Game Genres and High-Level Design Pattern Formations

Jonathan Lessard
Concordia University
1455 de Maisonneuve Blvd. EV 6.773
Montréal, Québec, Canada H3G 1M8
+1 514-848-2424 #4717
Jonathan.lessard@concordia.ca

ABSTRACT
In this paper, I argue for the need to recognize a higher level of abstraction above that of game design pattern. I propose the concept of "game architecture" defined as high-level, strongly synergistic formations of design patterns that efficiently implement a specific gameplay. I suggest that these game architectures form the design backbone of mechanics-centric game genres and constitute a significant factor in game evolution and innovation. They are reproduced in a number of individual games because they allow players to experience variety while remaining within the scope of a familiar and appreciated game experience for which they are already competent. A simple model is proposed to frame game architectures in relationship to other levels of abstraction in game design: form and content. Evidence for game architectures is discussed in a historical analysis of adventure games and trick-taking card games.

Categories and Subject Descriptors
D.2.2 [**Software Engineering**]: Design Tools and Techniques
K.8.0 [**Personal Computing**]: Games
K.2.0 [**Computing Milieu**]: History of Computing

General Terms
Design, Human Factors, Theory

Keywords
Game architectures, game design, design patterns, game history, game genres, adventure games, card games, trick-taking games

1. INTRODUCTION
Amongst the various possible approaches to game design research, historical inquiry hasn't received much attention yet. Although it can't provide as much control on the isolation of observed variables as experimentation, it can offer vast amounts of data concerning design, reception, and the evolution of those factors in time. It is especially precious to understand how and why game design evolves.

My own research on the design history of adventure games [1] raised conceptual issues that reach beyond the object of study itself, especially concerning the interactions of game design and genre construction. A major question quickly emerged: how could such objectively different games as text adventures, graphic adventures, point and click adventures, interactive movies or "*Myst*-likes" be so often considered avatars of a same genre by players, critics and designers alike? A discourse analysis of specialized computer game magazines revealed that those people saw continuity in all these different games beyond apparent differences. There is something in the experience of those games that remained recognizable. This led me to postulate a minimal continuity in adventure games' design that could afford this familiar gameplay despite important formal differences. This notion raised other problems. For example: how are genre-defining design elements to be distinguished from "facultative" ones—those affording individual games formal variation without disrupting their attribution to a genre? How can we even explain the appeal of genre continuity and the constant reproduction of its foundational design?

The necessity to address these questions led to the conceptualization of three different levels of abstraction in a game's design that would allow distinguishing phenomena of various degrees of granularity in the evolution of adventure game design. This model proved very useful in the analysis of adventure game formal variations over time. In this paper I will attempt to further conceptualize it and see if it can be abstracted from this specific body of games. If so, it could contribute to the general study of games and their design by providing a better understanding of the interactions between game design innovation and genre construction.

I chose to reformulate this work in terms of game design patterns as it seems to be currently the most solid framework to describe those elusive game design "components", "parameters", "atoms", "ludemes" or "characteristics". I think this decision contributed to a significant refinement of the model. The fact that this argument was not natively rooted in a design pattern approach but a historical one might make it unusual at times but I hope the reader will find the bridge between those two fruitful. Throughout this text, I will use the more flexible definition of design patterns as "semiformal interdependent descriptions of commonly reoccurring parts of the design of a game that concerns gameplay" [2]. I will later refer to Alexander *et al.*'s original formulation of design patterns as problem/solution pairs [3] to question game architectures' functionality as a whole.

In the first section of this paper I will discuss the relationship between design patterns and (some) game genres. This will lead to a description of the proposed notion of "game architecture" in relationship to other levels of abstraction in game design. The second section shows how this model helped make sense of the design history of the adventure game. Finally, I will attempt to further test the model on a very different historical corpus: trick-taking card games.

2. GAME GENRES, PATTERNS AND ARCHITECTURES

2.1 Stable Pattern Formations in Mechanic-Centric Genres.
It is no bold claim to state that game genres are confusing categories at best. While some are clearly organized around game

mechanics (platformers), you can also find others delimited by a specific fictional theme (science-fiction games), a representational strategy (side-scroller), a mode of input (motion games), a purpose (advergames) or even an intended audience (casual games). Others have tried to sort the "genre muddle" [4] or called for a critical reorganization [5]. I tend to agree with Arsenault who claims in his PhD thesis that "facing the irreducible resistance of genre to theorization, one must turn to its documented historical uses […] The concept's specificity and operability can be maintained by considering it as a discursive rather than structural phenomenon, the punctual crystallization of a common cultural consensus" [6, p.23, my translation]. In other words, genres exist and are useful categories inasmuch as historical discursive communities use them to refer to a consensual body of games. Any attempts at creating the "ultimate" taxonomy of games will likely be vain.

