Understanding Computer Role-Playing Games
A Genre Analysis Based on Gameplay Features in Combat Systems

Christopher Dristig Stenström[1]

[1]Chalmers University of Technology
Department of of Applied IT
412 96 Gotheburg SWEDEN
+46 (0)31-7721039
stenstrc@student.chalmers.se

Staffan Björk[2,3]

[2]Gothenburg University
Department of Applied IT
412 96 Gothenburg SWEDEN
+46 (0)31-7721039
staffan.bjork@gu.se

[3]The Interactive Institute
Lindholmsplatsen 1
417 56 Göteborg
+46 (0)702-889759
staffan.bjork@tii.se

ABSTRACT

A game genre as diverse as that of computer role-playing games is difficult to overview. This poses challenges or both developers and researchers to position their work clearly within the genre. We present an overview of the genre based on clustering games with similar gameplay features. This allows a tracing of relations between subgenres through their gameplay, and connecting this to concrete game examples. The analysis was done through using gameplay design patterns to identify gameplay features and focused upon the combat systems in the games. The resulting cluster structure makes use of 321 patterns to create 37 different subgenre classifications based solely on gameplay features. In addition to the clusters, we identify four categories of patterns that help designers and researchers understand the combat systems in computer role-playing games.

Keywords
Combat Design, Gameplay Design Patterns, Role-Playing Games

1. INTRODUCTION

Each year many new games are made available to players. One of the ways both players and developers of games try to understand the wide range available is through genres. These typically focus upon certain gameplay-related features, are broad in scope, and do not readily provide extensive insights for designers. For example, the first-person shooter (FPS) genre is characterized by the gameplay experience of combining a first-person view with shooting things. While much design knowledge exists regarding the genre among developers and researchers and also many conventions exists on what should be part of games in the genre, specific genres do not explicitly contain much of this information.

This paper offers a potential solution to one genre: a classification of Computer Role-Playing Games (CRPGs) by exploring the similarities and differences regarding game features related to the games' combat systems. While role-playing games are usually very complex games, with several different gameplay parts, players do typically spend a large part of the gameplay time in battles and preparation for battles are often the second most time consuming gameplay part ("most CRPGs place emphasis on tactical combat, through games vary greatly in how battles is handled" [3, p. 8]). Because of this, the combat system can be viewed as a vital part – if not the core gameplay – of the role-playing genre. This is a stance differing from for example that of Wolf [33] which uses an inclusive strategy to compile genres within video games. However, that approach leaves the motivation for specific subgenres difficult to understand from a structural perspective and does not clearly show any potential relation between the subgenres. While limiting the perspective, the choice of basing a subgenre specification on the gameplay related to combat offers to present a subgenre classification scheme with internal relations and a common method for selection. Focusing on the aspect of CRPGs allows a manageable design space to explore while looking at what is most likely to affect the majority of the gameplay experience.

This classification has been done by looking at computer role-playing games and presents subgenres as hierarchical clusters. Identified gameplay design patterns in the games are used as the basis for the clustering, and four categories of patterns help in the understanding of the design space of combat systems in the genre. After relating to previous work and related models, the iterative process of analyzing games, identifying patterns, and creating clusters are described. The four categories of patterns are presented next and the paper is concluded with a discussion on the possibilities and challenges of the method.

2. GENRES AND THE CRPG GENRE

There are a couple of fundamental parts that makes a game a computer role-playing game. The base of modern CRPGs comes from wargames and from pen-and-paper roleplaying game. One wargame that probably had a large impact on modern CRPG is the game *Chainmail*, while it used the same game mechanics as most other wargames all the units in the game were inspired by Tolkien's fantasy world. This was taken further by the pen-and-paper roleplaying games *Dungeon and Dragons*, which put emphasize on each player having one character, and Brathwaite and Schreiber [7] view character development as the most important part of any role-playing game. Typically, this development takes the form of letting players make choices on how to improve attributes or abilities that affect combat, but often players may also make decisions regarding the development of a narration or a relation with a non-player character.

Even so, the actual gameplay of CRPGs is focused on combat and letting the user improve their characters combat skills, primarily so players can defeat enemies that are more difficult. However, because of the popularity in using RPG elements in other genres it has become more and more blurred what really makes an RPG. Based on merging previous categorizations [3][14][31], one can argue that 6 different broad fields of CRPG have been perceived by developers, players, and reviewers:

- Western RPGs (WRPGs) – where players typically create their own characters and often allow explorations of more or less open worlds. Examples include *The Elder Scrolls: Skyrim* and *Dragon Age: Origins*.
- Japanese RPGs (JPRGs) – typically heavy tied to a narration with little character development but instead more unique characters selectable by players. Examples include *Phantasy Star 4* and *Skies of Arcadia*.
- Action RPGs (ARPGs) – real-time games which challenge players reflexes but often still requires strategic choices and allows for character development. Examples include *Diablo 2* and *Seiken Densetsu 3*.
- Tactical RPGs (TRPGs) – focused on combat with little or no world exploration. Examples include *Disgaea* and *Front Mission 4*.
- Massive Multiplayer Online RPGs (MMORPGs) – online RPGs that can support players in the hundreds or thousands (although spread over many severs). Examples include World of Warcraft and Star Wars: The Old Republic.
- Shooter RPGs (SRPGs) – while still classified as RPGs they are a hybrid between that genre and First person Shooters. Examples include *Borderlands* and *Mass Effect*.

This is not a conclusive list, and, in addition, there are many games that have clear RPG elements within them. For example, the game franchise *Heroes of Might and Magic* has heroes in the typical RPG style and *Warcraft 3* has heroes that highlight standard RPG game elements.

