THE RESEARCH, DESIGN AND DEVELOPMENT OF AN EDUCATION GAME FOR TRAINING RESIDENT ADVISOR STAFF

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A Thesis
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The task of training a Resident Advisor staff is often difficult due to the complex nature of the training requirements and the time constraints with which most training is conducted. Video games are increasingly being used as educational tools in situations where traditional training mechanisms are either not effective or could be improved. Resident Advisor training would be such a case where a video game (specifically an educational game) could be used to improve training either as a complement to or supplement for traditional means. This project involved the design and development of a game prototype that addresses the specific learning needs of Resident Advisors. Players were given a job-related scenario and information about how to handle that scenario. The players applied training knowledge by making decisions that affect the outcome of the scenario. The prototype was reviewed by a panel of experts for review of both educational standards and appropriate game design.
In Loving Memory of Seana
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CHAPTER 1. INTRODUCTION

Most residential colleges and universities have some form of para-professional staff present in the institution’s residence halls. These staff members are students employed and trained by the school to help develop the residential community, facilitate educational programs, and ensure discipline and living standards are maintained. While these staff members have a variety of titles and job descriptions; this paper will refer to them as Resident Advisors (RAs) and assume they carry out, to some degree, the tasks described above. The purpose of this study was to examine how RAs are trained and to determine if educational games can improve that process. This chapter provides an introduction to the RA role and training needs as well as lays the foundation for how this study was conducted.

Context of the Study

Resident advisors share common tasks related to residential students and communities of students. These roles are derived from the base of knowledge that is described in the previous section. Unlike most professionals in student affairs, RAs have little or no prior knowledge and experience in student affairs. Further, most RAs do not intend to study student affairs or pursue the field as a profession. Therefore, in training RAs, consideration needs to be taken in providing enough background to do their jobs while not overwhelming them with extraneous theory. Individuals who have a background in student affairs theory closely supervise most RAs and those supervisors will provide guidance and make many decisions about how the RA should conduct duties. Conversely, RAs do need enough training to identify student needs, serve as an initial resource, and be able to effectively implement the guidance provided by their supervisors.

Statement of the Problem

Three core questions were at the heart of this study. First and foremost was “Can an
educational game complement or supplement existing training methods for RAs?” This study addressed the viability of this medium for RA training and created a foundation for future research. The core purpose of this study was to determine whether it was worth the effort to perform further research and development in the area of educational gaming for RA training. The other two questions were therefore secondary to this first question. The second question was “What are the specific learning needs of RAs?” This question was important because solid learning objectives are necessary in order to create a well thought out educational game. RA learning needs were addressed during the review of the literature regarding student development. The final question was “What is the ideal process of developing an educational game for this purpose?” For an RA training program to include educational games, there needs to be a general understanding of the process and associated costs of developing those games. This question is answered further during the explanation of the method used for the study.

Significance of the Study

The effect of improving RA training is relevant not only to the RAs themselves but to the students they serve. Resident Advisors play a large part in the retention and engagement programs at most residential universities. Bowling Green State University, for instance, has a student enrollment of approximately 18,000. Between 6,000 and 7,500 students live on campus and are served by about 160 RAs (FTE, 2009; Residence, 2009). However, with almost all undergraduate students being required to live on campus for at least two years, it can be estimated that around 80% of students will be served by an RA at some point. With Bowling Green being an average size university, the impact of RAs across the United States (U.S.) alone is quite large. Given the diverse job expectations of RAs, the need for effective training is important.
Another beneficial outcome of this study was the additional knowledge about the process and practice of developing educational games. Educational gaming is a young field and there is still much work to be done to establish best practices for the creation of those games (Prensky, 2001a; Irish; 2005). Additionally, this study also found that educational games are able to provide an additional means of training and assessment in some situations where face-to-face role-playing is used. The ability to supplement role-playing as a means of training has significance beyond the scope of just RA training.

Objectives of the Study

This study addressed the potential of video games to augment or supplement some aspects of the training process. Van Eck and Gikas (2004) identify twelve genres of video games and their list has been summarized in Table 1.

Table 1

*Matrix of Game Genres*

<table>
<thead>
<tr>
<th>Genre</th>
<th>Explanation of Genre</th>
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<tbody>
<tr>
<td>Action</td>
<td>Focus on reflexes and hand-eye coordination. Requires continuous movement and focus of player.</td>
</tr>
<tr>
<td>Role Playing</td>
<td>A player portrays a character in a story that spans a large amount of time and is often quite complex.</td>
</tr>
<tr>
<td>Adventure</td>
<td>The player, as a protagonist, must solve puzzles based on a storyline.</td>
</tr>
<tr>
<td>Strategy</td>
<td>The player is required to make decisions that affect the movement and outcome of the game.</td>
</tr>
<tr>
<td>Simulations</td>
<td>Based on real-life scenarios and environments; allows the player to manipulate elements to affect the game.</td>
</tr>
<tr>
<td>Sports</td>
<td>Based on existing sports games and often includes real teams/players.</td>
</tr>
<tr>
<td>Fighting Games</td>
<td>Focus is on combat with one or multiple other players or non-player characters.</td>
</tr>
</tbody>
</table>
Casual Simple games that allow non-gamers to quickly learn and play.

God Games Players are given great deal of control over environment and game elements and there is no clear winning condition.

Education A specific body of knowledge or skill is the key focus of the game and the player must accomplish specific goals.

Puzzle Games A puzzle that does not include a context or story.

Online A game from other genres that have been adapted to play over a network.

While there are many genres of video games that could be used for training, an educational game would best serve this context because it focuses on teaching a specific body of knowledge, completing a defined goal, immediate feedback, and safety (Gee, 2004; Van Eck & Gikas, 2004). A simulation uses a branching storyline to both present content and navigate the game. A branching storyline is one in which the narrative changes direction based on choices made by the user. For the purposes of training, a problem scenario was described to the user followed by a brief introduction to the resolution process. Following that was the first section of the story in video form. Both the students and the RA are portrayed in the videos. At critical points the video stops and asks the user for input. The user either answers a question about the situation to assess thinking and interpretation or makes a choice as to what action should be taken next. The game presents feedback about the selection and then another video segment. All choices and the final debriefing can be made available to the instructor and student for further review.

Assumptions and Limitations

This study made the assumption that the Resident Advisors participating in training had a basic working knowledge of computers and video games as well as access to computers in order
to complete the training. For the purposes of the pilot scenario, it also assumed the basic methods and skills of conflict mediation are taught as they are tested in the game. A limitation of the study was the lack of assessment regarding actual learning resulting from game play.

Definition of Terms
Resident Advisor – A student staff member of a university residence hall that works with other students and professional staff to ensure the well being of the hall community and its members.

Roommate Agreement – A document prepared at the beginning of each year that outlines mutual expectations of residents of a particular room. This document is sometimes considered a contract that can be used as both a casual reference and a tool in formal conflict resolution.