That being said, those communities need a rational basis on which to found their generic definitions. It relies in many cases on the reproduction of a recognizable gameplay. The label "Adventure game" originally meant that a game *played* like Crowther and Woods' *Adventure* (1977). It was the most efficient way to communicate this as there were originally no other games quite like it. Arsenault observes a similar pattern with the appearance of the "doom-clone" label and its progressive surrender to the more general "first-person shooter" [7]. These two categories are good examples of mechanic-centric genres that afford recognizable gameplay despite significant changes in representational and fictional content.

What does it mean for a group of games to afford a recognizable gameplay and how can we track that immaterial property in historical objects? Ermi and Mäyrä observed that: "Looking at the discourses of current digital game cultures, 'gameplay' is used to describe the essential but elusive quality that that defines the character of a game, the quality of its 'gameness' [8, p.38]. For these authors, gameplay is not a formal property but rather a phenomenon arising from the interaction of players with a specific game system. However, since a large discursive community has constructed the "adventure game" category on the basis of familiarity of gameplay, it is legitimate to presume that these games' designs share something that affords that gameplay notwithstanding individual player differences. Besides, other perspectives on gameplay make it proceed essentially from the game's design: "We define *gameplay* as the challenges that a game poses to a player and the actions the player can perform in the game" [9, p. 43].

If we consider design patterns as "semiformal interdependent descriptions of commonly reoccurring parts of the design of a game that concerns gameplay" [see 2], then we should predictably find a number of those common to all games of such a genre. Consequently, we could describe mechanic-centric genres as bodies of games sharing a stable foundation of patterns. I will henceforth name these pattern frameworks "game architectures" for the sake of brevity and explain that choice later.

2.2 Genre Continuity and Rupture

Considering mechanics-centric genres through the lens of patterns raises important questions: how many (or what proportion of) patterns are needed to constitute an architecture? What distinguishes an "architectural" pattern from a "decorative" one? Why even reproduce game architectures rather than reshuffling the whole pattern set for greater diversity and innovation?

The observer looking at an interactive fiction game might consider its textual interface as one of its most noticeable features. Yet, when illustrations appear alongside the text, critics don't see the change as a rupture in the genre: "*Mystery House* and *Wizard and the Princess* […] follow the traditional two-word adventure game format, with one interesting exception. In addition to a text description you get a hi-res graphic view of the scenes" [10]. When menus replace the parser, many see it as a refinement rather than a transformation: "The computer makes grammatical sentences out of your joysticking and a click of approval sets your words into action. What could be simpler? […] [T]he interface is one of the most comfortable ever devised" [11]. Even with the complete removal of text and the reduction of input to verb-less clicking, game designer and critic Chris Crawford interprets *Myst* as a typical adventure game: "I do not exaggerate one iota in describing this as *Zork* with snazzy graphics" [12]. Despite this great flexibility, not everything will fit in the adventure game mold. When reviewing the last installment of *King's Quest,* the most famous series of adventure games, some journalists make sure of warning their players that a border has been crossed: "Let's establish a very important fact right off: this is an action/adventure game" [13].

Of course, not all players would agree that *Zork, Mystery House*, *Maniac Mansion*, and *Myst* belong to the same genre (and not *King' Quest VIII*) but the fact that a significant portion of the video game discursive community (including players, journalists, database contributors and scholars) agrees on this warrants to take into account the existence of *an* adventure game genre that does include all these different games. We thus have to conclude that for many, there is a stable adventure game experience maintained from text adventures to "*Myst*-likes", and that it is independent of specific modes of representation and interface.

The genre's mechanical stability in an environment that values novelty and innovation as intensely as the computer game industry is perhaps even more surprising than its formal evolution. The reproduction of the adventure game architecture in thousands of games and over decades is not always the result of deliberate strategies. If some developers chose to specifically make an adventure game and label it that way in order to reach a specific audience, others on the contrary tried hard to offer something new—not another one of those. In fact, the history of adventure games is in large part the result of attempts at making something else. In the first half of the 1980s, the main ambition of adventure game designers was to achieve "interactive fiction", a new form of electronic literature. The term was widely used and officially adopted by the company Infocom to describe what used to be "adventures". The next frontier was "interactive movies", as stated by Sierra's president (the major player in adventure game development and publishing): "We actually view our products as interactive movies. We allow the player to assume the identity of a character in our 'film'" [14]. As the interactive movie craze was about to turn into a widespread disillusion, the same Ken Williams was quick to change his discourse. Two years later he writes: "I've begun describing Sierra as a virtual reality company" [15]. Despite a widespread desire to achieve innovation towards more "interactive" forms, the great majority of those attempts ended up being considered just "adventure games" nevertheless.

A key to understand this inertia is in the basic observation made by Björk and Holopainen that game design patterns are strongly interrelated: "many of the patterns we identified described characteristics that more or less automatically guaranteed other characteristics in the game […] [T]he effect of introducing, removing, or modifying a game design pattern in a game affected many different aspects of the gameplay" [1, p.34]. This observation leads naturally to the hypothesis that some combinations of patterns might offer particularly strong synergies. In consequence, design patterns aren't as modular as Lego bricks: some pieces fit better together than others. We can postulate that the reason the core adventure game architecture was reproduced so often is that it is very hard to add, remove or replace its pieces: they work so well as a whole.

