting (Figure 8) or 2) simply, the achievement requires a defined game setting although the actions and conditions are available also in other settings (Figure 9).



**Figure 8:** “First Blood, Part 2” -achievement in *Team Fortress 2*. “The First Blood crit buff” is a condition that only exist in Arena game mode.



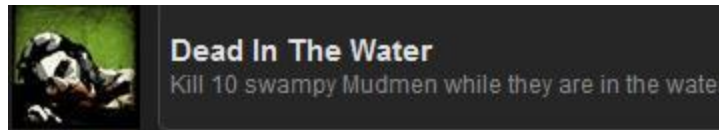
**Figure 9:** “Insane Campaign” -achievement in *Alien Swarm*. Pre-requirement for the achievement is that the player has selected “insane” difficulty setting. Still all the actions and conditions are available as they are in other difficulty settings.

A game developer can use pre-requirements for defining which achievements are available at which time to simplify monitoring of the completion of achievements, because only a certain portion of the achievements are available in a given game session.

The key difference between a pre-requirement and a condition is that a player can affect whether the conditions are satisfied within a game session, whereas pre-requirements have to be set correctly before the session.

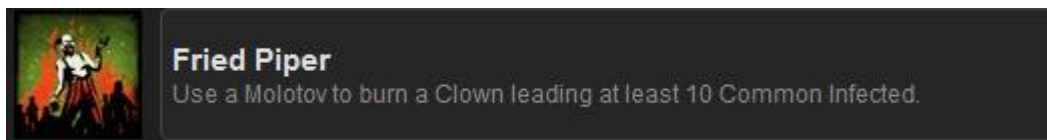
### Conditions

The condition component answers questions such as how, when, where, in what timeframe and with whom the trigger should take place. In other words, the condition component includes the requirements directed to the prevailing gamestate that have to exist or to the historical events within the game session that have to have happened before the action or event triggering the unlocking of an achievement takes place.

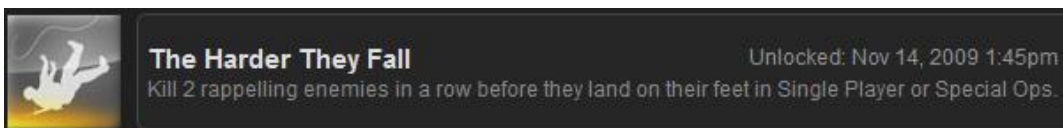


**Figure 10:** “Dead in The Water” -achievement in *Left 4 dead 2* with a condition of targets being underwater during at the time of the kill.

For example, in the “Fried Piper” achievement (Figure 11), the player has to have picked up a Molotov cocktail, made sure that a required amount of other zombies have been attracted by the squeaky nose of the Clown zombie, and still carry out the act of throwing the cocktail, which itself is a sum of multiple movement commands, aiming commands and firing commands (which together form a resultant action). As can be seen from the description of the achievement, not all of the conditions are mentioned. The player needs to have in-depth knowledge about the specifics of completing the achievement.



**Figure 11:** “Fried Piper” -achievement in *Left 4 Dead 2*



**Figure 12:** “The Harder They Fall” -achievement in *Call of Duty: Modern Warfare 2* with conditions of killing enemies while the enemies are still mid-air, not conducting other kills in between (and with a pre-requirement of a game mode)

Conditions are attributes that create additional difficulty to carrying out the actions or making an event happen. This component defines the attributes of achievements that Björk & Holopainen (2005) refer to as “handicap achievements”. From our view, the term handicap achievement is not very useful as all achievements in the end can be considered to have goals that handicap the play that is aimed at thriving in the actual game. It can be said that the more conditions an achievement has, the more it is a “handicap achievement” and the more it drives the player away from the expected ways of playing. However, the conditions can also entice players to try out new features and ways of playing the game.

### *Multiplier*

The multiplier component defines how many times the trigger (action/event) has to be carried out in the pre-required game setting and within pre-defined conditions for the gamestate. In its most simple form, an achievement has only one action that has to be repeated. There is no practical limit to the how many times the action has to be carried out. This is illustrated finely on the Pyromancer achievement in *Team Fortress 2*. Its description says “Do 1 million fire damage”.