Summary
The goal of this project was to develop a module of the game proposed above and to solicit feedback from experts about the content and effectiveness of the game design to determine the potential for further research and development. The development process involved researching the needs of the training curriculum and techniques required to design an educational game. The first step was to determine the needs of residential college students and how the training of Resident Advisor staff relates to those needs. A review of student training programs provided a basis by which to form learning objectives for the training program. The learning objectives were intended to address the developmental needs of the RAs as individuals and the needs of the students with whom they work. The next step was to establish how those training needs would be reflected in a game-based training model. This learning gap analysis included direct learning presented as in-game content and learning that is developed through practice and reflection stemming from playing the game. The final product includes a document describing the game and how such a game supplements the role-playing portions of Resident Advisor
training. Additionally, a sample module was developed to demonstrate the concept and process of the game. This sample module allowed the expert panel to see what Resident Advisors will experience while playing the game and to review how the learning is presented.
CHAPTER II. REVIEW OF THE LITERATURE

This review of literature provides background information that works toward answering the questions of the study and aids in the development of the study instruments. The first section describes the developmental needs of college students. Research about college student development serves as the basis for how RA training programs are developed. RA learning outcomes often stem from student development theory combined with knowledge of specific institutional processes and policies. Next, the review explores existing work with regard to educational gaming and how games fit into training programs. This establishes that games have become a serious area of research for developing new training programs. Finally, the review examines the current understanding of how educational games are created. Educational gaming represents the merging of two existing fields, educational content development and game development and therefore presents unique challenges.

Developmental Needs of College Students

Over the course of the past thirty years, a substantial body of knowledge has evolved around the developmental needs of students in colleges and universities. Student affairs professionals have reached a thorough understanding of the issues these students face and the patterns of growth they will experience as they move into adulthood. While technology has lead to new learning styles and new social patterns, much of the existing knowledge still offers valuable insight into how these students are best served. In training student affairs staff at any level, this research needs to be at the foundation of the curriculum in order for current and future professionals to best help students.

Much of the development and change students face focuses on development of identity and how that identity fits into existing social structures. Often until a student first attends college,
much of his or her identity is based on influences from family and a relatively homogeneous peer group. Suddenly, those students are exposed not only to more diverse perspectives and lifestyles but also the students are given freedom and encouragement to explore those freedoms. These new experiences create a sense of cognitive dissonance that the students must resolve all while establishing themselves into a new academic program and social environment (Piaget, 1964; Chickering & Reisser, 1993). The challenge of coping with these changes can lead to a period of difficulty for the students resulting in physiological stress, depression, eating disorders, and substance abuse. In some cases, the desire for independence or conflict with the views of their family prevents students from turning to their previous safety nets. In contrasting situations, students become overwhelmed by the independence and retreat back to family and may even choose to leave school altogether (Schroeder & Jackson, 1987; Pascarella & Terenzini, 2005).

Student Affairs research identifies significant areas of development and breaks the student acclimation process into either a series of stages or degrees of maturity along linear scales. Chickering and Reisser (1993) establish seven vectors of growth ranging from basic competence to emotional control to forming a sense of purpose. It is from this research, that programs and strategies have been developed to better help students cope and progress through this transformational period. A common practice at many larger institutions is to have first and second year students live at the school in residence halls. Living on campus forces the students to adapt to their new freedoms while providing a safety net and guidance (Pike, Schroeder, & Bery, 1997). The living situation often involves interaction with trained staff members (both peers and professionals) who can help work through situations and provide programming opportunities to further learning and personal development (Astin, 1973; Blimling, 1999; Pascarella et al., 1993).
Games as Effective Training Tools

Games, and especially video games, have emerged at the forefront of academic technology. The use of video games for teaching both in education and in corporate training is being taken quite seriously as the base of research continues to grow. While still highly controversial, the study of serious games has led to the establishment of entire degree programs, numerous conferences, and publications. The works of Prensky (2001a, 2001b, 2005), Gee (2003, 2004), Tapscott (1999), and Van Eck (2006), to name a few, have established that contemporary learners benefit from the media rich and problem-centered nature of games. While learners with heavy exposure to digital media benefit the most from games, other learners have shown to gain from game-based curricula as well.

A foundational principle of game-based learning was established by Prensky (2001) and added to by others (Gee 2003, 2004; Tapscott, 1999; Van Eck, 2006) and asserts that younger learners have grown up immersed in digital media. Prensky (2001b) coined the term “Digital Native” to describe this demographic of learner. Through this immersion, their brains and learning processes have formed to expect input in the form of fast-paced, media rich and dynamic content. As a result, learners not only work well in media rich environments but also are more engaged and thus benefit from media rich environments. Dale (Games, 2009) demonstrates this through his research and what has become known as Dale’s Cone of Learning; a model that shows a correlation between degree of learning interaction and retention of knowledge (Figure 1). It is important to note that Dale’s Cone of Learning is a theoretical model put forth by Dale and subsequently enhanced by others. The model itself is not grounded in any specific empirical research but does serve as a useful mental framework for other studies.
It is not merely the presence of media, however, that promotes learning. Interaction with and thinking about the media spurs higher levels of mental activity. Video games create challenges that learners must overcome by applying prior knowledge to unique situations. As has been demonstrated by popular games such as World of Warcraft, Civilization, Everquest, and a myriad of other games, the knowledge players must use is unique to the context of the game world. Therefore, in order to successfully play the game, the players must first and continually

**Figure 1. Dale’s Cone of Learning.** Adapted from Dale (Games, 2009).

<table>
<thead>
<tr>
<th>Nature of Involvement</th>
<th>After 2 weeks we tend to remember</th>
<th>Nature of Involvement</th>
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</thead>
<tbody>
<tr>
<td>Active</td>
<td>Doing the Real Thing</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Simulating the Real Experience</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Doing a Dramatic Presentation</td>
<td></td>
</tr>
<tr>
<td>Passive</td>
<td>Seeing It Done on Location</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Watching a Demonstration</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Looking at an Exhibit</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Watching a Movie</td>
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<td></td>
<td>Looking at Pictures</td>
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<tr>
<td></td>
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<tr>
<td></td>
<td>Reading</td>
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learn that knowledge and apply it. With the video game industry quickly overshadowing Hollywood, it would seem that players and many of them are doing just that (VanBurkleo, 2009).

Advocates of game-based learning assert that, based on the success of entrainment games, the same learning and application processes could apply in more practical learning tasks. As an example, one of Prensky’s (2001a) early experiments, Monkey Wrench Conspiracy, required players to learn a client’s design software in order to complete the game. Further practice and development in game-based learning has resulted in games for the teaching of most school subjects and corporate training needs.

At this point, even the strongest advocates still acknowledge the need for further study about overall effectiveness and refinement in the art of creating educational games. Despite this need, most feel the research done so far indicates a promising future for game-based learning and both a supplement and compliment to existing learning processes.

