

# Gaming the Design: Using Game Design Techniques in the Realm of Investing

by Kellie Rae Carter and Dominic La Cava

## Information Architecture

The use of aspects of game design in the design of other types of interfaces has increased as designers try to use the best design practices available, including those from outside their own disciplinary backgrounds. However, this borrowing from other design theories and philosophies can complicate the design process, particularly if not done thoughtfully and with an eye toward improving the user experience and meeting users' needs. The following is a case study on how one design team used game design techniques to inform the redesign of a transactional web task: opening a financial account online.

In the spring of 2007 our design team was tasked with the redesign of the process through which clients opened new accounts. Titled 27x, this project was a redesign of the money movement transaction at Vanguard. The intent was to reduce the average number of steps (27) of Open an Account (OA) down to an appropriate single number of x. The current serial process can take users anywhere from 17 to 80 steps depending on asset type, account type and funding method.

Kellie Rae Carter received her Ph.D. in communication and rhetoric from Rensselaer Polytechnic Institute and is a freelance user experience designer. Previous publications and presentations have focused on cultural usability and social computing, particularly on the formation and technological support of online communities. She can be reached at [kellierae@kellieraecarter.com](mailto:kellierae@kellieraecarter.com)

Dominic La Cava is a senior information architect at the Vanguard Group, working to improve the company's retail website. Dom is also an adjunct professor at Drexel's iSchool, teaching courses in human computer interaction and information organization, retrieval and use. Dom has published on scenario-based design and has reviewed and critiqued various institutions' websites. He is widely involved in many user interface communities, especially PhillyCHI. He can be reached at [dommocave@yahoo.com](mailto:dommocave@yahoo.com)

The 27x design team's goals were to understand the issues and dependencies around moving money to and within Vanguard and to engineer a solution, resulting in an innovative and intuitive user interface and a dynamic user experience. The design paradigm the design team employed focused on creating a dynamic user interaction on the back-end through mapping dependencies in the process and in the user interface by utilizing design principles from games.

Considering the vast amount written about game design, play theory and psychology, this paper will focus on how games capture players' attention and place them in an immersive environment where they tend to spend hours playing and engaging in the game's story. Gamers can spend between 12 and 30 hours a week, with an average of 45 minutes to 4 hours a day, playing video games [1, 2]. These statistics consider an aggregate of ages, children to adults, and gender. The interactive nature of games entices users to play by creating an environment in which, as players complete their tasks and progress through the game, they become engaged and gratified in knowing they are moving toward their goal. This feeling of reward encourages players to invest their time in games and to return to game play day after day.

In looking to game design, we had to understand and address a contradiction between our design goals and the design goals of games. Games are meant to keep people playing, while our goal was to significantly reduce the number of steps it took for a user to complete the open account process. So while a successful game is measured by the time and investment that people put into game play and the simple idea that the longer users play, the better the game is, we had the task of reducing the time users spent trying to navigate our screens. But while we realized that the goals might be contradictory, we also realized that games could provide us useful avenues

for design. Games use a variety of interactive and immersive techniques to create a play space, techniques that can be useful to designers of more work-oriented or transaction-based interactions. How, then, given this contradiction in goals, do we borrow from the field of game design for the design of other types of interactions with the intent of improving the overall user experience? We hope our use of game design techniques in the 27x project will prove to be illustrative.

### About the Design Problem

We quickly realized that the process of opening a new account can be complicated for users because the current serial process presents information and steps in a vacuum: the context of a particular decision can be difficult for a user to grasp. In other words, the step-by-step process obscures the vision of the whole. Further complicating the user's task is the fact that the current OA process does not react to user actions in a helpful or meaningful way. Users found the serial process "confusing," "too long and tedious" and "difficult to navigate." As one user explained, "I really hate your website. It's non-intuitive, filled with trap doors, and you are forced to go down paths without knowing what the requirements are for adding funds and setting up accounts." [3]

Figure 1 is a screen shot of the first page of the open account process we were redesigning. It provided a puzzling array of choices for users. It did not leverage user input to streamline the process and did not support user decision-making.