3. GAMEPLAY DESIGN PATTERNS

This paper explores the genre of CRPGs through the gameplay offered in combat situations. This requires a language in which one can express gameplay concepts and how they relate to other gameplay concepts as well as other aspects of a game design. The need for such design language in general for games has been noted already in the 1990s [12]. While this need was identified by designers from the industry, and they began projects to address this issue [4][11][19], dedicating significant amounts of time to this endeavor while actively developing games seems to have made progress difficult. Collaboration between industry and academic have produced results regarded as useful to both groups, e.g. the Mechanics-Dynamics-Aesthetics framework [18], but the results have not been expanded in scope or detail since their production. Started by researchers, the Game Ontology Project [34] provided a hierarchical structure specifically intended to provide a language for game analysis which has been applied to analyzing gameplay segmentation [35] and temporal frames [36]. However, the wiki created to enable players to populate the structure has not developed significantly since at least from 2009. The most active of these efforts, what is currently named gameplay design patterns, was started as an industry and academic collaboration. Adopting and modifying the idea of design patterns, which was originally from architecture [1] and have found its idea to game design [19] through software engineering [15], an initial framework and collection of 300 patterns were identified [6]. These have later been expanded with patterns covering pervasive games [26], non-player characters [20], game dialogues [8], camaraderie [5], and the collection is currently being updated and expanded in a read-only wiki[1]. Further, these patterns have been put to use in analysis how gameplay designs can support players in behaving good [9], exploring design possibilities regarding anonymity in cooperative board games [22], and boundary maintaining mechanisms in team-based online games [23]. Examples of smaller design pattern collections that have been developed independently include FPS level designs [17], 'Push & Pull' within level designs [25], quest and level design in CRPGs [29], 'old school' action games [10], and Facebook games such as FarmVille and CityVille [21].

Gameplay design patterns are a way of describing specific gameplay concepts that exist in games. Taking a position between logically formalizable concepts and imprecise terms such as genres, they are semi-formal description of reoccurring design features. Intended to support both analysis and design of games, they contain sections on what possibilities exist to make a pattern present in a game as well as the consequences such a presence in a game can have. Both the design options available regarding a pattern and the effects it can have on gameplay is often described through other gameplay design patterns, making each pattern part of a large network of patterns.

These attributes, and the possibility for expanding the collection of gameplay design patterns, made the patterns approach feasible for understanding the design space of combat systems in CRPGs. Two examples of patterns from the largest wiki[2] which exist in many CPRGs are CHARACTER DEVELOPMENT and INVENTORIES (the patterns are shown in SMALL CAPS for added clarity, as done by Lankoski [20]). Their one sentence definitions are "Changes in characters' abilities, skills, or powers" and "The space containing game elements carried by diegetic characters" respectively. Not too surprising for those familiar with roleplaying games in general, CHARACTER DEVELOPMENT is linked to patterns such as CHARACTER LEVELS, IMPROVED ABILITIES, and NEW ABILITIES while INVENTORIES have relations to pattern such as Equipment Slots and PICK-UPS.

4. METHOD

The gameplay design patterns discussed in the previous section provides a tool set to analyze CRPGs. However, the approach does not provide a methodology for how to apply this. While this is part of its flexibility and makes it possible to apply to new areas, it also meant that a choice needed to be made on how to use patterns for understanding the combat systems in CRPGs.

Gameplay design patterns have already been used to investigate an experimental game genre, namely pervasive games [26]. In this case many games – which although they use various technologies and various gameplay styles had in common that they could explored the concept of being able to play "anywhere, anytime" – were categorized based on what gameplay design pattern they contained. Games that shared many patterns in common formed local clusters and these clusters in turn created larger clusters until all games were positioned in a hierarchical structure. While this method originally was developed to compare similarities between texts [2];[27], here each cluster was given a name based upon the most pertinent patterns in their member games as well as the technologies or overall interaction they used. See Dahlskog *et al*. [13] for an approach that used 100 games and 17 functional classifications to find four general genres in computer games.

This approach resulted in an overview of pervasive games where each cluster suggested a subgenre, and was for this reason a suitable candidate for understanding combat systems in CRPGs.

---

[1] http://gdp2.tii.se/index.php/Main_Page

[2] ibid.

There are however some observations to make regarding the approach. First, many patterns that would be identified were likely to be new patterns. This is quite natural since any game can contain hundred of patterns – how many are found is partly an effect of how finely granulated the collection one is using is, and in many cases analyzing games causes the identification of new patterns. For this reason, the pervasive game analysis started with patterns developed specifically for understanding the particularities of mobile games and only added patterns related to pervasive gameplay. While having very common patterns in the analysis, e.g. MULTIPLAYER GAMES, would have highlighted the commonality between the different games this would not have helped distinguish the differences of subgenres.

For a study of combat systems in CRPGs, only patterns related to the combat were seen as appropriate. To encourage independent identification of pattern concepts, it was decided to start a new collection but to borrow patterns from the largest gameplay design pattern collection when relevant. While this still signified a rather large proportion of that collection, it seemed most practical given that the new collection was expected to grow significantly when more narrowly defined patterns would be found in the game examples. Although a very different categorization may have resulted from a comparison with the patterns collection focused on quests and levels [29], the perception was that not all CRPGs (especially some older ones) build heavily on these. Another observation regarding the method is that the sizes of the identified clusters do not necessarily represent the sizes of the subgenres in popularity or sales; rather, large clusters represent well-specialized subgenres in rather the same way that a well-populated branch in a zoological taxonomy represents having many specialized species but not necessarily that there are many living members in each species.