Design and Development of Educational Games

The development and implementation of games into the learning process involves techniques and thought processes that are based on, but different from, other content development. Experience in both game development and educational media development are needed to develop truly effective educational games. The art of educational game development is still in early stages and experts are still working to establish the best practices. In reviewing the methodology of developing educational games, it is necessary to draw on the established fields of game design, curriculum development, and multimedia.

When it comes to development of game design documents, Irish (2005) argues that the process needs to be fluid and involve all the engineering stakeholders from the beginning. The notion is that a large design document quickly can become unyielding and outdated. The first of
two major aspects of his strategy is to include and get feedback from designers, artists, and engineers rather creating a statement as to what these parties should do. The second aspect is to ensure that the document is always kept up-to-date to reflect the current state of the project. This includes requiring that notes about implementation be included in the actual design document once they are completed. In *Rules of Play*, Salen and Zimmerman (2003) describe the iterative development process. With this process there are frequent test versions created for each game. Potential players review these test versions and that player feedback is used to revise the game design. This cycle of feedback and revision continues as the game matures and helps to facilitate getting accurate and timely feedback.

Michael and Chen (2006) discuss some of the challenges and issues for the creators of educational games. First and foremost is how to get the learner to play the game. While “fun” is an important aspect of attracting players, Michael and Chen point out that documentary films and non-fiction books have wide audiences even when they are not fun. Therefore, fun is important but other types of engagement can be used to attract players. Another challenge in the creation of educational games comes from replicating the needs of the educational process such as assessment and coaching. For instance, player interactions need to be recorded in such a way that those interactions are re-viewable by an instructor and used to debrief and evaluate the learning that took place while playing the game.

Finally, simulation games meant for education require designers to forego some assumptions and strategies about design that often make games easier to learn and play. Four strategies identified by Michael and Chen (2006) are clear communication, time compression, reduction of headaches, and removing extraneous steps. Making games less realistic but “good enough” helps to keep players engaged and reduces levels of frustrations. However when the
players are using the simulation primarily as a learning tool those frustrations might represent important aspects of the environment being simulated that the player needs to be experience. The task then, is to strike the right balance of realism and frustration removal as to achieve the learning goals even if it makes the game slightly more difficult.

Summary

This literature review provided the background information needed to proceed with the study. Understanding the developmental needs of college students was the beginning step to forming adequate learning objectives for the study. Previous research on educational games provided insight on how and in what ways games could benefit RA training and considerations about developing the educational content for those training programs. Finally, a review of existing practices for the design and development of educational games allowed for the development of a sound methodology for the study.
CHAPTER III. METHOD

This chapter describes the method by which this study was conducted. It will first describe the design of the research process. The research design drew on existing research about developing educational games. Following the considerations used in establishing the research design is an explanation of the actual game prototype development. The third part of the chapter explains how the research results were gathered and evaluated.

Research Design

The development of this study followed a hybrid iterative process (Figure 2) that included elements of both instructional design and video game development. This process began by reviewing the literature specific to the development needs of college students and the related training needs of Resident Advisors (Astin, 1973; Blimling, 1999; Pascarella et al., 1993). From that literature, specific learning outcomes were established to guide the design. Research on peer mediation (Gilhooley & Scheuch, 2000) and narrative mediation (Winslade & Monk, 2000) were also referenced to develop the learning outcomes and information used in the game. The two learning objectives chosen for the game were “The Resident Advisor will be able to apply basic mediation techniques to resolve a conflict among residents” and “The Resident Advisor will identify best practices in conducting a mediation.” These learning outcomes also served as the basis for evaluation throughout the design process and for evaluation of the final product as a teaching tool.
Experts of game production seem to agree that the iterative design process should include review by artists, engineers, content experts, and players. This is the optimal model that allows for the best and fastest feedback (Salen & Zimmerman, 2003; Irish, 2005). However, this project did not have the benefit of professionals or experts to regularly review the design process. While a game prototype was sent to various area experts for feedback, these experts were asked to volunteer their time and talent and that limited the amount of time that could be asked of them. Time available to complete the project was another factor impacting the scheduled prototype and review process. With that, a routine for reviewing the game design, initial goals, and learning objectives was established by the author. This routine included a single review process rather than multiple reviews and revisions.
Once the learning and game play outcomes were established and matched, a sequence of objectives were created. This sequence determines how the player progresses from one learning and/or play objective to another and ensures that the sequence represents (as best possible) needed comprehension of skills and realistic flow in context of the game storyline. While an initial sequence was established, the game engine should be flexible enough to allow different sequences to be created. These alternate sequences could be defined by both the users (either learner or instructor) or through the use of adaptive personalization. The adaptive process created by the author for each module is shown in Figure 3.

Figure 3. Learning Module Structure

The scope of the learning for this game was the mediation of a conflict between two roommates. Conflict mediation was chosen for this pilot study because it was easy to teach and to test. Mediation has a relatively concrete set of skills and processes that can be defined, taught,
and evaluated. These skill sets could be taught using the game learning method but would not give as clear an indication of whether game learning was effective as a training method.

In choosing the engine on which to create the prototype module, several tools were considered. The first option explored was Alice, a visual programming tool from Carnegie Mellon. The current version of Alice was determined to be too simplistic and the newer version won’t be available in the time frame needed for this study. SecondLife was another option that would have provided many benefits because of its popularity in educational settings. However, programming characters currently requires the use of an external program to control the non-player character or “bot” that would interact with the learners. While some third parties have created modifications for off-the-shelf games such as The Sims, these are not officially supported and are complicated to program for complex character interactions. The Sims is a simulation game in which the player controls a number of characters, environments, and situations. RealmCrafter was considered because it is designed to create virtual worlds with easily programmable characters and interactions. An added benefit is that the software would allow the prototype to be scaled up and multi-player support added if there was a desire to continue this project after the initial prototype stage. The main downside to RealmCrafter was that it required a significant investment in time and learning to create an interactive game environment. The final decision was to create the prototype using a combination of Moodle and e Frontier Poser. Moodle was a web-based system primarily for online learning and community sites. The Moodle system was developed as open-source software and was therefore free to use and modify. Many elements of a learning tool were already established such as user management, grades, and content flow and management. Content developers could make use of many standard and third-party modules to aid in the development of learning materials. One such module is called Lesson
and is used for creating content pages that follow a branching structure determined by user choice or by responses to questions (Lesson, 2009). The branching structures in Lesson can be set up visually without any programming, significantly reducing the time needed to develop complex learning interactions. e Frontier Poser (referred to as Poser from this point forward) is a three-dimensional graphics tool for character animation. Several aspects of the training for RAs related to the use of body language both of the RA and of the residents. Poser allowed for the most control and demonstration of character visuals without becoming too cumbersome as with more advanced 3D packages. For instance, audio files could be used to automate the creation of speaking animations.