The current design lacked an intuitive field of action that responded to user inputs and provided a meaningful context for decision-making. So we looked outside the current practice in task-based

designs to game interfaces, particularly children's online games, which tend to be immediately intuitive and actionable and which use space and movement to focus and engage the audience. But we also used clearly designed strategies and goals to guide the process of incorporation of game techniques and to keep us focused on the user experience we were trying to provide.

The design goal was to provide a user experience that mitigated the complexity of opening an investment account by streamlining the task flow and eliminating tedious information gathering. Given that the task domain includes a number of account types and the complexity of investing, the design team aimed to orient users to their overall goal without the interference of redundant or unnecessary tasks and to provide a sense of working toward a final state of closure. In order to do this, we needed to place users immediately into the activity context and to provide a design that was intuitive and actionable from the onset. Thus, the goal was to reduce the time and number of steps to perform the task while providing an environment that was comfortable and inviting. The design team found that some techniques from games helped accomplish these goals, particularly the use of a single-interactive page to simplify the user's experience and build context, the use of animation and movement to provide focus and the use of graphics to tell the interactive story.

### Design Goal 1: Simplify the User's Experience

Users who feel overwhelmed by the number of options offered at a given decision point frequently respond by opting or canceling out of the selection process altogether. Barry Schwarz' study *The Paradox of Choice: Why Less Is More* [4] provides copious support for the principle of simplifying choice by reducing the number of options provided. The "parsimony principle" should be followed whenever possible to help reduce choices, focus the user's attention and guide him or her through any selection activity.

With our goal of simplifying the user experience, we looked to games to help us envision a simple interactive space that would support a complex decision-making process. We noticed that many children's games are immediately intuitive despite an array of options. For example, in the game *Dora the Explorer: Dora Saves the Farm* [5], the rules of the game are

FIGURE 1. Image of Vanguard Open-an-Account Process

**Getting started**

**Step 1: Select your investment purpose**

- Invest for retirement  
Invest in an IRA or move retirement money to Vanguard from a former employer's plan or another financial institution.
- General Investing  
Save for a rainy day or general purpose using an individual, joint, or trust account.
- Save for college and children  
Invest for your child's future by opening the Vanguard® 529 College Savings Plan, sponsored by the state of Nevada, or a Uniform Gifts/Transfers to Minors Act (UGTMA/UTMA) account.

**Step 2: Select an option**

- Individual  
An account with one owner.
- Joint  
An account with two or more owners.
- Trust  
Non-retirement account in the name of a preestablished trust.

**Step 3: Select your investment type**

- Vanguard® mutual funds  
Vanguard's family of no-load stock, bond, and money market funds provides investment options for nearly every financial goal.
- Stocks, bonds, ETFs, and non-Vanguard mutual funds  
A Vanguard Strategic Investor® account enables you to invest in stocks, bonds, ETFs, CDs, and funds from hundreds of mutual fund companies. You'll select a money market fund now and make purchases after your account is open.
- Annuities  
Variable annuities offer tax-deferred growth potential for retirement assets. The Vanguard® Variable Annuity allows you to invest in a choice of stock, bond, and money market portfolios. The Vanguard® Fixed Annuity—Single 5 pays a fixed interest rate that is guaranteed for the first five policy years. Variable annuities are long-term vehicles designed for retirement purposes and contain underlying investment portfolios that are subject to investment risk, including possible loss of principal.

© 1999-2009 The Vanguard Group, Inc. All rights reserved. Vanguard Marketing Corp. DIBS. Terms & conditions of use | Security Center | Obtain prospectus | Contact Vanguard | Feedback | Enhanced Support

established by audio and graphic cues. Considering that most of the intended players may not be able to read yet, text is absent from the game. Instead, the metaphor of a barn on a farm is immediately established through the use of graphics, as all elements of the game are immediately visible on the screen. The game displays animal images that players intuitively understand and know that they will have to interact with. It creates a sense of curiosity, compelling players to see why they are hiding. The game design establishes this curiosity before Dora even explains the rules. There are no elements to drill down into to understand game rules or to progress to the final state. The design invites players to interact with the screen and learn the fundamentals of the game by doing, by immediate immersion in the interface.