Besides the choice of what patterns to use initially, a choice also needed to be made on what games to explore. The CRPGs genre is populous and contains many varied forms of gameplay. A first selection of games to be removed were MMORPGs (including text-based MUDs); this since they are often treated as a genre in itself. Second, the rather limited group of CRPGs played by a few players together was removed leaving only single-player games. Two other limitations were made based on gameplay features. One was that the players have to be able to develop their characters in the game; this was deemed such a common feature of roleplaying games that the few games that did not have it could be seen as exceptions. Likewise, nearly all games studied were those where players are in control of parties of characters, or in some cases even armies of characters. This is since team work is an archetypical feature of roleplaying games, even if the cooperation in single-player games may be between characters rather than between players. In practice, the limitations made the SRPGs games fall outside the scope of the study. As the researchers were well familiar with the CRPG genre as players, this still left them with a potential of hundreds of games especially since one of the researchers has a large collection of games developed in Japan. Furthermore, the Japanese game industry has had a rich RPG tradition with many different series and thus highlights more diverse gameplay traits in their combat systems.

To develop the cluster analysis iteratively, it was decided to start with a low number of games for which patterns were identified and then clusters automatically extracted. This would then be expanded by adding games and identifying patterns for these; if this resulted in new patterns the old games were re-examined for

their presence. This expanded analysis was then used to create a new cluster hierarchy. By repeating this process several times, it was felt that novel patterns could mature in concept through use and a perception of the stability of the subgenres could be found be examining how they differed between iterations. The working hypothesis was that a stable hierarchy had been achieved when neither new patterns were found nor clusters differed as new games were added.

4.1 Iteration 1

21 games played extensively by the primary investigator were selected for the first iteration. The motivation for choosing particular games was either that they represent the subgenres of CRPGs described in earlier, have sold in the millions, or are regarded as cult classics. Most of them have Metacritic rankings[3] in the 80 or low 90 percentages. The chosen games were: *Breath of Fire 5, Chrono Trigger, Diablo 2, Disgaea 1-3* (regarded as one game), *Dragon Age: Origins, Dragon Quest 8, Final Fantasy 9, Final Fantasy 10, Final Fantasy 12, Final Fantasy 13, Final Fantasy 13-2, Grandia 2, Ogre Battle, Pokémon Black and White, Resonance of Fate, Saga Frontier 2, Secret of mana 3, Soul Nomad, Suikoden 5, Vagrant Story,* and *Valkyria Chronicles*.

While it may seem as if the Final Fantasy games were over-represented, this franchise has varied the combat system considerably between installments. The initial analysis of iteration 1 identified 218 patterns; while many of these came from the collection developed by Björk et al., many were new. For each new pattern, it was ensured that more than one example existed for it even if this might be games not in the collection. While the pervasive game analysis had used a custom built clustering algorithm shown using Treemap visualizations [30], the open source systems Cluster 3.0 [16] and Treeview 1.16 [28] was chosen to be used in this analysis. Names were not given to
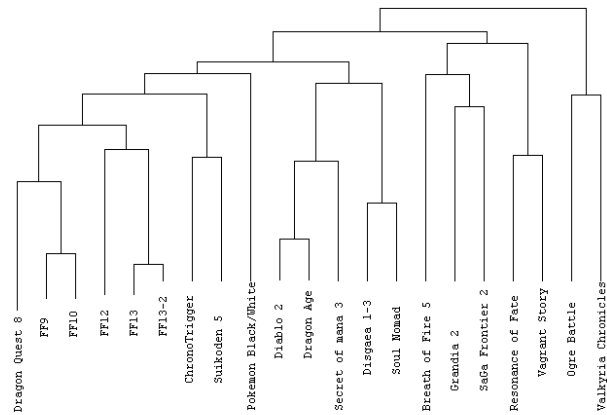

Figure 1: The first cluster structure.

clusters at this point since the hierarchy was expected to change significantly with the next iteration.

4.2 Iteration 2

During the start of Iteration 2, a critical review of the identified patterns was performed. This led to the removal and merger of many patterns as well as alignment of some patterns with those already established in earlier work.

After this, 10 games were added into the examination from the WRPG, JRPG, and TRPG subgenres. Some of the games where added to observe if they would change the parts of the cluster structure that went counter to the primary investigator's perception of CRPGs. For example, *Tactics Ogre: Let Us Cling Together* was added to see how it would affect two potential outliers: *Ogre Battle: The March of the Black Queen* and *Valkyria Chronicles*. Like for the first iteration, franchises where the games were regarded as very similar were treated as one entry into the analysis. The games added were: *Elder Scrolls V: Skyrim, Fire Emblem Franchise, Front Mission 4, Phantasy Star 4, Phantom Brave, Rogue Galaxy, Shining Force* (franchise), *Skies of Arcadia,* and *Tactic Ogre: Let Us Cling Together, Wild arms 3* Besides the ten games added, many more candidates were identified and kept for additions in later iterations.

As in Iteration 1, many new gameplay design patterns were identified but effort was put to connect these two previous collections and avoid overemphasizing certain sub domains of the design space of gameplay combat. The clusters resulting from this revised exploration were also given preliminary names based upon the relation to existing genre classifications.
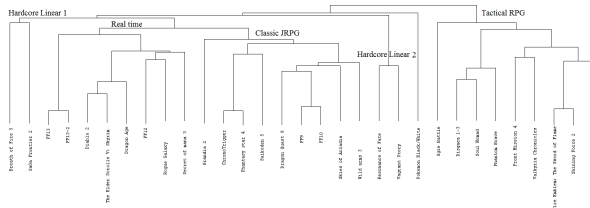

Figure 2: The second structure with some suggested names.

Some observations can be made about this cluster structure. First, while a mapping could be done to subgenre groupings already used, not all are present and the one called "Hardcore Linear" (which closest relates to TRPGs) is spread over two different parts of the structure. Second, the effect of adding *Tactics Ogre: Let Us Cling Together* could not easily be determined; while it may have had a big impact, it could just as easily been the other games that rearranged the structure. This was however not seen as a problem since the resulting structure was more balanced in not having a small splinter group at the top level. Third, and arguably the most noticeable observation, is that Final Fantasy 12, 13, and 13-2 games are not part of the "Classic JPRG" cluster – which runs counter to the common perception that the Final Fantasy franchise is a central example of JRPGs. This indicated that more iterations might be necessary.