2.3 Architecture Inertia

If the constituting patterns of a game architecture are reproduced because they act as a unit, why not replace the whole thing? Or why not break it apart nevertheless and relinquish the product of that particular synergy in favor of a new one? There are at least two ways to address that question. The first is tightly linked to the purpose of video game genre themselves.

Genres in various cultural practices hold many functions. A central one is to delimit a subset of a medium's overall expression space to facilitate the meeting of certain creators with certain publics. It is obvious that genre preference has an important influence on media consumption. The amateur of western films not only knows that another western film will satisfy her love for Wild West fantasy, but also that it will be easily "readable" thanks to past experience with the genre's motifs and tropes.

Genre preference is even more structuring for game players as the cost of crossing genre boundaries is much greater. Our western fan might not enjoy or understand science-fiction much but would still be able to sit through an entire film without much difficulty. In comparison, moving from card games to pool or from adventure games to first-person shooters is a major step. The players concerned might need hours, weeks or even months of practice to become proficient enough in those games to enjoy their aesthetics smoothly without constant conscious efforts of learning and adaptation. This is what Arsenault calls "functional attunement" (*mise-en-phase fonctionelle*) [5, p.250]. In the words of game designer Dan Bruno: "a video game genre elucidates how and where a gamer's skills will transfer between similar titles" [quoted in 5]. The certainty of being able to transfer one's hard-earned competences to an upcoming title is a very strong incentive for genre fidelity. On the development side, this calls for the reproduction of whatever part of the design is responsible for putting these skills to test. In a mechanics-centric genre, the architecture ends up being reproduced in part because it ensures gameplay continuity.

Elias *et al*. reach similar conclusions in their discussion on what they call "standards"—that is "commonly accepted patterns that many players are familiar with" [16 p.76]. They note that although "people often decry the use of standards and claim they represent a lack of innovation […] most people enjoy games with which they have a certain comfort level". They also identify something close to our notion of game architecture: "Standards often come in groups or bundles, usually in accordance with the game's genre" [16 p.78]. They do not, however, define much further the precise relationship of standards and genres.

The second lead to understanding game architecture inertia is the original formulation of design patterns as problem/solution pairs [3]. This approach might seem a bit awkward in game design which is as much about inventing arbitrary problems as about solving the implementation issues they raise. However, once an interesting problem has been identified as a key component of a game, patterns as solutions make perfect sense. This is also true of architectures, which can be identified as ready-made solutions to higher-level game design problems. We can then presume that game architectures are reproduced because they both create an interesting problem for players and implement efficiently interesting constraints to solve it. The architecture of adventure games was so efficient that it acted somewhat like a game design "attractor". Even as designers tried to innovate, they had a hard time pulling away from that almost inevitable functional model. We'll examine the affordances of the adventure game architecture in section 3.

In summary, game architectures are high-level, strongly synergistic formations of design patterns that efficiently favor the emergence of a specific gameplay. They are reproduced in a number of individual games (thus forming mechanic-based genres) because they allow players to experience variety while remaining within the scope of a familiar and appreciated game experience for which they are already competent. Architectures tend to remain relatively stable because any modification can significantly change their behavior.

2.4 The Architecture / Form / Content Model

Having identified these high-level design structures in games, what are we to call it and how does it relate precisely to other levels of design? Having already imported the term "pattern" from elsewhere, we might as well begin our search there. "Design pattern" originates from architecture through the work of Alexander *et al.*[3]. I do not know however that there is any word to designate high-level formations of patterns in architecture. The other inspiration for "design pattern" in games is computer science, which has made extensive use of the notion. This field does offer a higher-level concept above design patterns: architecture. Although the naming is not as important as the identifying, I find "game architecture" efficiently describes what I've been discussing.

Identifying a higher level of design forces us to consider the lower scales of granularity. Elias *et al.* recognize that their "standards" can be "low-level details, like the WASD keys, or high-level ideas—the very idea of a first person shooter is a standard" [16, p.76]. Björk and Holopainen also recognize different levels of abstraction in game design patterns [2, p. 37]. These authors do not propose any stratification of this spectrum that would allow us to distinguish general categories of scale.

Once again, computer science can provide us with an interesting model to think the different levels of abstraction in game design: architecture, design, and implementation [17]. At the highest level we would find those patterns accounting for a generic game experience, one that can transpire in a great variety of games. The mid-level would concern design variations that don't jeopardize genre affiliation while not being unique to each game either. This would account for sub-genre design variations such as text adventures or point and click adventures. The lowest level would distinguish design decisions unique to each game: specific puzzles, embedded stories or audio-visual content.

The application of this model to games is promising but the actual names are problematic. Game design happens at all these levels and it is confusing to identify one with that name. As for implementation, it suggests the straightforward, top-down realization of a design plan, something quite alien to the actual game design process. Keeping "architecture", I've chosen in my work to name the other levels "form" and "content". Form concerns the actual interface and mechanical design patterns that concretely implement the architecture. Content is the low-level information that is accessible through the formal design and usually unique to a single game.