## Rewards

Achievement systems store information about which achievements are completed, and upon completion, the player receives some kind of cue that the completion happened. Usually completed achievements are visible to players between game sessions, and to other players: for example, in *Steam* all the achievements a player has completed are visible in the system's website. However, achievements (usually) contain also a more substantial reward being given to the user.

In the achievement system player accumulate points towards the maximum achievement points available. For example, in *Xbox Live* players have a cumulative number of points awarded from completing achievements called Gamerscore. In *Kongregate*, achievements are divided into score tiers which yield different amount of points towards the overall achievement score. Some systems do not explicitly express the amount of points available from an achievement. In *Steam*, every game has a specific achievement score that is based on how many achievements the player has completed giving each game an effective score of 1 out of the total amount of achievements. Of course not all players engage in the achievement-hunting meta-game and thus might not regard the progression in the achievement system itself as a reward, however, unlocking an achievement takes the player closer to the (usually implicit) winning condition of an achievement system – unlocking the maximum amount of badges.

Some achievements reward a player with a virtual goods or artefacts. For instance, *Team Fortress 2* awards the player with new weapons to be used in the game after reaching certain achievement milestones. Also, all achievements in *Habbo* award the player with virtual currency that is usable in the service.

There seems to exist also a third category of rewards in addition of meta-game related rewards and in-game rewards. In *Alien Swarm*, the “Hat Trick” achievement (Figure 2 above) rewards the player with a virtual good, a hat for the avatar that has no functional value, for another game, *Team Fortress 2* (see Moore 2011 on hats in TF2). Also, if we look outside the gaming industry, in *Foursquare* restaurant owners can award customer with free drinks. These rewards reside in the world outside the game and outside the achievements meta-game. Hence we call these outside-game achievements. They can be virtually anything.

A significant, but from our view design-relative aspect is whether an in-game reward can affect the performance of a player in a game or not. For example, purely aesthetic virtual goods are often argued not to affect the balance between the players, however the aesthetic function of artefacts shouldn't be overlooked, as they bear all kinds of social meanings. It is difficult to assess which are the actual winning conditions in larger multiplayer games: status through being on top of the ranking or owning the most beautiful set of clothes?

Björk & Holopainen (2005) would by definition insert the aforementioned hats of *Team Fortress 2* to the extra-game realm as they do not affect the competence of a player in the pure quantifiable game. However, it seems that *Team Fortress 2* is not purely a game of quantifiable outcomes but also a race towards owning and displaying the most varied and stylistic collection of aesthetic belongings, and a social system of reputation and competition. This thinking is in line with Moore's (2011) analysis of the social and aesthetical aspects of achievements and artefacts in TF2. It seems that defining and

drawing a clear cut line between “in-game” and “extra-game” rewards can be rather difficult in this sense.

Moreover, rewards that give new abilities, such as weapons in *Team Fortress 2*, also have aesthetic qualities. One reward can have many value offerings, contributing in many game realms, be it in-game or extra-game, depending on the definition. Therefore, we feel that the split between items that contribute towards to the game’s winning conditions and to those that do not is not a viable way of dividing value offerings of rewards in this paper. We place non-functional rewards to the in-game rewards as well and differentiate a third category which contains rewards that are entirely separate from the game. We attempt to propose a design independent categorization as follows.

From previous we can draw three reward categories based on the boundaries of different games: 1) achievement (meta-)game 2) “in-game” the game where the achievement was unlocked and 3) “out-game”, that is not directly relevant within game where the achievement was unlocked nor within the achievement system (See more on boundaries of game systems and sessions in Björk & Holopainen, 2005, p. 8., Juul 2007)

### Levels in an Achievement

Some game developers have built a levelling mechanism (See for example Björk & Holopainen, 2005, p. 60-62) for what seems to be a single achievement. In most cases, however, it is an emergent feature from a synergized design of multiple achievements. For instance, achievements can have a similar name or visual element, only differentiated by a number that corresponds to the “level” of the achievement. Alternatively, levels might be in level hierarchy due to their similar completion logic, for example, level 1: kill 10 and level 2: kill 20.

In *Habbo*, for example, many of the achievements are divided into levels (Figure 13) and each level has to be reached before the next. Additionally the badge of completing one level is replaced with the next one and the amount of actions already carried out towards the total amount reset. Each consecutive level requires the player to carry out more of the achievement-awarding actions. The signifier element remains almost the same between levels; only the level indicator (and in this case some colour changes) is added to correspond the achievement level in question. The completion order in *Habbo*’s case is hence forced.