4.3 Iteration 3
Structurally, iteration 3 was done similarly to iteration 2. However, besides adding more examples of CRPGs using more or less traditional design solutions, a few games with radically different combat system where added to observe their effect. Examples of this include *Legaia 2: Duel Saga*, which uses a gesture-based input system. *Final Fantasy Tactics* was added as a franchise in itself as this series has a markedly different combat system. Overall, the 10 games added were: *Bahamut Lagoon, Final Fantasy Tactics Advance, Legaia 2: Duel Saga, Lufia The Legend Returns, Mario & Luigi: Bowser's Inside Story, Shin Megami Tensei: Persona 4, Romancing saga: Minstrel Song, Star Ocean: The Last Hope, Tales of Phantasia*, and *Xenogears*.

During this iteration, some games added very few patterns. This was expected since some of the games were not perceived as

having radically different combat systems. However, it should be noted that some very narrow sub patterns were found but not kept as they were perceived as skewing the analysis towards a focus on
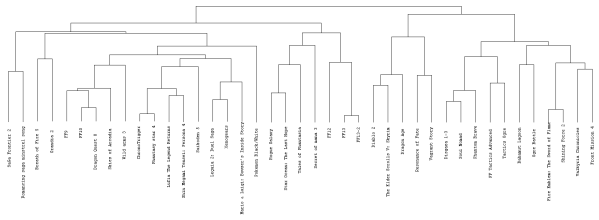

Figure 3: The third structure.

their sub domain of combat systems. The end result was a structure where 41 games had been clustered depending on their closeness in regards to 321 different gameplay design patterns.

While some difference can be seen in comparison with the previous structure, the overall characteristics have stayed the same. One notable change is that *Grandia 2* and *Breath of Fire: Dragon Quarters* left the "Classic JRPG" cluster and created one connected to "Hardcore linear". The most important difference was that the two clusters consisting of real-time "JRPG" games and "Western" RPGs merged into one large cluster.

4.4 Iteration 4
The next iteration focused upon verifying the analysis and find ways to most effectively convey how the patterns influenced the clusters. The first step of this was to verify manually that two games forming a cluster had similar designs regarding the combat system and likewise for clusters formed from a cluster and an individual game. While this did not significantly change the structure, this work did bring forth the idea of using the three most dominant patterns common in the cluster as a way of identifying the cluster. Doing this produced figure 4, an annotated version of figure 3.

To examine how important the three patterns identified for each cluster actual was for creating it, a new structure was create were only the patterns present in figure 3 were used, which meant using 89 patterns in total. This simplified model was seen as an acceptable reproduction since the cluster name easily could be reintroduced even if some changes were noticeable. While for example the tactical RPGs cluster was still one major group, it had become closer to the cluster of western styled real-time games. Further, real-time JRPG had become more distinct as their own group the bigger group of Japanese games.

To validate further the soundness of the structure, 4 sessions with focus groups were conducted. In these unstructured interviews, groups of 3 or 4 experienced CRPGs players were introduced to the structure, patterns, and – when necessary – unfamiliar games (unfortunately, no female players could be recruited). They were allowed to explore and comment on the structure freely, resulting in sessions lasting between two and three hours. While the overall structure was deemed satisfactory, and the Tactical group seemed especially solid, many smaller comments regarding patterns motivated a revised structure.

While revising the structure, it was hypothesized that the number of patterns could be lowered further by replacing sub patterns with their parent patterns. This motivated the creation of a structure using only 53 patterns. However, the resulting structure became inconsistent. For example, the perpetual outlier *Ogre*
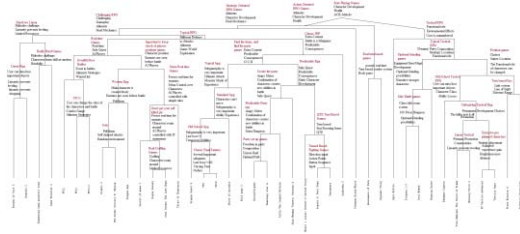
Figure 4: the final structure with penultimate cluster names.

Battle suddenly became close to *Pokémon* and these two became close to the "Really Hard" cluster; two factors which went strongly against the primary investigator's understanding of the games. Further, *Front Mission 4* – which uses most of the more advanced patterns found in modern TRPGs and was seen as unquestionable being much more related to *Valkyria Chronicles* – was suddenly closely related to *Bahamut Lagoon*. This went against both the primary investigator's knowledge and the structures in all previous iterations.

After considering the findings in iteration 4, it was decided that the best compromise between clarity and precision in the structure lay in using all 321 patterns (i.e. the structure found in figure 3) but use the 89 patterns to show the clusters in this structure. While the three patterns given for each cluster in this solution did not provide an exact definition for the clusters, they gave a good approximation while not requiring an examination of all 321 patterns (see figure 5 for the matrix of all games and patterns). This lead to a consideration of the role the remaining patterns played in design space of combat systems of RPGs. A first observation was that many of the remaining patterns existed in nearly all games; these patterns could be seen as belonging to a *ubiquitous* group in that it is rather their absence than their presence that would be noted in a design. Of the remaining patterns, many only indirectly affected the combat system and could therefore be classified as a *meta* group. The remaining patterns were then recognized to be *flavor* patterns; they were noticeable as giving specific effects to the overall gameplay but not on a level that they defined clusters.

5. RESULT

The main results of the investigation can be divided into two parts. The first is the cluster structure that provides one way of classifying subgenres of

Figure 5: the game/pattern matrix after all iterations.