Table 1. Comparison of design levels of abstraction

Computer Science	Genre	Game Design	Example
Architecture	Genre specific	Architecture	Adventure games
Design	Sub-Genre specific	Form	Parser input vs. point-and-click input
Implementation	Title specific	Content	The cat-hair mustache puzzle in *Gabriel Knight III*.

The architecture and pattern approaches were developed in computer science and engineering in order to make the design and development processes more efficient. This is not yet reflected in game design in which architectures have not been the product of a top-down rational process but rather emerged from empirical trial and error, and then reproduced as convenient and efficient "recipes". This might change however as the practice of game design is increasingly professionalized and researched.

3. The Adventure Game Architecture

Having described in a rather abstract fashion the game architecture concept, I would like to examine now some supporting evidence. As mentioned previously, existing game architectures were not the result of deliberate thought but of intuitive design heuristics. Therefore we shouldn't look for explicit traces of it in design documents or interviews. Game architectures are to be found in groups of games that play alike without being clones. In order to distinguish within those games the architectural features from the formal variations, one needs precise data concerning their historical evolution and reception. Historical work proceeding from the rigorous scrutiny of series of similar games is still quite rare. My own research on the formal evolution of adventure games has provided me with relevant information and will serve as my core example. In the next chapter, I will attempt to test the concept on a very different game genre on the basis of secondary sources.

3.1 *Adventure*'s Architecture

History doesn't always provide us with a clear-cut "first" but the origin of adventure games is unambiguously Crowther and Woods' 1977 *Adventure*. It was impossible for the immediate imitators of *Adventure* to distinguish its architectural from its formal elements. In fact, even the game's content was generally reproduced as Graham Nelson recalls: "for the five years to 1982 almost every game created was another 'Advent'. […] The secret canyons, cold spring streams, wizards' houses, passive dragons, bears, trolls on bridges, volcanos, mazes, silver bars, magic rings, lamps with limited battery power, octagonal caverns with exits in all directions and so forth recur endlessly in a potent, immediately recognizable blend" [18]. Successive experiments would help understand what parts of *Adventure* could be changed while maintaining the "adventure" feel and over time greater content and formal variations were introduced. Looking at what remained stable allows us to identify some key architectural elements.

This is, of course, the result of an interpretation and is not intended as an exhaustive, essentialist description of the adventure game. It also does not concern every game ever described as an adventure game but only those in the direct tradition *Adventure*. This corpus is mostly constituted of personal-computer games distributed over these sub-genres: text adventures, graphic adventures, point and click games and *Myst*-likes. Historical evidence, for which there is no space here, can be found here [2].

As my goal is ultimately to speak of game architectures, I will keep the description of individual patterns at a high level rather than use a more exhaustive template. Wmphasis will be put on the patterns interactions in order to highlight their synergy. The architecture as a whole will later be submitted to the questions of affordances, consequences and relationships. As these patterns are abstracted from a great number of games, punctual historical information is given for nuance.

3.1.1 Scripted Interactions

Perhaps the most innovative and defining feature of *Adventure* and adventure games are their reliance on scripted interactions as opposed to procedural ones. As observed by Jesper Juul, the genre effectively introduces what he calls "games of progression" as an alternative to the traditional "games of emergence" [19]. Every action available to the player and its effects have been thought of in advance by the designer and "hard-coded" in the game. This entails that very little variety can emerge from these systems. However, it affords a fine-grained crafting of the game experience, including the embedding of very specific content.

3.1.2 Player-Generated Time

Adventure was designed in a technical environment that gave little alternatives to turn by turn command-line interaction. Time passes only as a result of player action thus constructing a slow-paced temporal regime closer to puzzle-solving or board-games than sports or arcades. This is structurally linked to *Turn Taking* although it is not necessarily experienced as is.

This is challenged by the inclusion of an avatar moving in real-time starting with *King's Quest* (Sierra 1983); a pattern widely reproduced henceforth. Although this innovation affords time-pressured challenges, leaving the pacing to the player will remain widely dominant.

3.1.3 Dialogical Interface

The interaction scheme of *Adventure* is both the product of a "command-line" mindset and an adaptation of *Dungeons and Dragons* referee mediation [20]. When I press "jump" in *Donkey Kong*, the player-character jumps. As I said it, it was done. There is no perceived mediation. By contrast, I first need to tell *Adventure* what I want to do, and maybe something will happen in consequence (depending on whether such an action was pre-scripted or not). This pattern is closely linked to the previous one. Players of games of emergence usually know all the actions they

can perform in the game and their likely consequences on the system. Players of *Adventure* cannot know all the available scripted actions, and in fact, discovering these actions is a major part of the challenge. The dialogical interaction is also coherent with the game's player-generated time: the system will politely answer only when spoken to.