Development of the Prototype

A learning interface developed using the Lesson module in Moodle integrated animated Poser movies to depict the role-playing scenes and text content. The player answered questions about the scenes and directed further action of the RA character. Additional guidance and instruction appeared as needed depending on decisions made by the player. The Lesson module’s branching structures were what provided the interactive and navigation elements of the prototype. Audio for the video sequences was created using the text-to-speech system included in MacOS X. The default voices were less than ideal but it is possible to purchase much higher quality voice packages for this purpose. While real speech should be included in a final product, the computer generated speech proved to be an effective means of developing the dialog sequences. During the development, some additional tools had to be used to work around technical limitations. Each Poser sequence (a block of dialog by a single character) had to be animated and rendered individually then combined using Apple iMovie. The final video files were then uploaded to YouTube for hosting and embedded into the Moodle game environment.
Each Lesson page was simply a rich content area that could support any element that could appear on a standard website. Videos were embedded using the “<embed>” tags that YouTube automatically generates for any other site. The Moodle Lesson module was advantageous because the navigation structure and decision trees were easily constructed and required no custom programming. The downside to this approach was that the interface and human interaction elements lacked customizability and the resulting product was not as friendly or visually appealing as would have been preferred for the prototype. Figure 4 shows the process used in the development of the prototype.

![Figure 4. Game Prototype Development Process](image)

Although this development technique would not be ideal for a polished game product, it did provide a decent product considering the little amount of time and effort required. Further experimentation with these tools and approaches could provide better results, as the author had never attempted many techniques used in the development of the prototype. The approach could have potential in other venues for adding interactive media to online learning without a significant resource cost.

The structure used for the actual prototype was much simpler than would be used for a fully developed game module. In a complete module there could be multiple paths a player could follow. The design of the prototype was such that it showed how multiple paths could exist even
though the game flow was hard-coded to follow a single path. The game consisted of twelve content screens, two were used only to show a narrative video while the rest contained decision points for the game. There were ten video sequences to demonstrate the skills being demonstrated for each decision point. The decision points were multiple choice questions asking the player to evaluate the RA's previous action, guide the RA's next action, or reflect on a point of content knowledge. Some questions had only one correct answer while others could have had multiple correct answers. After each selection, the player was presented with feedback describing the correct choices and an explanation for why those were the best choices for the given scenario. After reviewing the feedback, the player continued to the next content page. At the top of each page was the running score for the game. Figure 5 shows an example of a content page including video and questions and Figure 6 shows an example of the feedback provided after answering the question. The full text of the videos and a list of the questions and feedback are provided in Appendixes A and B respectively.
It looks like Josie and Meghan have resolved their conflict thanks to Chris. Way to go Mr. RA!

What final steps should Chris take as an RA?

- Document this discussion with his supervisor as required. The documentation might also include a copy of the new agreement.
- Formalize the new agreement in writing and have the residents add it as a part of their roommate agreement.
- Follow up with Josie and Meghan after a few weeks to see how the new agreement is working out. Suggest adjusting things if needed.

Figure 5. Screenshot of Final Prototype Screen
Once the game prototype was completed, it was sent to knowledge experts for review. The expert reviewers consisted both of professionals in the area of residence life and of current and past RAs. The panel consisted of seven individuals who were chosen to provide varied perspective and experience. Of this panel six members were or had been RAs within the past ten years. Four members were currently or had recently served as Resident Hall Directors. Two members also currently served or had recently served as senior administrators in residence life departments. The reviewers were asked to assess the game design for both effectiveness at reviewing the stated objectives and for quality as a learning game. Feedback was collected by means of an open-ended, online survey. The survey questions were created by the author in
response to the primary research questions of the study. The survey questions were included in Appendix C. In addition to the expert panel, the author used the principles of effective educational games put forth by Gee (2004) to evaluate the game. Gee's criteria for effective educational gaming (see Appendix D) are inclusive of both effective learning systems and aspects of engaging game play.

Timeline

Table 2

*Project Timeline*

<table>
<thead>
<tr>
<th>Task</th>
<th>Date Completed</th>
</tr>
</thead>
<tbody>
<tr>
<td>Complete Proposal and Submit to Committee</td>
<td>December 08</td>
</tr>
<tr>
<td>Project Outline and Framework</td>
<td>January 09</td>
</tr>
<tr>
<td>Develop Prototype / Submit to Expert Panel</td>
<td>February/March 09</td>
</tr>
<tr>
<td>Revised Draft for Review by Committee</td>
<td>March 09</td>
</tr>
<tr>
<td>Document Complete / Defense</td>
<td>March 09</td>
</tr>
</tbody>
</table>

Summary

The game prototype and design document was sent to residence life professionals and former RAs. These professionals were asked to review the learning objectives and the means of meeting the learning objectives. It is important that not only the learning objectives be met by the design of the game, but that the objectives themselves were sound and realistically reflected the training and development needs of resident advisors. This review process took the place of focus groups and play testing that would normally be part of the iterative process used for game design. A second assessment instrument for the game was based on Gee's principles for
educational games.
CHAPTER IV. EVALUATION OF DESIGN AND PROTOTYPE

The evaluation of the study was done in two phases. The first phase was a self-evaluation by the author. This phase involved the author scoring the game according to Gee’s Learning Principles for Educational Games. The second phase involved a qualitative review by an expert panel.

Gee’s Learning Principles of Educational Games

One of the methods used to evaluate the game prototype was to apply Gee’s principles for learning games. These principles were described in full in Appendix D. While not originally intended as an evaluation metric, Gee’s principles provided a good sense of how well a particular game meets both criteria areas of playability and of being educationally sound. This evaluation looked at each principle and described how and to what extent the game prototype fit that principle. Table 3 includes an abbreviated version of the principles and description of how the game reflected that principle. Additionally, the applicability of each principle was rated on an arbitrary scale of one to three. A score of one indicated that the principle was not significantly reflected in the game design, a score of two indicated that the principle was somewhat reflected in the game design, and a score of three indicated that the principles was heavily reflected in the game design.

Table 3

Prototype Self-Assessment Based on Gee’s Principles

<table>
<thead>
<tr>
<th>Abbreviated Principle</th>
<th>Score from Author</th>
<th>Application to Game Design</th>
</tr>
</thead>
<tbody>
<tr>
<td>Co-Design - Good</td>
<td>3</td>
<td>While the prototype lacks alternative narrative paths, learning requires that a more developed scenario could allow for differing</td>
</tr>
<tr>
<td>Parameter</td>
<td>Value</td>
<td>Description</td>
</tr>
<tr>
<td>---------------------------</td>
<td>-------</td>
<td>---------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>learners feel like active agents</td>
<td></td>
<td>outcomes and situations.</td>
</tr>
<tr>
<td>Customize - Different styles of learning work better for different people</td>
<td>3</td>
<td>The game concept provides a different method of learning than traditional training while including visual, audio, and text elements.</td>
</tr>
<tr>
<td>Identity - Good games offer players identities that trigger a deep investment on the part of the player</td>
<td>2</td>
<td>The player does not have a specific identity but their interactions guide the identity of the RA character.</td>
</tr>
<tr>
<td>Manipulation - The more and better a player can manipulate a character, the more the player invests in the game world</td>
<td>2</td>
<td>While the player controls elements of the story, the level of control over any character is rather limited.</td>
</tr>
<tr>
<td>Well-Order Problems - Problems in good games are well ordered</td>
<td>3</td>
<td>The problems presented to the player build on the prescribed sequence the learner should have been taught prior to playing the game.</td>
</tr>
</tbody>
</table>
Pleasantly Frustrating -

Good games adjust challenges and give feedback in such a way that different players feel the game is challenging but doable and that their effort is paying off.