CRPGs based upon the design of their combat systems. The two main grouping were Action-Oriented RPGs and Tactical RPGs while Hardcore Linear RPGs, Real-Time RPGs, and Gentlemen's Boxing RPGs were important sub groups. This introduced novel suggestions to subgenres of CRPGs with unfamiliar names, but these were chosen based on gameplay features. Hardcore Linear RPGs is similar to the FPS genre in that it gets its name from being the combination of two different features; in this case being both difficult and providing very little freedom for players regarding story development or game world exploration. Gentlemen's Boxing RPGs is named so since all participants in their battles take turns attacking whomever they please, and all other participants patiently wait their turn while this happens (another suggested name was Show Off RPGs). While some clusters were given very precise names, e.g. Real-Time Position-Based Battle RPGs, others were identified as very similar to their parent cluster. Since the latter could happen due to the algorithm always adding to entries together, they were simply distinguished by adding prime symbols leading to clusters such as Old School JRPG′. The final structure, figure 6, is structurally similar to figure 4 but has revised names.

The second part of the result is the 321 patterns identified (figure 5 contains all patterns except the one classified as ubiquitous, as explained in the next section). In the following, these are discussed in terms of the four groups described in the previous section. Given the large number of patterns, only examples of patterns will be given to illustrate specific areas or exceptions.

5.1 Ubiquitous Patterns

36 patterns were found in all games examined; they were therefore not included in figure 5 since they do not affect the cluster structure. Knowledgeable players of RPGs are likely to have experienced gameplay related to these patterns and are likely to be sensitive to particularities regarding these, especially their absence from a design. As such they are of concern to anybody that is about to design or analyze combat systems for CRPGs. We thereby identify the following patterns as being ubiquitous in CRPGs: PRIVILEGED ABILITIES, PRIVILEGED MOVEMENT, EQUIPMENT SLOTS, ANALYSIS PARALYSIS, EQUIPMENT, ARMOR, GAME ITEMS, ENEMIES, PLAYER CHARACTERS, AVATARS, PARTIES, BOSS MONSTERS, IMPROVED ABILITIES, NEW ABILITIES, GAMEPLAY STATISTICS, GRINDING, QUESTS, COMBAT, COMPANIONS, CUTSCENES, DAMAGE, DIALOGUES, GAME WORLDS, GOD VIEWS, HELPERS, ILLUSION OF OPEN SPACE, INACCESSIBLE AREAS, INVENTORIES, LOOT, MAIN QUESTS, NON-PLAYER CHARACTERS, OBSTACLES, PLAYER/CHARACTER SKILL COMPOSITES, STIMULATED PLANNING, TACTICAL PLANNING, and WEAPONS.

Maybe not too surprising, many of these patterns have been previously identified [6][29]. While most patterns in this group are probably no surprise for those familiar with RPGs, they do provide a quick overview of what gameplay elements players most likely expect to find when starting to play a new CRPG.

5.2 Cluster Distinguishing Patterns

These are the 89 patterns that were found by examining the clusters and identifying the three most relevant ones for each. While some are commonly known, e.g. ABILITY LOSSES, ACTION POINTS, BATTLE IS A MINIGAME, BODY PARTS, CRAFTING, CHARACTER DEVELOPMENT, LINE OF SIGHT, and SIDE QUESTS, they do not occur in all combat systems and can help designers and analyzers to position games within the various subgenres of CRPGs. Other patterns in this group reveal the specificity of
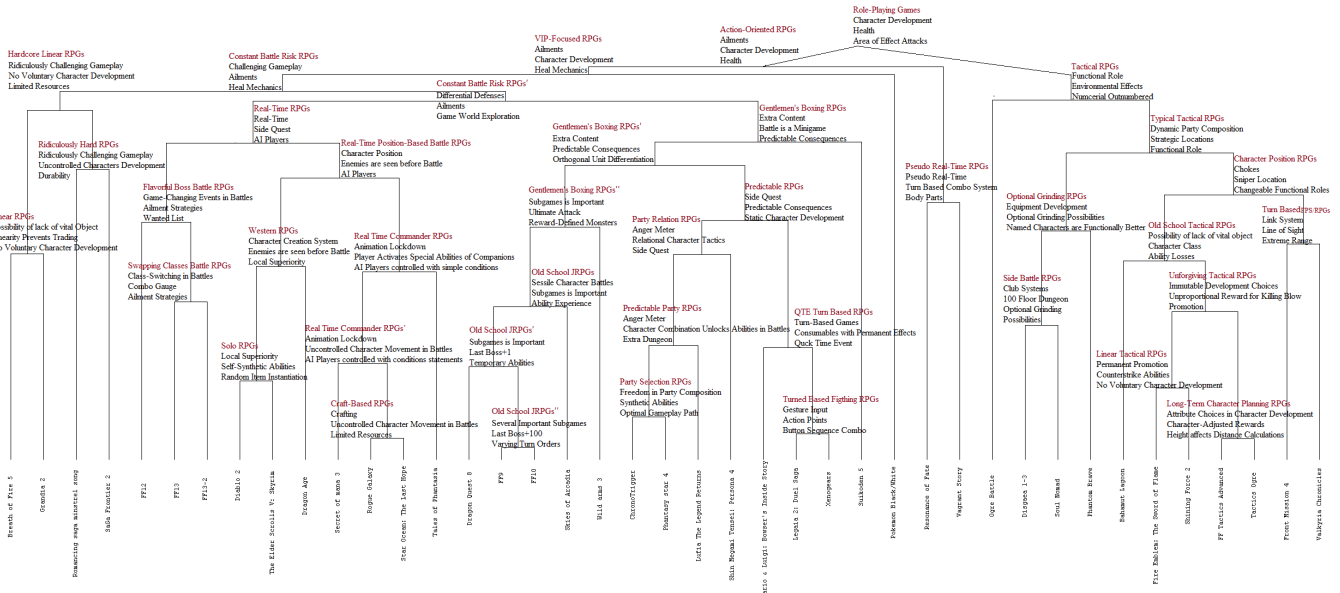
Figure 6: Final structure with named clusters.