One of the reasons for this immediate ease of use is that the options are all grouped and surfaced on the screen so they are easy to access and view. The single-page interface utilized in these games connected the interaction narrative with the control space and provided a visual gestalt that allowed users to immediately grasp the overall structure and interaction. We know from Gestalt psychology that people attain a visual comprehension of a page quickly. A page that has good information and visual design, good use of grouping and clear hierarchy, for example, can begin to tell the story (like how many pieces of information a person has to comprehend) and establish pertinent relationships (like which pieces of information are subsumed under main topics).

Children's games utilize these techniques well; they present spaces that are easy to comprehend and take action in. We used these as inspiration in our design. First, we grouped the information users had to provide into the primary buckets that make up an investment account: where the money is coming from (the method), the tax structure and ownership information (the account) and the investment vehicle (the investment). We placed these three grouped informational points onto a single screen. The single screen interactive space helps users to see the whole of the task. Visually, they can see that there are only three main completion points, similar to how many games set up a screen with a clear path, target and goal, like the arcade classic Donkey Kong. Nothing is hidden – the path, the obstacles and end point are all on display in a visual field. Our first step toward simplification,

then, was to show the interaction narrative in one space so users could conceptually grasp the information needs and path toward completion.

Our next step was to simplify in ways that users couldn't necessarily see. In *Rules of Play* [6], Salen and Zimmerman discuss meaningful play in game design as one that offers meaningful choice within a responsive system. They write: "In order to create instances of meaningful play, experience has to incorporate not just explicit interactivity, but meaningful choice. When a player makes a choice in a game, the system responds in some way. The relationship between the player's choice and the system's response is one way to characterize the depth and quality of the interaction" [6, p. 61]. This interactivity seems like a simple idea; if you are playing a game like Resident Evil, and you shoot a zombie, the zombie should die. Otherwise, actions have no meaning and the game play interaction is not particularly fun.

However, in the open account process we were redesigning, we realized that user choice was not leveraged in the interaction or particularly meaningful. The system didn't use user inputs to change the game and provide quality interaction. However, in designing 27x, we realized that many user choices could streamline the subsequent flow. For example, if the user selects Rollover IRA as the funding method, then we can remove non-IRA account options from subsequent screens, like Joint or General Investing. We decided that the application needed to be smart enough to recognize dependencies between different activity areas within the transactional process, and the user should be presented only with currently applicable information, rather than generic or irrelevant information.

Our behind-the-scenes simplification work, then, was to make sure we utilized every bit of information we had on hand and mapped dependencies so that users were only presented with choices they had to make, not generic screens that gave all choices to all users. So we leveraged user choice within the OA application to eliminate steps and questions that were not important to the task at hand. But we also went further, beyond the set of screens we were designing. We realized that we had a wealth of information about users depending on where they entered the process. For example, if users entered the process by clicking "Invest Now" from a specific mutual fund page, we knew which investment they had chosen and we could pre-fill that information

and move them several steps down the path toward task completion. The same thing applied if they selected an option to “Open an IRA.” It was our job to ensure that the system recognized and responded to dependencies by tracking previous selections and leveraging backend rules engines to filter out irrelevant options based on both previous selections and the overall transaction context.