This pattern is obvious in text adventures where the conversational interface is explicit. It is also quite clear in point-and-click games that essentially provide sentence-construction assistance. Its status in *Myst* is more ambiguous. One could argue that its minimalistic one-click interface effectively implements a direct manipulation scheme. I would answer that *Myst* merely reduces the player's expression to a single generic question resembling: "can I do something here"? In fact, the player still doesn't know what actions are available and cannot formulate direct command that would yield consistent results in different contexts (the nature of a direct, procedural interaction).

3.1.4 Discrete Nodal Space

Almost all adventure games observed structure space as discrete locations (often thought of as "rooms" or "scenes") interconnected by arbitrary links. When contrasted to its main alternative, continuous space, this pattern emphasizes the importance of being somewhere rather than moving towards something. Navigation in these adventure games is usually trivial, the main challenge lying in identifying places to go to and gaining access (unlocking doors for example).

This pattern is also challenged by the inclusion of a free-moving visible avatar in *King's Quest*. This effectively adds an element of continuous space. It remains however subjected to the discrete node network as its scope is limited to each "scene". Another challenge comes from *Myst* and its imitators. Although most of these games continue to split space in discrete positions, these are so fine-grained that they feel less like "places" and more like successive points of view in a world that feels almost continuous. Interestingly, even when technology will afford real-time exploration in 3D environments, the majority of adventure games will remain true to the "scene" division. This is probably due to its strong coherence with player-generated time (emphasizing step by step actions) and importance of scripted interactions (which make procedural challenges such as moving around of little relevance).

3.2 Purpose and Integrity

Once again, it is quite surprising to find such stability in a medium supposed to thrive on novelty and innovation. I suggested earlier that game architectures are reproduced because they work as a coherent whole difficult to break apart and because they reliably afforded a specific, desirable game experience. To test that hypothesis, we'll explore the following questions: What is the adventure game experience? Or, from another perspective: what "design problem" is its architecture a solution to? How are its constituting patterns working together to fulfill its purpose?

When William Crowther designed *Adventure*, he certainly wasn't targeting an elusive "adventure game experience", as there was of course no such thing. I've explored that question in detail elsewhere [23] but it essentially boils down to the happy combination of eclectic cultural references such as *Dungeons and Dragons*, speleological surveying and hacking. This arbitrary set of affordances and constraints was quick to seduce players: by talking to your computer in plain English, you could vicariously explore a fictional world. A few months later, Don Woods brought his own game culture in the mix and further explored *Adventure*'s potential to articulate puzzles. Exploring a fictional world and overcoming its obstacles while generating pages of prose afforded an experience distinct from the software's immediate models: it felt like interacting with a book, playing an active part in a story, being able to converse with its author. In a sense, *Adventure* both invented and solved the game design problem of "interactive fiction"; *i.e.* providing the player an active role (exploration and puzzle-solving as opposed to mere path-choosing) in the unfolding of a mostly pre-written story. This experience reproduces the slow pace of reading or newspaper puzzle solving and emphasizes intellectual engagement rather than a "kinesthetic" one [21]. There is obviously much to say about the relationship between play and narrative in adventure games. I will focus here on how the previously described game architecture affords something that can be understood in these terms.

The core pattern here is *Scripted Interactions.* This allows the designer to embed specific events and even control the order in which those events can be experienced by defining their triggering conditions. The same mechanism can be used to set up puzzles as well as narrative sequences. Those in fact overlap to create what Karhulahti names the "fiction puzzle" [22] which challenges the player to reconstruct the sequence of actions that allows the story to move forward. Interesting stories can emerge from procedural/emergent games. Watching sports and games as a spectator wouldn't be so popular if those systems didn't generate compelling narratives. However those stories are always different. Adventure games combine the pleasures of an authored narrative (as found in novels and films) to those of playful problem solving.

Players need to express precise and varied actions in order to participate in an intricate story. Many actions actually make sense only once: "put the hamster in the microwave", for example. The *Dialogical Interface* pattern borrows *Dungeons and Dragons'* refereed interaction in which players can attempt anything that comes to their mind but in exchange need to surrender their ability to act directly on the game system to a mediator. Through *Scripted Interactions*, the imagination of the game master is hard-coded as a database of possible events which is probed through the *Dialogical Interface.*

Player-Generated Time, was originally the result of a technical constraint. It was however consistently maintained despite the possibility for real-time skill-based interactions in order to keep the focus on solving fiction puzzles as opposed to overcoming dexterity challenges. This pattern works in concert with the *Dialogical Interface* which would be problematic in time-critical situations. It is also coherent with *Scripted Interactions* as the challenge of uncovering possible actions is more of a heuristic process than the opportunity to perform within well-known parameters.

The *Discrete Nodal Space* of *Adventure* also contributes to interactive storytelling by giving ample opportunities for ellipses. Just like in novels or films, space in an adventure game doesn't have to be exhaustively and homogeneously simulated. Time also can be played with during these transitions. For example, in *A View to Kill*, the player enters a submarine after escaping death in Siberia. With the single "go down" input, five days go by and thousands of kilometers are crossed as James Bond reaches

London immediately. In an adventure game, the player feels present by moving the story forward rather than through the impression of physically occupying a virtual space. This space structures emphasizes story-important locales—being somewhere—as opposed to navigating the ambiguous in-between places of continuous space. It also works in harmony with the previously mentioned patterns: each move from node to node is itself a *Scripted Interaction*, its possibility is probed through the *Dialogical Interface*, and the actual movement as well as the passing of time await the player's command (*Player-Generated Time*).