certain subgenres. LAST BOSS+1 and LAST BOSS+100 point out that some CRPGs provide additional optional enemies that players can confront after completing the main story if they wish, while LINEARITY PREVENTS TRADING and NO VOLUNTARY CHARACTER DEVELOPMENT shows how hard the narration controls some games. Others point to very specific concrete variations in the combat system: ANIMATION LOCKDOWN (where players can interrupt enemy actions to cause them to lock in animation loops) and PSEUDO REAL-TIME (in which battles alternate between being real-time based and turn-based) and QUICK TIME EVENTS.

Although the cluster defining patterns was the first group to be identified, it is presented after the ubiquitous group. This for the reason that those wanting to familiarize themselves with CRPGs should first be able to recognize the core patterns. When an overview of the genre has be achieved by examining those, the subgenres that can be argued exists within CRPGs can then be approached using the cluster defining patterns.

5.3 Flavor Patterns

In one sense, the patterns in this group are the leftovers from the other groups. However, they affect combat gameplay directly or are linked to consequences of the outcome of battles. While they do not distinguish subgenres in the way the cluster defining group does, they do have noticeable impact on the gameplay and can thereby be seen as flavoring it.

Some of the patterns in this group are known from both CRPGs and other game genres. Examples of these include DYNAMIC DIFFICULTY ADJUSTMENT, FOG OF WAR, FRIENDLY FIRE, PERMADEATH, TIME LIMITS, UPGRADES, VARIABLE ACCURACY, and ZONE OF CONTROL. Others are more uncommon but most likely recognizable for how they affects gameplay, e.g. BATTLE IS OVER WHEN ENEMY LEADER DIES, FORCED BATTLE RETRIES, HEADQUARTER MUST BE PROTECTED, and STORYLINE EVENTS IN BATTLE. Also noteworthy are ACTIVE TIME BATTLE, which is the individual tick-based action system introduced in *Final Fantasy 4*, and LAST RESORT, the availability of attacks that are only worth considering when one is about to lose a battle.

5.4 Meta Patterns

These patterns do not directly affect the combat gameplay in CRPGs but do so by affecting abilities, powers, skills, or other game state values influencing combat. That these can still be integral to the perception of the combat system is shown by the fact that some meta patterns are part of the ubiquitous group (e.g. DIALOGUES and CUT SCENES) or the cluster distinguishing group (e.g. CHARACTER DEVELOPMENT and LINEARITY PREVENTS TRADING). The meta pattern group collects the patterns that are neither present in nearly all CRPGs nor are important to illustrate gameplay aspects of subgenres. As such, they can be seen as flavor patterns but not directly related to the combat system. One group of meta patterns concern how players can access new playable characters in the game. Examples include PARENT SYSTEMS, which has several different sub patterns for example BREEDING and MARRIAGE, and USER CAN CREATE INFINITE NUMBER OF CHARACTERS. Others deal with having a base from which to explore the world, e.g. STORE DEVELOPMENT HOME and SAFE HAVENS. THEME PARK., EXPERIMENTING, MINIGAMES, and POTTERING (see [24] for a detailed description of the latter) are example of patterns that support other types of gameplay than fighting even though all of these may make future battles easier.

While these patterns do not directly affect combat, they can affect them by modifying when one can engage in battles. QUICK TRAVEL allows combat to take a larger part of players' playing time since travelling time is reduced. SECRET AREAS provide hidden places where combat can occur, and its subpattern SECRET GRINDING PLACES specifically supports this (SECRET AREAS may contain other types of challenges).

6. DISCUSSION

A first question the analysis can raise is how well the identified clusters relate to the various subgenres of CRPGs presented earlier. Some of the clusters share names with the aggregated list of subgenres presented early in the paper, but that list is specifically that: a compilation of several different attempts to classify the variety of CRPGs that are not fully compatible with each other without some interpretation. Therefore, it is not

appropriate to judge the quality of the clusters based on their exact similarities to that list. Noteworthy is that even if only a few western RPGs were present in analysis, these did cluster together, showing that there may be gameplay basis for viewing these games as a distinguishable subgenre (although a more descriptive name would either involve freedom in character creation or hit-and-run tactics). Looking at the other genres from the introduction, JRPGs and TRPGs did occur in the penultimate structure while ARPGs can be said to be represented by Real-Time RPGs. Closer examination of the clusters however reveal an inconsistency since the whole TRPGs subgenre consisted of only games developed in Japan, but these were only related to the suggested JRPGs cluster on the top level. Based on an analysis of what gameplay they contained, the JRPGs cluster was renamed Gentlemen's Boxing RPGs. Several other clusters were also identified as having inherited names that only partly described all games and clusters they contained; these were also renamed based upon gameplay analysis of their contained games.

Looking at the final structure, Action-Oriented RPGs and Tactical RPGs constitute the first branches with the former including the majority of the games. Most Action-Oriented RPGs focus upon a smaller number of characters – VIP-focused RPGs – and do not always let players choose when battles should occur through being Constant Battle Risk RPGs. This last group is divided into the three clusters of Hardcore Linear RPGs, Real-Time RPGs, and Gentlemen's Boxing RPGs; the two last of these are each approximately the same size as the Tactical RPGs cluster. It should be stressed again that sizes of the clusters do not represent some measure of popularity; rather a large group acknowledges an observed diversity. That being said, the cluster analysis also provides many much more specific subgenres, e.g. Linear RPGs, Flavorful Boss Battle RPGs, Craft-Based RPGs, Party Relation RPGs, Long-Term Character Planning RPGs, and Unforgiving Tactical RPGs. Each of these are positioned hierarchically in relation to other subgenres of CRPGs and explained through three core gameplay design patterns. Comparing a cluster to one above it or below it in the structure adds more core patterns (in the case of higher-level clusters) or optional ways of varying it (in the case of lower-level clusters). In addition, the structure also provides examples of games that exemplify the subgenre and games that are closely related to the subgenre.