**Figure 13:** Achievement levels in Habbo.



All in all, if a series of achievement resembles a levelled order, it might be practical to consider them as a single achievement which spawns sub-achievements in accordance with the amount of levels. Hence, the level is a top-level component of an achievement from where the sub-achievements are derived (See Figure 14).

## Summarizing Examples

In the Table 1 below we summarize the components of an achievement presented above. We also provide two example achievements which we analyze.

**Table 1:** Framework of an achievement

Element / Component	Description	Example 1 (Team Fortress 2)	Example 2 (Foursquare)
<b>Signifier</b> defined in the achievement system	Signifier element consists of the visible parts of the achievement		
Name	The name of the achievement	Cooking the Books	Barista
Visual	The visual representation that is commonly related to the name and the description of the achievement. Other common implementations are more generalised badges and trophies		
Description	A textual description of the central parts of the unlocking logic of an achievement, or a more vague hint as well as the description of the consequences and rewards.	“Ignite 5 enemies carrying your team’s intelligence”.	“Congrats - you’ve checked in at 5 different Starbucks! Be sure to pick up a double tall latte for your friend - I’m sure they’d do the same for you.”
<b>Completion logic</b> defined / derived through mechanics in another system	The foundational logic of an achievement, which defines the trigger (a player-invoked action or a system-invoked event), how many times it has to be triggered, under which conditions and what pre-requirements exist		
Pre-requirements	Pre-requirements are requirements for the game session for it to be possible for the achievement to be completed either due to availability of a certain gamestate or simply because the achievement requires it	Player has to play as a Pyro (only they can ignite), playmode has to be Capture the Flag (intelligence is available only in CTF). Player has to play <i>Team Fortress 2</i> .	None
Trigger (action/event)	Trigger is either a player action or a system-invoked event required to happen.	Doing fire damage to another player	Checking in.

Conditions	Condition component includes the requirements directed to the gamestate or to the historical events in the system that have to exist when the action or event goes off to be counted toward completing an achievement.	Player was using a weapon capable of igniting opponents.  The player ignited was carrying the intelligence.	Starbucks cafe is in the range from the GPS coordinates of the player.  The user hasn't checked-in in the same Starbucks location before.
Multiplier	The amount of times the trigger has to go off in the pre-required game setting while required conditions are satisfied to unlock a given achievement. It simply defined the amount of times the required action has to be carried out.	5	5
<b>Reward</b>	Reward element defines the reward(s) a player acquires after unlocking the achievement		
In-game	Rewards, such as new abilities, into the game in which the achievement's fulfilment conditions were met.	(One point towards the achievement milestones which award in-game weapons)	None
Achievement game	Rewards related to the achievement system.	1 point in the Steam achievement system and 	(1 point in the Foursquare achievement system) 
Out-game	Rewards that are external to the achievement system and the game itself.	None	A second double latte.

## THE MODEL AND A RESULTING DEFINITION OF A GAME ACHIEVEMENT

In this section of the paper we summarize our findings and present the resulting framework of an achievement (Figure 14). We found that every achievement had elements of one *signifying element*, one or more *completion logics* and at a minimum one *reward*.

The *signifying elements* in all cases consisted of *a name, a visual badge and a description* that describes the operational rules and rewards. This element can be compared to the concept of a *game view* described by Brathwaite & Schreiber (2008) – an element that contains information to the players. However, it is not necessary for an achievement to have all of these three components.

One achievement can have many *completion logics*, which are distinguished by separate triggers, pre-requirements or condition. The completion logic element consists of a trigger which is a player-invoked action or a system-invoked event, one or more bounding conditions for the gamestate that can be affected during a game sessions, via for example game mastery, and pre-requirements for the game setting that can only be modified before the beginning of a game session. The completion logic also has a multiplier component that defines how many times the trigger action or event has to happen. At minimum, one achievement has one completion logic that includes one trigger and has a multiplier of 1.

Achievements have at least one reward which is the amount of achievement points. In addition, some achievements grant players with in-game items and some achievements even yield physical or virtual rewards that are not part of the game or the achievement system, thus in the framework called out-game rewards.

