

Twenty Years of Design Patterns in Games

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INTRODUCTION

The introduction of Alexandrian design patterns into the discipline of game development was proposed twenty-five years ago by Bernd Kreimeier (2002). In the quarter-century since its introduction, a significant number of scholars and developers have explored possible implementations of these concepts. This work has reached a level of maturity and critical mass that demands reexamination and consolidation to move this work forward and foster broader adoption and efficacy.

Christopher Alexander's (1977) foundational description of design patterns remains viable and descriptive of our ongoing work: *"Each pattern describes a problem which occurs over and over again in our environment, and then describes the core of a solution to that problem, in such a way that you can use this solution a million times over, without ever doing it the same way twice."*

Patterns, created for the field of Architecture, have been adopted by various disciplines. The most well-known adoption is described in the book *Design Patterns: Elements of Reusable Object-Oriented Software* by Gamma et al. (1995). These patterns, as widely understood and adopted, did not follow Alexander's above description, as it omits the clear statement of the problem that a given pattern is suited to solve. Difficulties in the use of these Object Oriented Software Design patterns largely result from this omission and have been generalized to the larger viability of design patterns.

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Two of the major game-related design patterns projects currently active are the Game Design Patterns (GDP) collection by Staffan Björk and Jussi Holopainen (2005), and the Pattern Language for Game Design (PLfGD) patterns library by Christopher Barney (2020). Both of these projects address the generation, representation, and use of patterns in novel ways.

GENERATION

The intent of the GDP project was to map out the patterns in all of game design space, not to find 'all' of them, but to create a good foundation, something akin to Alexander's 253 patterns but for games. The intent of PLfGD, in contrast, has been to create a process for pattern generation rather than a specific set of patterns. Patterns described in the PLfGD book are intended as examples of the generation process exercise that make up that text, rather than the primary output. This makes these two projects very compatible as they are not competing sets of patterns but complementary attempts to create tools and structure for a broad-based attempt to map the design space of games.

REPRESENTATION

Patterns in the GDP are represented within a single text structure, divided by semantic sections and heavily linked using hyperlinks. The repository is stored in a wiki and uses markdown to create its semantic structure.

The Pattern Library for PLfGD in contrast stores all data in a highly structured relational database. Linking of patterns is based on internal ID's. Patterns stored in this library can be output as JSON objects and displayed in a web application, but it is also possible to output patterns in natural language for semantic parsing, or to output them in the OWL2 structured ontology language. While having advantages, this more formal representation creates a rigid structure that may limit broader use.

USAGE

Design patterns related to games are currently being actively used in research, pedagogy, and practical game design. They have been central to a gameplay design course for 20 years at two universities in Sweden and have supported many research papers in the years following the GDP book (Lankoski, P. & Björk, 2007a; Lankoski & Björk, 2007b; Peitz. & Björk, 2007; Brusik & Björk, 2009; Bergström *et al.*, 2010; Hullett. & Whitehead, 2010; Lankoski *et al.*, 2010; Smith *et al.*, 2011; Cermak-Sassenrath, 2012; Dahlskog & Togelius, 2012; Lewis *et al.*, 2012; Lundgren & Björk, 2012; Zagal *et al.*, 2013; Canossa *et al.*, 2014; Dahlskog *et al.*, 2015; Björk & Zagal, 2018).

In practical design, patterns are most commonly used to address specific design problems rather than as a holistic framework for design. For example, Christopher Totten used the PLfGD methodology to articulate and communicate the intended level design structure of his game, *Little Nemo and the Nightmare Fiends*.

As described by Christopher Barney (2021) in the paper *Application of Pattern Language for Game Design in Pedagogy and Design Practice*, design patterns can form part of an effective pedagogical loop, empowering students to derive a nuanced design framework by examining the games that they have personal experience with

and then using the patterns they create in practical design, which they subsequently critique.

The rigor and formality of patterns can be successfully applied to research, as shown by the PhD work of Brandon Layman and Yijun 'Shirley' Qian, who are respectively conducting research into creating games that leverage lived experience in aging gamers, and creating exercise-focused games that generate engagement and enjoyment commiserate with traditional games

MOVING FORWARD

Ongoing work by Barney, Björk, and Holopainen includes the expansion of online pattern repositories which, collectively, capture more than 4,500 patterns. Barney has recently published the second edition of the Pattern Language for Game Design textbook, which expands the number and variety of pattern generation exercises it presents and expands on the structure and purpose of both its pattern template and the definition and construction of problem-specific pattern languages.