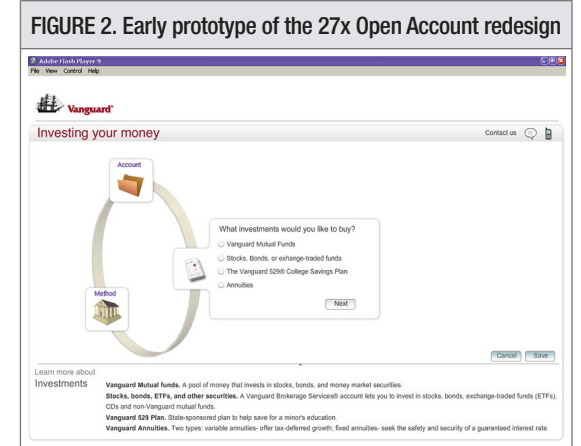
## Design Goal 2: Use Visual Metaphors to Lower the Learning Curve

Games are, of course, heavily visual. In the children’s games we looked at, the imagery provided an intuitive space for players. In *Dora the Explorer: Dora Saves the Farm*, all the objects that players interact with are animals, common objects from players’ lives or books. The images are intuitive because they leverage existing, non-interface knowledge to bring users into the design. The animal images are large so players can easily find their target and click on the image to complete the task and to achieve the goal, which is to move the animals to the barn door. These large animal images are inviting and attract players’ attention immediately. As players interact with the screen, the game responds to each user action, such as highlighting the image as players mouse over them, while also providing feedback for positive or negative actions. For positive results, the game gives audible and visual feedback, including encouraging responses from Dora, making the appropriate animal sound and animating the graphic to move toward the barn door. For negative results, Dora states that the choice was not correct as the graphic makes the appropriate animal sound.

The games provided intelligible and easy-to-grasp interactive objects familiar to players. However, children are not the only ones who can use visual metaphors, as we all know. As Stephen Utkus of the Vanguard Center for Investment Research noted recently [7], “Visual learning is more intuitive and often faster than cognitive learning.” His presentation included several compelling examples of how visually imagery can impact choice behaviors and open up new avenues of affective communication. Because the investing task domain can be difficult and because most investors do not open new investing accounts often, we sought to leverage visual metaphors to help tell the story of investing.

Metaphors facilitate users’ understanding of moving money while also providing an intuitive interface for users to interact with in accomplishing their tasks. It was very important to apply a metaphor that reflects the majority of users’ mental models for moving money. The visual design was meant to improve the overall user experience for, and provide education about, moving money to and within Vanguard. The 27x concept employed icons and visual metaphors to educate users on the relationship between key investment concepts (such as accounts and investments) and help them adapt their mental models to the industry’s business model as well as to Vanguard’s specific approach to money movement transactions.

Figure 2 is a screen shot of one of the prototype models. This example shows how we leveraged icons in the design, provided task completion feedback and task-specific help and used the single-screen design to provide focus. The task areas rotate around until the user provides all information.



## Design Goal 3: Animation and Movement to Provide Focus

In providing a single screen without the typical jumps between pages to signal movement and progress toward completion, we knew that we had to guide our users through the interaction in a different way. Novice investors often find it difficult enough to comprehend complex investing concepts and relationships, and this difficulty is compounded by inelegant handoffs or transitions between different segments of a serial process. The task domain of investing should be users’ focus, not navigation through the interface. Thus, to keep users from dropping out of a transaction, special care is needed to signal and prepare users for any necessary transitions or handoffs.

But we also didn't want to clutter the screen with all data points surfaced in the dependency mapping we had done. Such a display would be an inelegant way to design for user choice. The 27x design attempted to provide a clear focus for users during each activity state by ensuring that only information that is immediately relevant to the current task displays in the visual field. We needed to have a way to keep a user focused on a specific area and then shift focus after that part of the process was complete. Here again we looked to games. In any first person shooter game, the field of vision provides the view of the interactive space. Players move through this space, alert and watching, and often it is a movement of an object that draws their interest and focus.

One of the most immersive aspects of games is movement: both movement through an interactive space and movement to help players focus on the important areas of the screen. Movement and animation engage and direct the play, smoothing handoffs and providing focus by utilizing natural experiential responses. One part of game experience, as Salen and Zimmerman explain, is *apprehension* [7]. Apprehension helps immerse players in games by drawing on a heightened sense of awareness and watchfulness of objects on the screen. Movement in this visual field gives players something to focus on and respond to in the game play.