Looking at the problem negatively, we can question what would happen if one of those patterns were to be removed. Take away *Scripted Interactions* and you lose the possibility or an embedded pre-written narrative. Establishing a real-time regime (*contra Player-Generated Time*) would necessitate some form of continuous space (*contra Discrete Nodal Space*) for more fine-grained operations and then would still be stuck with awkward *Dialogical Interactions*. There are some "action sequences" here and there in adventure games that do all that, leveraging the real-time movement of the on-screen avatar. They are however felt like embedded mini-games. In fact most of them are skippable and many players resent them as ruptures in the experience.

In order to circumvent the *Dialogical Interface* and devise a direct, non-contextual, procedural interface for interactive fiction, one would need to write a story with a finite set of actions and object types. This would also mean relinquishing *Scripted Interactions* and thus pre-authored narrative sequences in favor of emergent behaviors.

Shifting to continuous space (*contra Discrete Nodal Space*) is a bit less problematic. *RealMyst*, a real-time 3D version of the original *Myst*, didn't break its model's experience and there are a few adventure game titles published every year using continuous space environments rendered in real-time 3D. Despite the fact that this technology is now very accessible and hardly more complex than discrete 2D space, these games are still a minority. Keeping the other patterns intact in order to maintain puzzle-based interactive fiction deprives continuous space of most of its meaning: fine-grained procedural interaction with the environment. On the contrary, continuous space mostly adds a more or less tedious layer of unchallenging roaming to get from one "interactive" place to the other.

3.3 Formal Variation and Rupture

The adventure game architecture was consistently reproduced not only because it is one of the few available solutions for meaningful interactive fiction, but also because it affords considerable space for variation. While most interactive fiction and interactive movie titles ended up using it (perhaps despite themselves), they could still make a case of innovation in the following areas:

Puzzle vs Narrative Focus: Early adventure games were mostly puzzle-focused. They had a very minimal embedded story usually consisting of a treasure hunt. Interactive fiction pushed the emphasis towards embedded stories that framed and gave meaning to the puzzles.

Interface: Adventure games could follow the general trend of computer interfaces by moving away from the command line and efficiently appropriating menus and mouse-driven input; thus gaining in accessibility.

Representation: Text-only representation was quick to fall out of fashion once almost all the home-computers afforded graphical and color display. The adventure game architecture was easily adapted to this rapidly changing technical environment through a succession of solutions such as still illustrations, animated characters, full-motion video and pre-rendered 3D graphics.

The fact that a game architecture needs to remain stable in order to maintain its associated gameplay doesn't mean that its constituting patterns cannot be reused in other contexts. A major example of this is the early emergence of the action-adventure game genre through Atari's *Adventure* (1979). If we were to posit a very general game architecture for action games, it could hardly be more different than that of adventure games. It would probably include such patterns as procedural objects and interactions (often physics-related), real-time, a direct player interface and continuous space. When Warren Robinett set out to adapt *Adventure* to the Atari 2600, he was attempting to reconcile very different game design cultures. Almost all (if not all) games on the Atari shared these action game architectural patterns that suited very well the platform's hardware, controllers and audience.

Action-adventure games keep the original action game architecture with the addition of some adventure game architectural patterns. Most interactions are still procedural (moving, jumping, shooting, etc.) but some of them are pre-scripted (fiction puzzles), affording an interactive fiction unfolding via mostly kinesthetic challenges but some puzzle solving as well. Some form of contextual indirect input is added, usually through the means of a generic "action" button evoking *Myst*'s single click. This button acts as a probe to know if a pre-scripted interaction is available at a specific place. Real-time and continuous space regimes are mostly maintained, keeping an emphasis on dexterity and reflexes. However, many action-adventure games use discrete space at a higher level, structuring the game-world in distinct "levels" between which ellipses can be used to move the story forward (in terms of narrative, space and time).

4. Trick-Taking Games

The last paragraph began the exploration of the game architecture concept beyond adventure games, the domain of their first observation. Here I will try to pursue this beyond the realm of digital games. If game architectures are essentially game design formations, there should be evidence of them in traditional games as well. My hypothesis is that a game architecture is to be found for every group of games similar enough for a player to transfer most of her competences from one to the other while varying enough to afford expert specialization. Some preliminary suspects would include, for example, "cue sports" (Pool, Carom billiards, Snooker), "racquet sports" (Tennis, Badminton, Racquetball) or trick-taking games (Bridge, Whist, Sergeant Major). I am now moving out of my own primary historical research and so I have chosen the latter example mostly because of the quality secondary sources to be found.