The general similarity in intent and format of many of the collections of game design patterns suggests the utility in pursuing the unification or federation of these repositories in a way that will allow for greater discovery and utility for the patterns they contain. This increased collaboration and interconnection of pattern creation projects extends beyond the field of game design and is of interest to pattern scholars in a variety of other fields.

CONCLUSION

In summary, nearly a quarter century of work on game design patterns has yielded a diverse and increasingly mature body of knowledge that now calls for a renewed synthesis. By emphasizing Alexander's original take on problems and their reusable solutions, further development and unification of contemporary projects such as GDP and PLfGD demonstrate how complementary approaches can jointly advance both pattern generation and application.

REFERENCES

- Alexander, C. 1977. *A pattern language: towns, buildings, construction*. Oxford university press.
- Barney, C. 2020. *Pattern language for game design*. CRC Press.
- Barney, C.A. 2021. Application of pattern language for game design in pedagogy and design practice. *Information*, 12(10), p.393.
- Bergström, K., Björk, S. & Lundgren, S. 2010. Exploring Aesthetic Gameplay Design Patterns – Camaraderie in Four Games. Paper presentation at Mindtrek 2010. Tampere, Finland.
- Björk, S. and Holopainen, J. 2005. *Patterns in game design*. Hingham: Charles River Media.
- Björk, Staffan and Zagal, José P. 2018. Game Design and RolePlaying Games. In Zagal, José P. and Deterding, S. (eds.), *Role-Playing Game Studies: Transmedia Foundations*. New York: Routledge, 323-336.

- 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.
- Canossa, A., & Nelson, M. & Björk, S. 2014. X-COM: UFO Defense vs. XCOM: Enemy Unknown - Using Gameplay Design Patterns to Understand Game Remakes. Foundations of Digital Games 2014, April 3-7, 2014, Fort Lauderdale, US.
- Cermak-Sassenrath, D. 2012. Experiences with design patterns for oldschool action games. In Proceedings of The 8th Australasian Conference on Interactive Entertainment: Playing the System (IE '12). ACM, New York, NY, USA, , Article 14 , 9 pages.
- Dahlskog, S. & Togelius, J. 2012. Patterns and procedural content generation: revisiting Mario in world 1 level 1. In Workshop Proceedings of the 7th International Conference on the Foundations of Digital Games.
- Dahlskog, S., Björk, S. & Togelius, J. 2015. Patterns, Dungeons and Generators. Foundations of Digital Games Conference, 2015.
- Gamma, E., Hjelm, R., Johnson, R., Vlissides, J. 1995. *Design patterns: elements of reusable object-oriented software*. Addison-Wesley.
- Kreimeier, B. 2002. The Case for Game Design Patterns. *Game Developer*. <https://www.gamedeveloper.com/design/the-case-for-game-design-patterns>
- Hullett, K. & Whitehead, J. 2010. Design patterns in FPS levels. Foundations of Digital Games, June 19–21, 2010, Monterey, California, USA.
- Lankoski, P. & Björk, S. 2007a. Gameplay Design Patterns for Believable Non-Player Characters. Paper presentation at DiGRA 2007, Tokyo, Japan.
- Lankoski, P. & Björk, S. 2007b. Gameplay Design Patterns for Social Networks and Conflicts. Paper Presentation at Computer Game Design and Technology Workshop, John Moores University, Liverpool.
- Lankoski, P., Johansson, A., Karlsson, B., Björk, S. & Dell'Acqua, P. 2010. AI Design for Believable Characters via Gameplay Design Patterns. In M. M. Cruz-Cunha, V. H. Carvalho and P. Tavares (Eds.), *Business, Technological and Social Dimensions of Computer Games: Multidisciplinary Developments*. IGI Global. ISBN 1609605675.
- 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. DOI=10.1145/2282338.2282373 <http://doi.acm.org/10.1145/2282338.2282373>
- Lewis, C. 2014. *Irresistible Apps: Motivational Design Patterns for Apps, Games, and Web-based Communities*. APRESS.
- 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.
- Peitz, J. & Björk, S. 2007. Understanding Pervasive Games through Gameplay Design Patterns. Paper presentation at DiGRA 2007, Tokyo, Japan.
- 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. In Proceedings of the 4th international conference on Interactive Digital Storytelling (ICIDS'11), Mei Si, David Thue, Elisabeth André, James C. Lester, and Joshua Tanenbaum (Eds.). Springer-Verlag, Berlin, Heidelberg, 326-329. DOI=10.1007/978-3-642-25289-1_40 http://dx.doi.org/10.1007/978-3-642-25289-1_40

Zagal, J.P., Björk, S. & Lewis, C. 2013. Dark Patterns in the Design of Games. Foundations of Digital Games 2013, May 14-17, 2013, Crete, Greece.