Each question or decision point in the game includes feedback to explain why a given choice was correct or incorrect. There is little ambiguity.

Cycles of Expertise -

Expertise is formed in any area by repeated cycles of learners practicing skills until they are nearly automatic.

While the game provides practice for each skill required for mediation, each skill is only tested once.

Information on Demand -

Human beings are quite poor at using verbal information (i.e., words) when given lots of it out of context and before that can see how

The game provides all feedback and information after each choice the player makes. The game interface itself requires no significant learning to be able to play.
it applies in actual situations.

Fish Tanks - Fish tanks are stripped down versions of the game. This principle does not really apply with the current game design because each game is a complete module rather than a larger system.

Sandboxes - Sandboxes are game play much like the real game, but where things cannot go too wrong too quickly or, perhaps, even at all. The game structure is essentially a sandbox for real-world interactions. No mistake can cause a player to fail; the game does not award a point for incorrect responses.

Skills as Strategies - People learn and practice skills best when they see a set of related skills as a strategy to accomplish goals they want to accomplish. Each game module is meant to test skills as a means to solve a specific problem and, as such, questions are always presented within a larger context.

System Thinking - any experience is enhanced when we understand how it fits into a larger meaningful whole. In terms of RA training as a whole, having these specific game modules does not reflect the more complex resident/RA interaction context.
Meaning As Action  3  The application of skills in the game turns abstract training and procedure into concrete examples through practice.

Image - Humans do not usually think through general definitions and logical principles.

In summary of the above table, the proposed game design and prototype met most of Gee’s principles either somewhat or very well. Areas where the game did not reflect the principles were where certain skills needed to be applied to a broader system or context (i.e. the RA and resident relationship over an entire year) and the ability for the player to have extensive control of and identification with the characters and variables of the game. The game design used simplicity to ensure a correct and safe learning path is followed at the cost of a richer game experience. An important question to ask was whether that cost in playability significantly affected the game’s ability to achieve its intended outcomes. The author believed, especially considering the alternative forms of training used currently, that the game still provided a suitable play experience.

Feedback from Expert Reviewers

Overall, the feedback received from the reviewers was positive. There was unanimous agreement that the game methodology had a potential application in the RA training process. The following were the questions asked of the review panel and a summary of their responses.

“What are your thoughts about the purpose stated for this game and the potential value to RA training?”

Some felt that a game could supplement existing activities and others felt that a game
could be used in addition to existing activities or as a refresher exercise outside of the training program. Several recognized the benefit of having a safety net where mistakes could be made without consequences and also the appeal of concrete demonstration of skills. One reviewer commented that “[t]he greatest potential value for this game is that RAs can have experience making decisions without fear of choosing a ‘wrong’ answer.” Unlike live role-playing, the game offered the ability to reflect and think about decisions and to replay the video sequences so the player could review the scene as needed. In general, most felt the game structure was appropriate and was an improvement over other forms of learning and assessing knowledge of skills.

“Do the learning objectives reflect the assessment needs of mediation training? Does this game meet those learning objectives?”

The reviewers felt the objectives were appropriate and that the game met those objectives. It was suggested that a third objective be added that referred to knowledge of job procedures and/or institutional policies.

“Is the general game structure understandable and useful to determining whether the learning objectives have been met?”

It was commonly noted that some of the questions were confusing and better wording would make them less ambiguous. Beyond that, the reviewers felt that the structure was easy to follow and that it did reliably indicate whether the player had met the learning objectives. One reader equated the game structure with “the Choose Your Own Adventure stories a lot of today's college students read as a child.” Additional comments indicated a current display of the score and feedback at each step was better than only a summary of the game play at the end of the game.

“Does the game structure provide an engaging medium to review the skills of conflict
resolution? Was the experience enjoyable?"

Overall, the reviewers found the experience enjoyable and engaging. Many felt that real voices, or perhaps live actors, would be better for the characters. The author’s notes to reviewers did not indicate that the synthetic voices were merely meant for prototype purposes and would be changed in final product. One comment did indicate that the slow pace of the videos caused her to lose focus on the video. Another reviewer noted that the ability to replay the videos as beneficial for someone who might have missed what was said by the characters. A reviewer noted the advantage over live scenarios because “[s]ometimes the live scenarios go by so fast, and are so rushed that you don't have time to think as much about it as you should.”

“If this game were developed further, how would you see it used in your RA training programs? What other topics and needs could be addressed using this format?”

It was suggested that other topic areas for a game of this nature could include minor policy violations and discussions that did not require substantial background context. Additionally, it was suggested that a game of this nature could also serve as a pre-test prior to training so as to determine what existing experience an RA might have. One reviewer also felt that this method of training could have applications beyond the scope of RA training such as preparing new Teaching Assistants for classroom interactions.
CHAPTER V. SYNTHESIS

This final chapter will present the connections between the questions of the study and findings that stem from the development and evaluation of the game prototype. A reflection of the game evaluation and feedback will directly answer the primary research question. With the research questions answered, further research and application potentials are explored.

Reflection on Game Evaluation and Feedback

Both the feedback from the panel of reviewers and a comparison with Gee’s (2004) learning game principles indicated there was merit in using educational games for RA training. One concern throughout the design process was that a game of this nature would not be of interest in terms of playability and therefore suffered as an educational tool. The primary research question for this study was whether an educational game could serve as an effective means of RA training. While there were many improvements to be made, it seemed the approach of simple educational game modules was in fact viable as a means of training. When initially conceptualizing this project, a much more complicated game was devised. Those plans were heavily reduced to games that were simple, modular, and focused on one topic at a time. One possibility for future development would be to make a number of games in this format, all using the same characters. By playing each game, the RA could get more depth of experience that a more complicated game structure would have provided. This increased depth would also address limitations with regards to identity development and systems thinking. A complete product could, therefore, be a series of individual games each focused on one skill area but tied together using common themes and situations. The next logical step for research would be to develop a complete curriculum for RA training that included games as intentional programmatic elements.

Another direction for research would be to broaden the scope and determine where games
such as these could be used in similar situations. One of the reviewers commented that these games would be useful for preparing graduate level teaching assistants for common occurrences in the classroom. The same could apply for undergraduates who serve as peer facilitators in academic courses; often taking on responsibilities of an instructor but without any prior teaching experience.