4.1 Card game genres

The notion of a card game "genre" is perhaps less familiar than it is for video games. That card games by themselves don't

constitute a genre should be made obvious by their great variety. Parlett writes: "Cards are not 'a game' but equipment for playing different types of game" [23, p.3]. In current game studies terms, a card deck could be considered a platform, a standard specification to mediate a number of different games. Within this broad spectrum of games, it is common to group resembling games in some form of classification although there does not seem to be a standard term for it. In his book on card games, Parlett interchangeably refers to game "families", "types" or even "genres" [26].

As for the principle of organization to be used, Parlett advocates for something similar to what I've been calling mechanic-centric genres: "We will probably do best to ignore decorative elements and take 'mechanics of play' as a first line of classification" [26, p.62]. He also sees games as groups of "elements" or "ludemes" (which we can also broadly understand as "patterns") working in synergy: "card games may be regarded as bundles of elementary gaming features acting in harmony towards a common end" [26, p.61]. As is common with genres, there is no universal consensus as to where to draw the division lines. Parlett's main categories are "'null-play' (gambling) games, card-exchange games, matching games and trick-taking games". In his history of Tarot, Dummett identifies three main "categories" of card games: trick-taking, draw-and-discard and fishing [24]. The Wikipedia article on card games has a slightly longer list that also includes the previous categories. Trick-taking games is a consistent category across classifications [25].

4.2 Trick-Taking Game Architecture

Parlett sums up the foundational mechanics common to all trick-taking games quite efficiently: "the leader is free to play any card, each player in turn must then contribute exactly one card, the trick is taken by the highest card of the suit led, and the winner of one trick leads to the next" [26, p. 69]. These observations are reflected in [27] as well. In order to speak of the underlying game architecture, we need to abstract this procedural description as a series of patterns. The following attempt is still very experimental and should be considered as a working hypothesis.

4.2.1 Distributed Information

In trick-taking games, most cards (except sometimes a small 'widow') are distributed evenly amongst players. This means that there is little uncertainty as to which cards are in play although each player is only aware of a subset of the actual distribution.

4.2.2 Steady Exhaustion

With each turn (trick) an equal number of cards are revealed thus reducing the uncertainty concerning the card distribution and advancing steadily towards final resolution. Each trick being public, all players know of their respective progress towards the final score.

4.2.3 Constrained Card Play

Except for the leading card, players are very constrained in their choice of card to play. Depending on the game, there are strict rules determining which suit can be played in specific contexts.

4.3 Purpose and Integrity

Again, let's ask the question of the purpose of this architecture: what is the trick-taking game experience that this pattern formation consistently affords? According to Parlett: "Tricksters are distinguished by the high degree of creative strategy to which the best of them give play. The play of cards to early tricks, when choice is as maximum, may be so shaped as to influence the lie and play of cards to later tricks when choice has been whittled down to a minimum" [26, p.68]. The trick-taking game architecture solves the game design problem of generating a highly skill-based competitive game on a "platform" that is mostly about chance and hidden information. It is no coincidence that Bridge is one of the main card games to be played in high-level tournaments. Its main rival at this level is Poker which, as it involves very little actual card-play [26, p. 69], leverages a completely different set of skills.

The game's architecture patterns all work hand in hand to allow players to devise long-term strategies and adjust the aim progressively as uncertainty retreats. If the cards weren't almost all distributed (*Distributed Information*), if the outcome was reached all at once rather than progressively (*Steady Exhaustion*), and if a player could play any card at any time (*Constrained Card Play*), there would be no way to deduce card distribution. These patterns make sure that the information is out there to find, that there are opportunities to find it, and that player choice is constrained enough to infer the hidden circumstances that led to it (a suit shortage for example).

4.4 Continuity and Variation

There is evidence of trick-taking games in Europe and the western world since the XVth century. It has been reproduced in a great variety of games from the very early Karnöffel to the modern Auction Bridge designed at the turn of the XXth century [27]. Again, the question is why was the trick-taking game architecture so often and consistently reproduced over centuries instead of exploring entirely new mechanics?

A plausible hypothesis is that the trick-taking game architecture has the same appeal as most popular mechanics-centric genres: it affords both variety and continuity. Players who have exhausted their interest in a specific game and are longing for a change can renew their pleasure in another trick-taking game without relinquishing their hard-earned skills in this very strategic genre. The same basic tactics of card counting, deductions on the distribution of cards *etc.* can be carried over to another game with the same architecture. However, the important formal variations between games force players to explore new strategies adapted to the specifics of that new game.

The main areas for formal variations in trick-taking games are:

Scoring: Some games count only the number of tricks won while others award points depending on the cards contained in the tricks.

Trumps: Some games have no trumps, some have a suit dedicated to that role, and others have mechanics to establish the trump suit.

Contracts: Some games always have the same winning conditions; others have mechanics to negotiate them at the beginning of each game on the basis of each player's distribution.

Card Play Restrictions: Depending on the game, one might be constrained to follow suit, top the last card, trump if possible, *etc.*

5. Discussion

I've attempted to make a case here for the recognition of a higher level of abstraction and organization in game design patterns and its relationship to mechanics-centric genres. Although I feel the examples presented here give strong evidence for the existence and nature of game architectures, they still concern a very little portion of the entire spectrum of games. As for the actual architectural patterns outlined in our examples, they are inductions based on observation and still very much matter of debate.