One probable reason why achievements have not been consistently defined in previous literature stems from their dual nature. Achievements are always simultaneously related to at least two coinciding games, the achievement completion (meta-)game and the one in which the achievement's fulfillment conditions are met. Previous efforts have ended up defining the achievement from only either perspective. We argue that different aspects of an achievement became relevant depending on the angle from which they are examined, because both the meta-game and the game can be analyzed atomically. This might also explain why many achievements compilations for games have failed in respect to the overall game experience. If the complex relationship between the systems has been ignored, it can result in the neglect of the robustness of the achievement compilation or the appropriateness of the achievements to the game where the fulfillment conditions are met which may encourage users to behave in a manner that is disruptive for the core game.

Achievement system, in principle, can be considered to be a game where the (usually implicit) winning conditions are related to completing the maximum amount of achievements or to gathering achievement points. From this perspective, the games where the actions to unlock the achievements are carried out can be seen as mini-games coinciding within the achievement game. However, from the perspective of individual games connected to the achievements system, the achievement system is a transgressive information system providing meta-game features for the individual games including tracking, monitoring, storing, displaying and sharing achievement information.

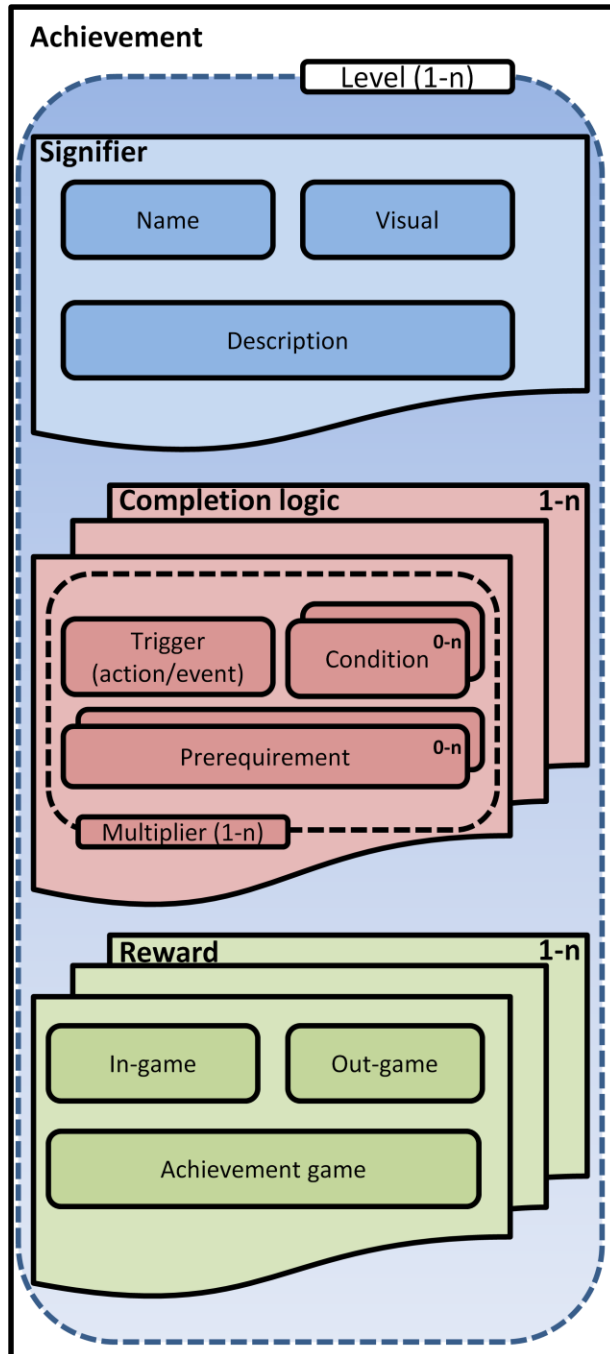
However, it is also possible that the achievement system is not connected to the game in any visible way where the achievements are completed in and thus having no in-game effect. For example, some of the third-party statistics software monitor everything that is happening on pre-defined servers and reward player with badges. However, most players are not apprised that they are monitored or given badges. (See for example: Third party-Battlefield: Bad Company 2 – Stats Verse – <http://bfbc2.statsverse.com>).