The third question asked about the potential processes involved with creating an educational game. After completing the project, much was learned about the process but there is still much more to be studied. Further research would also be needed in refining the development of future games. The approach used for the prototype would differ significantly from a production quality product. As such, the cost, time, and resources for a polished game would be much higher. While something similar to the prototype could be reasonably created at the institutional level, a polished product would be best developed by a specialized third party. However, after reviewing the feedback, there might not be a need for a significant increase in quality. With some refinement, a game that fits the learning needs of RAs and is enjoyable might not require the development effort of a commercial game.

Conclusions

The intent of this project was to examine the potential for educational games in RA training and to develop a procedure for creating such a game. After reviewing the many different genres of video games, it was determined a simple narrative structure would provide the ideal medium for teaching and assessing skills that RAs typically learn in training. A proof-of-concept game was devised as a means of determining the usefulness of a narrative game in training. Subsequent review of the game by knowledge area experts and by the author using an existing game learning framework indicates that an educational game does certainly meet the needs of
RA training for basic skills. The application of the game was intended as a supplement to existing methods of skill review that followed other forms of instruction and limited in scope to certain skill sets such as light counseling, policy violations, and community issues. A learning game of this type would allow RAs to practice skills using a safe environment that provided concrete application of skills and helpful feedback. Further research would expand on this knowledge by developing an entire game-based curriculum, creating a more polished play experience, or applying this type of game learning to similar job areas such a peer facilitation and Teaching Assistant training. A next step would be to conduct play testing with a sample group and integrate the game into a real training program with pre- and post-game learning assessments.

It was discussed in the literature review that there is still much to be learned about the creation of educational games. The third research question focused on this process as it applied specifically to RA training. However some of the things learned about the development process could add to the existing body of knowledge in general. Also examined in the literature review was the developmental needs of college students and how RAs help to address those needs. Interpersonal interactions are one of the life skills that are mastered by college students and the resolution of conflicts directly reinforces that skill. The properly trained RA, therefore, is able to not only resolve individual conflicts but serves as a role-model and teacher for how conflicts can be resolved on a broader scale. With RAs serving as ad-hoc teachers in terms of college student development, it is essential that RA training prepare them for that responsibility.
REFERENCES


APPENDIX A. VIDEO DIALOG

The dialog for the videos was broken into the ten sequences listed in this appendix.

Sequence 1:

Josie: I’ve had enough of this! No matter how many times I’ve asked Megan to clean her side of our room it is always just as messy. You’re the RA, make her clean up!

Meghan: Josie just needs to chill out. My side of the room is not that bad but she keeps pestering me about it anyway. I have so much homework to do that I don’t always have time to clean up. Frankly she is just being rude and unreasonable. Maybe I should just move out.

Sequence 2:

Chris: Okay Josie, let’s start by you telling me what the situation is. Let’s try to focus on the actual problem and not bring in other issues.

Josie: Meghan always leaves the room messy. I try to keep my half and the shared parts clean but sometimes her stuff spills into those spaces too. She just doesn’t care that I need a clean space to study in.

Chris: For the time being, let’s set aside how you don’t think she cares. Describe Meghan’s actions and how they bother you.

Josie: Fine. I ask Meghan to clean up her stuff and she does for a day or two but then its messy again. When we did our roommate agreement, we agreed to keep the room clean. I can’t keep living like this!

Meghan: I feel like Josie is always nagging me to clean the room. I don’t think it’s that messy and I am often too busy to keep things pristine. Its not that I like being messy but there is only so much time in the day!
Sequence 3:

*In room with all three sitting in equal and neutral positions.*

Chris: Josie and Meghan, I’ve heard each of your sides and now I want us to discuss them together. Are both of you willing to follow some basic rules so that we can keep this discussion constructive?

Sequence 4:

Chris: Okay, now what I would like each of you to do is to describe to the other person what there actions are and how they make you feel. Describe the actions using the phrase: “When you do X, I feel Y”. Remember the rules we agreed on and don’t interrupt the other person.

Josie: Meghan, when you leave your stuff around the room and don’t clean up I feel that you don’t respect my need for a clean space to study. We agreed to have a clean room and you are breaking that agreement.

Meghan: Josie, when you keep saying that I’m messy, I feel frustrated because I don’t mean to be messy but I just don’t have time to clean up. It is important that I get homework and other tasks done and sometimes that means not being as neat as you want it.

Sequence 5:

Chris: It is important to make sure both sides are heard accurately. Meghan, would you summarize in your own words what Josie just said.

Meghan: Josie said that she needs a clean place to study and she feels I don’t respect that.

Josie: What I heard is that Meghan thinks I don’t respect how busy she is and that I am not being fair by expecting her to keep the room clean.

Chris: It seems that you both have made points that are valid. Are you willing to work together to resolve this issue?
Sequence 6:
Chris: Good. Now I suggest that you take turns cleaning the room every Saturday. This way it will be fair and the room will stay clean. You made an agreement to keep the room clean and you both need to follow that.

Sequence 7:
Chris: Okay, why don’t we brainstorm some ideas. What suggestions do you have about this?
Meghan: What if we each took turns cleaning the room once a week?
Josie: But what happens when you get busy? Maybe if we both cleaned the room every week and just got it over with.
Meghan: Since you have less things of your own why don’t you keep the common areas clean too.

Sequence 8:
Chris: I think we are making progress but that solution seems a little one-sided. Meghan, would you be willing to help out with some of the shared areas too.
Meghan: I guess we can each be responsible for our own things and then work together to do the dishes and take out the trash.
Josie: And I will try not to bother Meghan when she is busy doing homework. Josie10.aiff
Chris: Does this work for both of you?
Josie: I guess, but Meghan goes home a lot on weekends and I have meetings during the week.

Sequence 9:
Chris: What steps can you both take to hold each other accountable?
Meghan: What if we keep a calendar for each week. If I forget to do my share of cleaning one
week I’ll by her desert at dinner. If she bothers me during the week about my stuff, she can buy mine.

Josie: I can agree to that. We eat together a lot and it will be a good reminder for us.

Sequence 10:

Chris: I’m glad that we were able to reach an agreement. Now, let’s put this into writing and add it to the roommate agreement. I’ll give you a copy to post in the room and I’ll keep a copy.

Meghan and Josie shake hands.
APPENDIX B. GAME SCREEN CONTENT

The following are the text included on each page, the possible answers, and the feedback given to the player.

Page 1:

This game is intended to challenge your ability to mediate conflicts among residents. Use your knowledge to help a fellow RA with his first roommate conflict.

Watch the video to begin the story.

Page 2:

Two residents, Josie & Meghan, have gone to their RA, Chris, with a roommate conflict. Josie is mad at Meghan for being messy and Meghan is mad at Josie for being too picky and not giving her time to study.

Chris is a new RA and is still not sure what to do. Your job is to help Chris successfully mediate this dispute.

What is the first step to get this mediation started?

A1: Chris should sit both residents down right away and have them talk it out together.

A2: Chris should separate Josie and Meghan and talk with each one individually.