Despite those reservations, I'm confident that the concept of game architectures can help better understand patterns of continuity and variation in the history of games. I would also suggest that an awareness of these resilient clusters of synergetic patterns can help designers understand how and why existing genres are reproduced and perhaps inform their attempts at innovation.

6. GAMES CITED

Adventure. William Crowther, Don Woods. 1977.
Adventure. Atari. Atari. 1979.
James Bond 007: A View to a Kill. Angelsoft. Mindscape. 1985.
King's Quest. Sierra On-Line. Sierra On-Line. 1983.
King's Quest VIII: The Mask of Eternity. Sierra On-Line. Sierra On-Line. 1998.
Maniac Mansion. Lucasfilm Games. Lucasfilm Games. 1987.
Myst. Cyan. Brøderbund. 1993.
Mystery House. On-Line Systems. On-Line Systems. 1980.
Zork. Dave Lebling, Tim Anderson, Marc Blank, Bruce Daniels. 1979.

7. REFERENCES

[1] Lessard, J. *Histoire formelle du jeu d'aventure sur ordinateur (le cas de l'Amérique du nord de 1976-1999)*. PhD Dissertation, Université de Montréal, Department of Art History and Film Studies. 2013.

[2] Björk, S. and Holopainen, J. *Patterns in Game Design*. Charles River Media, 2004.

[3] Alexander, C., Ishikawa, S., and Silverstein, M. *A pattern language: towns, buildings, construction*. Oxford University Press, New York, 1977.

[4] Adams, E. The Designer's Notebook: Sorting Out the Genre Muddle. *Gamasutra*, 2009. http://www.gamasutra.com/view/feature/132463/the_designers_notebook_sorting_.php?page=2.

[5] Apperley, T.H. Genre and game studies: Toward a critical approach to video game genres. *Simulation & Gaming* 37, 1 (2006), 6 –23.

[6] Arsenault, D. *Des typologies mécaniques à l'expérience esthétique : Fonctions et mutations du genre dans le jeu vidéo*. PhD Dissertation, Université de Montréal, Department of Art History and Film Studies. 2011.

[7] Arsenault, D. Video Game Genre, Evolution and Innovation. Eludamos. *Journal for Computer Game Culture* 3, 2 (2009), 149–176.

[8] Ermi L. and Mäyrä F. Fundamental Components of the Gameplay Experience, in *Worlds in Play*, De Castell S. and Jenson J., Ed. Peter Lang Publishing, New York, 2007, 37-53.

[9] Adams, E. and Dormans, J. *Game Mechanics: Advanced Game Design*. New Riders, Berkeley CA, 2012.

[10] Marlow, M. On-Line Adventure Games. *Computer Gaming World* 2, 1 (1982), 31–32.

[11] Ardai, C. The Doctor is in: an Appointment with Terror in Activision's Maniac Mansion. *Computer Gaming World*, 1988, 40–41.

[12] Crawford, C. Myst. *The Journal of Computer Game Design* 7, (1994), 11.

[13] Yoder, S. Review: King's Quest: Mask of Eternity. *Just Adventure*, 2001.

[14] Williams, K. President's Corner: Multimedia: an Advance Look. *Sierra Magazine* 2, 2 (1989), 4.

[15] Williams, K. A View from the Inside: the Interactive Film Industry is a Virtual Reality. *InterAction* 4, 3 (1991), 4–10.

[16] Elias, G. S., Garfield, R., Gutschera, K. R., *Characteristics of Games*, MIT Press, Cambridge MA, 2012.

[17] Eden, A.H. and Kazman, R. Architecture, Design, Implementation. *ICSE* (2003).

[18] Nelson, G. The Inform Designer's Manual: Fourth Edition. 2001. http://www.inform-fiction.org/manual/html/.

[19] Juul, J. Half-Real: Video Games Between Real Rules and Fictional Worlds. MIT Press, Cambridge, MA, 2005.

[20] Lessard, J. Adventure Before Adventure Games A New Look at Crowther and Woods's Seminal Program. *Games and Culture* 8, 3 (2013), 119–135.

[21] Karhulahti, V.-M. A Kinesthetic Theory of Videogames: Time-Critical Challenge and Aporetic Rhematic. *Game Studies* 13, 1 (2013).

[22] Karhulahti, V.-M. *Puzzle Art in Story Worlds: Experience, Expression and Evaluation*. 6th International Conference on the Philosophy of Computer Games: the Nature of Player Experience, (2012).

[23] Parlett, D.S. *The Oxford guide to card games*. Oxford University Press, Oxford; New York, 1990.

[24] Dummett, M. and Mann, S. *The game of Tarot: from Ferrara to Salt Lake City*. Duckworth, London, 1980.

[25] The object here is not to prove the existence of a trick-taking game genre via the identification of a common game architecture but rather to better understand the design history of an already acknowledged genre.