6.1 New Patterns
Of the 321 patterns identified, 279 were previously undocumented by earlier work. While this ratio is high, it can point to both of lack of attention to this sub domain of gameplay from previous work and the very specialized nature a specific part of gameplay can have in a game genre that has been popular for many years. Another potential reason for the high figure may be that the search was inclusive; all patterns that were found and could be agreed upon by the investigators were kept.

That being said, the significant effort it takes to fully document design patterns and their relations to each other has not been done. While this is a weakness found in various degrees in many other reported collections, the iterated nature of the work reported here ensured that each pattern was considered and "used" many times although it might not have been described according to one of the templates developed. Arguably, this makes a point that the core concept behind each pattern is solid and unlikely to change when further developed (even if the names of many patterns have changed several times during the work). For some of the patterns another indication of their value is that it is easy to find examples

of their use in other genres than CRPGs once they have been identified. AREA OF EFFECT ATTACKS and ANIMATION LOCKDOWN exist in Action games; BUTTON SEQUENCE INPUT, COMBO GAUGES, and COUNTERSTRIKE ABILITIES can be found in Fighting Games; and RTS games have FREEDOM IN PARTY COMPOSITION and NAMED CHARACTERS ARE FUNCTIONALLY BETTER.

6.2 Validity of the Results
The method reported here arguably is subjective in several ways. First, the selection of games was based on the authors' views of what would create a diverse starting batch for the cluster algorithm. Second, judging if a pattern has a presence in a game often has a subjective component to it due to the semi-formalized nature of the patterns. Third, the names of clusters and the patterns representing them were selected manually by the authors. Fourth, it could be argued that the selection of games overemphasis Japanese developed RPGs. While all these arguments are true, the approach is more transparent than the categorizations presented in texts aimed at the gaming community, and allows for a tracing from individual games and patterns up to the high-level genres. Regarding the question of western RPGs, future work could without changes to the approach add several of these to see if the western RPG cluster would become larger and more detailed, if the added games would form a new cluster, or if they simply became spread out over the structure. The two latter possibilities would in one sense invalidate the western RPGs cluster but in another sense either show that there exist two different subgenres of western RPGs or that there exists one main approach but with exceptions. Finally, that the western RPGs do collect in a cluster currently may point to a difference in innovation focus; these games may be innovating in other areas than the combat system.

The genre overview of CRPGs provided in this paper can be seen as one perspective on genres. Game researchers and developers could be empowered by having a collection of such perspectives, e.g. ones based upon narratives or levels and quests (e.g. through the patterns by Smith et al. [29]). Further, independent recreations of cluster hierarchies based on combat gameplay could be performed, both by looking at more other games and by modifying the clustering algorithms used (e.g. allowing more than two entries to be clustered in each step). Finally, the restriction used here on requiring companions and character development as present features and not being multiplayer games could be removed. While this may make the distinction between CRPGs and other genres blurry, making a cluster analysis with borderline cases and counter-examples could be used to see if the concept of CRPGs becomes a stable cluster; in effect, this could be an approach to see if there are structural aspects of game designs that support current genre classifications. A slightly less ambitious approach would be to add MMORPGs, tabletop RPGs, and Live Action Role-playing to explore the broader genre of RPGs.

7. CONCLUSION
This paper has presented an analysis of 40+ games in the CRPGs genre to identify subgenres based upon the gameplay in battles. This was performed through using gameplay design patterns to find clusters of commonality in gameplay. The two main clusters found were Action-Oriented RPGs and Tactical RPGs, with Hardcore Linear RPGs, Real-Time RPGs, and Gentlemen's Boxing RPGs as the largest sub clusters. In addition, the VIP-Focused RPGs and Constant Battle Risk RPGs point towards the common features of many CRPGs. In doing the analysis, 279 new

patterns were found and four categories of patterns were identified: ubiquitous, cluster defining, flavor, and meta. The clusters and pattern categories together help describe the design space of the combat systems in computer role-playing games.

8. REFERENCES

Due to space limitations, games references are not provided.

[1] Alexander C., Ishikawa S., Silverstein M., Jacobson M., Fiksdahl-King I. and Angel S., 1977. A pattern language. NewYork (NY), Oxford University Press.

[2] Barry, M.W., & Fierro, R.D., 1995. Low-Rank Orthogonal Decompositions for Information Retrieval Applications. Numerical Linear Algebra with Applications 3:4 (1996), pp. 301-328.

[3] Barton, Matt. (2008) Dungeons and Desktops: The History of Computer Role-playing Games A K Peters Ltd.

[4] Barwood, H. & Falstein, N. (2001) The 400 Project, Game Developers Conference 2001.

[5] Bergström, K., Björk, S. & Lundgren, S. (2010). Exploring aesthetical gameplay design patterns: camaraderie in four games, in Proceedings of the 14th International Academic MindTrek Conference: Envisioning Future Media Environments. ACM: Tampere, Finland. p. 17-24.

[6] Björk, S. & Holopainen, J. (2004) Patterns in Game Design. Charles River Media.

[7] Brathwaite, B. & Schreiber, I., 2008. Challenges for Game Designers, Charles River Media.