Feedback: Josie and Meghan seem pretty mad at each other. In some cases, mediation can begin right away. In this instance it might be better to let things cool off and meet with them separately.

Page 3:

Chris sits down with Josie and Meghan separately to hear their perspectives on the dispute. This gives them both time to cool off and Chris is better able to get a sense of what is going on. It's
important to listen carefully to what the core issues are.

Page 4:

Now that Chris has met with both residents separately, he will meet with them together. When setting up this meeting, what are some things Chris should keep in mind?

A1: Find a common area that is comfortable. Perhaps they can meet in the dinning hall.

A2: They should make sure to meet in a space that is neutral.

A3: Make sure everyone sits at an even level and so all participants in the discussion can see each other.

A4: When planning the meeting, allow enough time for a full discussion. Ensure that classes or meetings won't interrupt the process.

Feedback: While comfort is nice, the meeting should be held in a private location. Also, distractions such as food other other noises should be avoided when possible.

Meeting in the resident's room is okay but not ideal because it will be easy to get distracted. The best place to meet would be the RA's room or a conference room where the conversation can be kept private.

Keeping the parties neutral help to create an atmosphere for constructive discussion.

Being rushed for time can impede the conversation. Having to start from scratch again could offset progress that you made so far.

Page 5:

Chris has both Josie and Meghan meet in his room. Realizing these two roommates could quickly become argumentative, he decides the first step is to set some ground rules for the
What are some of the ground rules that should be set?

A1: There should be a set amount of time for the discussion.

A2: Listen to the other and avoid personal attacks.

A3: Both parties should start by listing off all the problems with the other person.

A4: Agree that what is said should remain private and mutual friends won't be brought into the dispute.

Feedback: The discussion should have enough time set to reach a conclusion but not be allowed to drag on indefinitely.

Focus on the issues and not the person. Using I-statements can help to keep the discussion focused.

The discussion should only focus on the specific issues and not involve other concerns.

The RA is a neutral 3rd party. Bringing friends and other residents into the situation will likely make things worse.

Page 6: Each person takes turns describing their concerns using I-statements.

It seems pretty clear that the roommate agreement is being broken by Meghan. This might be an open and shut case.

Should Chris tell Meghan to follow the agreement?

A1: The purpose of the roommate agreement is to set ground rules for living together. It is a
contract and needs to be enforced.

A2: While the roommate agreement is a contract and needs to be enforced it clearly isn't working out here. Chris should continue the discussion further to see what is really going on.

Feedback: Roommate agreements are meant to be guidelines and can change as the needs of the residents change. Enforcing a contract that isn't working won't resolve the core issues. More discussion is needed.

Page 7:

Chris knows that active listening is an important part of the process. To make sure that both Josie and Meghan are really listening to each other he has them summarize each other’s position.

It seems as if they are in agreement. Now it is time to begin the resolution process.

Page 8:

Chris seems to have a good idea of how to solve the problem.

Do you think Chris did the right thing by suggesting his solution?

A1: Yes, Chris' idea seems reasonable.

A2: No, Chris is the mediator and shouldn't be the one to give advice.

Feedback: While his advice might have worked, it's better to let the parties create their own solution if possible. This means that they will buy into the process and it is more likely to succeed.

Page 9:

Both Josie and Meghan brainstorm some solutions to the problem.

Meghan has a point, since Josie wants the room to be clean then it would make sense for her to
put forth more effort.

Do you agree with Meghan?

A1: Sure, that sounds like a good suggestion.

A2: Good suggestion but it seems there are better ideas.

Feedback: On the surface Meghan has a good suggestion but it seems pretty one-sided. In mediation, the ideal solution is one where both parties reach a fair solution.

Page 10:

Meghan and Josie continue to brainstorm and develop a solution that is more even for both of them.

However, it seems Josie is concerned that Meghan won't hold up her end of the agreement.

What can Chris to do help alleviate that concern?

A1: Chris could have Meghan and Josie agree on measures to hold each other accountable to maintaining their new agreement.

A2: As the RA, Chris can keep checking back and make sure the room is staying clean.

Feedback: When mediation participants are able to hold each other accountable it allows them to own both the solution and the success of that solution.

Page 11:

Chris asks Josie and Meghan to come up with some ideas for keeping each other accountable for the new agreement.

Page 12:
It looks like Josie and Meghan have resolved their conflict thanks to Chris. Way to go Mr. RA!

What final steps should Chris take as an RA?

A1: Formalize the new agreement in writing and have the residents add it as a part of their roommate agreement.

A2: Follow up with Josie and Meghan after a few weeks to see how the new agreement is working out. Suggest adjusting things if needed.

A3: Document this discussion with his supervisor as required. The documentation might also include a copy of the new agreement.

Feedback: If you selected all of these, you are correct. Good follow up is important to keeping an agreement intact.

Congratulations on helping Chris resolve this roommate conflict.
APPENDIX C. SURVEY INSTRUMENT

The following questions were included on the survey used to gather feedback from the expert reviewers. The survey included basic demographic information to establish the profession background of the reviewer and also confirmed that the reviewer consented to their comments being used as part of this document.

1. Name

2. Email Address

3. Institution

4. Professional Role/Position

5. What are your thoughts about the purpose stated for this game and the potential value to RA training?

6. Do the learning objectives reflect the assessment needs of mediation training? Does this game meet those learning objectives?

7. Is the general game structure understandable and useful to determining whether the learning objectives have been met?

8. Does the game structure provide an engaging medium to review the skills of conflict resolution? Was the experience enjoyable?

9. If this game were developed further, how would you see it used in your RA training programs? What other topics and needs could be addressed using this format?

10. You may use my comments and name in final thesis document. Reviewers will be acknowledged in the document and some quotes may be used. Only comments pertaining
to an area in which you have prior experience will be used.

[ ] Yes, you may use my feedback.

[ ] Yes but please do not quote me.

[ ] I prefer not to have my feedback included in the document.
APPENDIX D. GEE’S LEARNING GAME PRINCIPLES


EMPOWERED LEARNERS

Co-Design

Principle: Good learning requires that learners feel like active agents (producers) not just passive recipients (consumers).

Games: In good games, players feel that their actions and decisions—and not just or primarily the designers' actions and decisions—are co-creating the world they are in and the experiences they are having.

Example: Players' decisions in The Elder Scrolls: Morrowind shape the world and game play in such a way that the game becomes different for each different player.

Customize

Principle: Different styles of learning work better for different people. People cannot be agents of their own learning if they cannot make decisions about how their learning will work. At the same time, they should be able (and encouraged) to try new styles.

Games: Good games achieve this goal in one (or both) of two ways. In some games, players are able to customize the game play to fit their learning and playing styles. In others, the game is designed to allow different styles of learning and playing to work.

Example: Rise of Nations allows players to customize myriad aspects of the game play to their own styles, interests, and desires. Deus Ex and its sequel Deus Ex: Invisible War both allow quite different styles of play and, thus, learning, too, to succeed.