**From the perspective of the achievement system, an achievement appears as:**

A challenge consisting of a signifying element, rewards and completion logics whose fulfilment conditions are defined through events in other systems (usually games).

**From the perspective of a single game, an achievement appears as:**

An optional challenge provided by a meta-game that is independent of a single game session and yields possible reward(s).



**Figure 14:** Framework

While achievements are a primary goal in the meta-game and an optional goal for the game in which they are completed, they can yield the player rewards for both.

## CONCLUSIONS AND DISCUSSION

This paper set out to conceptualize the components of an achievement to provide further studies a starting point to rigorously conduct experiments on the long-run effects of achievements in games as well as to provide game designers a tool for designing, sharing and communicating achievements.



This paper provides a framework that helps further studies systematically design different kinds of achievements for experiments and to further point to certain components and their contribution to user behaviour. One obvious task for further research is to test which kinds of implementation of components of achievements contribute to which kinds of user experience. For example, how would it affect to the appeal of completing achievements if the *multiplier* was changed, i.e. how many action it would require from the user.<sup>7</sup> Alternatively, it could be tested how different kinds of *rewards* (achievement points, in-game and out-game rewards) affect the motivational attitudes towards the overall gameplay<sup>8</sup>.

Moreover, the framework could be used to design achievements that give rise to variety of emotions based on the different causes for completing achievements (for example, unlocking an achievement because of help of others, mastery or by accident – see Weiner et al. 1979 for different emotional responses based on cause of accomplishment). Furthermore, the literature on extrinsic and intrinsic rewards show that rewards that are expected can have a detrimental effect on intrinsic motivations whereas non-expected rewards increase intrinsic motivation (Deci, Koester & Ryan 1999). In this vein, it could be interesting to study the effects to gameplay between scenarios where players know what achievements and rewards are available for them and one where they did not know and would hence unlock achievements by surprise.

It seems that game design is starting to penetrate multiple areas of human life. The trend of “gamification of life” seems to especially be prevailing in the service design area (such as Foursquare and Yahoo Answers.) Therefore, the study of game mechanics should translate beyond what are traditionally perceived as games. It is increasingly pertinent to understand game mechanics in other fields of inquiry, for instance in behavioural economics, marketing and cognitive sciences. In the quest for understanding and defining game mechanics we ought to maintain an abstraction level that is agnostic to any single game system, but applicable to variety of systems, to guarantee the usefulness of results across different disciplines.

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## **ENDNOTES**

<sup>1</sup> There are differences in the definitions of gamification. Huotari & Hamari (2011) explicitly state that also games can be gamified e.g. via achievement systems (meta-games), whereas Deterding et. al. (2011) suggest that gamification is only related to adding game-like features to *non-games*. We see that achievement systems, such as Kongregate mini-game portal, Steam achievement systems and Xbox Live all gamify the games that are offered on those platforms by introducing a shared meta-game layer across different games and systems.

<sup>2</sup> By the “new wave of gamification” we refer to the current boom of gamification during which the term “gamification” has been coined. Services have always been gamified (e.g. loyalty programs and serious games) however the new wave of gamification is sort of a novel realisation of the variety of possibilities it potentially offers. This new wave has been particularly initiated by the success of social games and social online networks.

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<sup>3</sup> The components of a game related to rules and goals at the level of data presentation and algorithms (see Hunicke et al. 2004 and Brathwaite and Schreiber 2008 for game design abstraction levels).

<sup>4</sup> Alien Swarm, Borderlands, Call of Duty: Modern Warfare 2, Killing Floor, Left 4 Dead, Left 4 Dead 2, Plant vs. Zombies, Portal, Team Fortress 2, Zeno Clash.

<sup>5</sup> The name *signifier* is taken from the constitution of a sign in Charles Sanders Peirce's semiotics.

<sup>6</sup>This only applies with larger achievement systems that span through more than a single game.

<sup>7</sup> For example, behavioral economics theories, such as goal-gradient effect (Kivetz et al. 2006) and endowment progress effect (Nunes & Drèze 2006) explain how people increase their rate of activity based on the perception of how close to goal they are.

<sup>8</sup> If we regard rewards that players receive by completing achievements as extrinsic to the gameplay experience, it could be contrary to the general consensus in motivational studies, where extrinsic rewards are believed to undermine the motivations in the long run (Deci, Koester & Ryan 1999).

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