We sought to leverage movement in our design as well, albeit in a much smaller way than an immersive game. The design leveraged animation effects to signal and smooth transitions between steps and between the three main informational buckets of the transaction (Investments, Account and Method). Upon completion of the investment path, for example, the screen where users had been entering information shrank, a green checkmark appeared by the icon and the next set of screens opened so users could continue on in their task.

## Conclusion

The design team approached the task of opening an investment account as an example of complex problem solving. In her book *Interaction Design for Complex Problem Solving* [8], Barbara Mirel highlights the tension between textual description and static visual representation by exploring

differences between Tolstoy's textual description of battleground decision-making (in all its muddled, contradictory, in-the-moment complexity and storytelling) and Minard's graphic representation of Napoleon's Russian campaign of 1812. She points out neither the purely textual nor the purely visual representation worked to tell the full story. She links this tension to design teams' challenges in getting both the interface and the user's story correctly. One way to resolve some of these issues, she argues, is to look to other visual and story-telling media, as the 27x design team did. She writes,

[A]nother way for HCI specialists to merge investigative stories with data meanings in applications is to give users ample interactivity to explore, set courses, shift perspectives, and configure investigative plots as needed. Toward these ends, analogies with other visual media such as movies and the interactive narratives of computer games can offer software teams guidance. Both genres have an overarching concern with visually presenting action and problem solving through the lens of story, context, and meaning. [8, p.xxxviii]

In trying to create the 27x interface, the design team established a set of user-centered design principles that this interface had to live up to. This allowed the team to keep their attention on the user experience, particularly the user's story or journey, as well as focus on the key interactive aspects. However, that is not all the design goals did. They also helped guide the incorporation of game design techniques into the overall design and resolve the contradiction between the goals of games and the goals of a transaction process. We couldn't borrow wholesale from game design; our goal was not to have our investors play the investing game all day. But at the same time, we knew that some techniques could provide us with inspiration and help in solving some of the problems we wished to solve through our design. Throughout the design process and multiple iterations of the 27x prototype, the design goals we established early in the process served as a touch point and a check to the use of game design techniques. We were careful not to get too caught up in the fun of borrowing from games that we forgot the important user needs and goals we were trying to meet. ■

RESOURCES on next page

### Resources Cited in the Article

- [1] CGM-Yukino. (2006, March 23). Adults spent more time gaming than teens. Retrieved March 7, 2009, from [http://gameaddiction.gameshogun.ws/13news/adults\\_spend\\_more\\_time\\_gaming\\_than\\_teens](http://gameaddiction.gameshogun.ws/13news/adults_spend_more_time_gaming_than_teens)
- [2] Metrics 2.0. (2007, April 4). Video game addiction: 81% of American youth play, 8.5% are addicted. Retrieved March 7, 2009, from [www.metrics2.com/blog/2007/04/04/video\\_game\\_addiction\\_81\\_of\\_american\\_youth\\_play\\_85.html](http://www.metrics2.com/blog/2007/04/04/video_game_addiction_81_of_american_youth_play_85.html)
- [3] User comments from project interviews and usability tests
- [4] Schwartz, B. (2004). *The paradox of choice: Why more is less*. New York, ECCO.
- [5] *Dora the explorer: Dora saves the farm* – [www.nicksplat.com/games/dr\\_farm/](http://www.nicksplat.com/games/dr_farm/)
- [6] Salen, K., & Zimmerman, E. (2004). *Rules of play: Game design fundamentals*. Cambridge MA: MIT Press.
- [7] Utkus, S. (2007). *Ideas from the 2007 Behavioral Finance Forum*. [Presentation at the Vanguard Group.]
- [8] Mirel, B. (2004) *Interaction design for complex problem solving*. San Francisco, CA: Morgan Kaufmann.