[8] Brusk, J. & Björk, S. (2009). Gameplay Design Patterns for Game Dialogues. Paper presentation at DiGRA 2009: Breaking New Ground: Innovation in Games, Play, Practice and Theory. London, UK.

[9] Björk, S. (2010). On Making Good Games - Using Player Virtue Ethics and Gameplay Design Patterns to Identify Generally Desirable Gameplay Features. Paper presentation at Nordic DiGRA 2010, Stockholm, Sweden.

[10] Cermak-Sassenrath, D. (2012). Experiences with design patterns for oldschool action games. In Interactive Entertainment 2012. ACM, New York, NY, USA..

[11] Church, D. (1999). Formal Abstract Design Tools. Game Developer . Available from: http://www.gamasutra.com/features/19990716/design_tools_01.htm

[12] Costikyan, G., I have no words & I must design. Interactive Fantasy. 1994.

[13] Dahlskog, S., Kamstrup, A. & Espen, A. (2009). Mapping the game landscape: Locating genres using functional classification. Paper at DiGRA 2009.

[14] Fahey, M., 2010. A Visual Guide To The Role-Playing Game. Available from kotaku.com/5546807/a-visual-guide-to-the-role+playing-game

[15] Gamma, E., Helm, R., Johnson, R. & Vlissides, J. (2001). Design Patterns – Elements of Reusable Object-Oriented Software. Addison-Wesley, 2001.

[16] de Hoon M.J.L, Imoto S, Nolan J, Miyano S. (2004) Open source clustering software, BIOINFORMATICS, Vol. 20, no. 9 , pp. 1453-1454.

[17] Hullett, K. & Whitehead, J. (2010). Design patterns in FPS levels. Foundations of Digital Games, June 19–21, 2010, Monterey, California, USA.

[18] Hunicke, R., LeBlanc, M. & Zubek, R. (2004) MDA: A Formal Approach to Game Design and Game Research. In proceedings of the Challenges in Games AI Workshop, Nineteenth National Conference of Artificial Intelligence.

[19] Kreimeier, B. The Case for Game Design Patterns. 2002 Oct 29, 2004]; Available from: http://www.gamasutra.com/features/20020313/kreimeier_01.htm.

[20] Lankoski, P. (2010). Character-Driven Game Design - A Design Approach and Its Foundations in Character Engagement. D.A. thesis at Aalto University. Publication Series of the School of Art and Design A 101

[21] Lewis, C., Wardrip-Fruin, N. & Whitehead, J. (2012). Motivational game design patterns of 'ville games. In Proceedings of the International Conference on the Foundations of Digital Games (FDG '12). ACM, New York, NY, USA, 172-179.

[22] Linderoth, J. (2011). Exploring anonymity in cooperative board games. Think Design Play: The fifth international conference of the Digital Research Association (DIGRA).

[23] Linderoth, J., Björk, S. & Olsson, C. (2012). Should I stay or should I go? - Boundary maintaining mechanisms in Left 4 Dead 2. Proceedings of 2012 DiGRA Nordic.

[24] Lundgren, S. & Björk, S. (2012). Neither Playing nor Gaming: Pottering in Games. Foundations of Digital Games 2012, May 29-June 1, 2012 Raleigh, NC, USA.

[25] Milam, D. & Seif El Nasr, M. (2010) Analysis of Level Design 'Push & Pull' within 21 games. In proceddings of Foundations of Digital Games.

[26] Peitz, J. & Björk, S. (2007). Understanding Pervasive Games through Gameplay Design Patterns. Paper presentation at DiGRA 2007, Tokyo, Japan.

[27] Quesada, J.F., et al. (2001). A Computational Theory of Complex Problem Solving Using the Vector Space Model (part I): Latent Semantic Analysis, Through the Path of Thousands of Ants. In Cañas (Ed.) Cognitive research with Microworlds, pp. 43-84, pp. 117-131.

[28] Saldanha, A.J. (2004). Java Treeview - extensible visualization of microarray data. Bioinformatics. 2004 Nov 22;20(17):3246-8. Epub 2004 Jun 4.

[29] Smith, G., Anderson, R., Kopleck, B., Lindblad, Z., Scott, L., Wardell, A., Whitehead, J. & Mateas, M. (2011). Situating Quests: Design Patterns for Quest and Level Design in Role-Playing Games. To appear in Proceedings of the 4th International Conference on Interactive Digital Storytelling (ICIDS 2011), Vancouver, Canada, November 28 - December 1, 2011.

[30] Shneiderman, B. (1992). Tree visualization with tree-maps: 2-d space-filling approach ACM Transactions on Graphics, Volume 11, Issue 1, pp. 92-99, 1992.

[31] Strategy Informer, 2010. Star Wars: The Old Republic (Interview with Daniel Erickson). Available at www.strategy informer.com/pc/starwarstheoldrepublic/interview.html

[32] Weiser, M., 1993. Some Computer Science Issues in Ubiquitous Computing, in: Communications of the ACM, vol. 36, no. 7 (July 1993), p. 75-84.

[33] Wolf, M.J.P. (2000). Genre and the Video Game. In Wolf, M.J.P. (Ed.) The Medium of the Video Game, University of Texas Press, 2000.

[34] Zagal, J., Mateas, M., Fernandez-Vara, C., Hochhalter, B. and Lichti, N. (2005). Towards an Ontological Language for Game Analysis. In Proceedings of DiGRA 2005.

[35] Zagal, J. P., Fernandez-Vara, C., Mateas, M. (2008). Rounds, Levels, and Waves: The Early Evolution of Gameplay Segmentation, Games & Culture. Vol. 3. No. 2, 175-198

[36] Zagal, J. P. & Mateas, M., (2010). Time in Videogames: A Survey and Analysis, Simulation & Gaming, 41(6), 844-868.