Identity

Principle: Deep learning requires an extended commitment and such a commitment is powerfully
recruited when people take on a new identity they value and in which they become heavily
invested—whether this be a child "being a scientist doing science" in a classroom or an adult
taking on a new role at work.

Games: Good games offer players identities that trigger a deep investment on the part of the
player. They achieve this goal in one of two ways. Some games offer a character so intriguing
that players want to inhabit the character and can readily project their own fantasies, desires, and
pleasures onto the character. Other games offer a relatively empty character whose traits the
player must determine, but in such a way that the player can create a deep and consequential life
history in the game world for the character.

Example: Metal Gear Solid offers a character (Solid Snake) that is so well developed that he is,
though largely formed by the game's designers, a magnet for player projections. Animal Crossing
and The Elder Scrolls: Morrowind offer, in different ways, blank-slate characters for which the
player can build a deeply involving life and history. On the other hand, an otherwise good game
like Freedom Fighters offer us characters that are both too anonymous and not changeable
enough by the player to trigger deep investment.

Manipulation

Principle: Cognitive research suggests that for humans perception and action are deeply inter-
connected. Thus, fine-grained action at a distance—for example, when a person is manipulating a
robot at a distance or watering a garden via a web cam on the Internet—causes humans to feel as if
their bodies and minds have stretched into a new space. More generally, humans feel expanded
and empowered when they can manipulate powerful tools in intricate ways that extend their area
of effectiveness.

Games: Computer and video games inherently involve action at a (albeit virtual) distance. The
more and better a player can manipulate a character, the more the player invests in the game world. Good games offer characters that the player can move intricately, effectively, and easily through the world. Beyond characters, good games offer the player intricate, effective, and easy manipulation of the world's objects, objects which become tools for carrying out the player's goals.

Example: Tomb Raider, Tom Clancy's Splinter Cell, and ICO allow such fine-grained and interesting manipulation of one's character that they achieve a strong effect of pulling the player into their worlds. Rise of Nations allows such effective control of buildings, landscapes, and whole armies as tools that the player feels like "god". Prince of Persia excels both in terms of character manipulation and in terms of everything in its environment serving as effective tools for player action.

PROBLEM SOLVING

Well-Order Problems

Principle: Given human creativity, if learners face problems early on that are too free-form or too complex, they often form creative hypotheses about how to solve these problems, but hypotheses that don't work well for later problems (even for simpler ones, let alone harder ones). They have been sent down a "garden path". The problems learners face early on are crucial and should be well-designed to lead them to solutions that work well, not just on these problems, but as aspects of the solutions to later, harder problems.

Games: Problems in good games are well ordered. In particular, early problems are designed to lead players to form good guesses about how to proceed when they face harder problems later on in the game. In this sense, earlier parts of a good game are always looking forward to later parts.

Example: Return to Castle Wolfenstein and Fatal Frame 2: Crimson Butterfly, though radically
different games, each do a good job of offering players problems that send them down fruitful paths for what they will face later in the game. They each prepare the player to get better and better at the game and to face more difficult challenges later in the game.

Pleasantly Frustrating

Principle: Learning works best when new challenges are pleasantly frustrating in the sense of being felt by learners to be at the outer edge of, but within, their "regime of competence". That is, these challenges feel hard, but doable. Furthermore, learners feel-and get evidence-that their effort is paying off in the sense that they can see, even when they fail, how and if they are making progress.

Games: Good games adjust challenges and give feedback in such a way that different players feel the game is challenging but doable and that their effort is paying off. Players get feedback that indicates whether they are on the right road for success later on and at the end of the game. When players lose to a boss, perhaps multiple times, they get feedback about the sort of progress they are making so that at least they know if and how they are moving in the right direction towards success.

Example: Ratchet and Clank: Going Commando, Halo, and Zone of the Enders: The Second Runner (which has different difficulty levels) manage to stay at a "doable", but challenging level for many different sorts of players. They also give good feedback about where the player's edge of competence is and how it is developing, as does Sonic Adventure 2 Battle.

Cycles of Expertise

Principle: Expertise is formed in any area by repeated cycles of learners practicing skills until they are nearly automatic, then having those skills fail in ways that cause the learners to have to think again and learn anew. Then they practice this new skill set to an automatic level of mastery
only to see it, too, eventually be challenged.

Games: Good games create and support the cycle of expertise, with cycles of extended practice, tests of mastery of that practice, then a new challenge, and then new extended practice. This is, in fact, part of what constitutes good pacing in a game.

Example: Ratchet and Clank: Going Commando, Final Fantasy X, Halo, and Pikmin do a good job of alternating fruitful practice and new challenges such that players sense their own growing sophistication, almost as an incremental curve, as the game progresses.

Information on Demand and “Just in Time”

Principle: Human beings are quite poor at using verbal information (i.e., words) when given lots of it out of context and before that can see how it applies in actual situations. They use verbal information best when it is given "just in time" (when they can put it to use) and "on demand" (when they feel they need it).

Games: Good games give verbal information-for example, the sorts of information that is often in a manual-"just in time" and "on demand" in a game. Players don't need to read a manual to start, but can use the manual as a reference after they have played a while and the game has already made much of the verbal information in the manual concrete through the player's experiences in the game.

Example: System Shock 2 spreads its manual out over the first few levels in little green kiosks that give players-if they want it-brief pieces of information that will soon thereafter be visually instantiated or put to use by the player. Enter the Matrix introduces new information into its "on demand" glossary when and as it becomes relevant and useable and marks it clearly as new. The first few levels of Goblin Commander: Unleash the Hoard allows the player to enact the information that would be in manual, step by step, and then the game seamlessly moves into
more challenging game play.

Fish Tanks

Principle: In the real world, a fish tank can be a little simplified eco-system that clearly displays some critical variables and their interactions that are otherwise obscured in the highly complex eco-system in the real world. Using the term metaphorically, fish tanks are good for learning: if we create simplified systems, stressing a few key variables and their interactions, learners who would otherwise be overwhelmed by a complex system (e.g., Newton's Laws of Motion operating in the real world) get to see some basic relationships at work and take the first steps towards their eventual mastery of the real system (e.g., they begin to know what to pay attention to).

Games: Fish tanks are stripped down versions of the game. Good games offer players fish tanks, either as tutorials or as their first level or two. Otherwise it can be difficult for newcomers to understand the game as a whole system, since the often can't see the forest because of the trees. Example: Rise of Nations' tutorial scenarios (like "Alfred the Great" or "The 100 Years War") are wonderful fish tanks, allowing the player to play scaled down versions of the game that render key elements and relationships salient.

Sandboxes

Principle: Sandboxes in the real world are safe havens for children that still look and feel like the real world. Using the term metaphorically, sandboxes are good for learning: if learners are put into a situation that feels like the real thing, but with risks and dangers greatly mitigated, they can learn well and still feel a sense of authenticity and accomplishment.

Games: Sandboxes are game play much like the real game, but where things cannot go too wrong too quickly or, perhaps, even at all. Good games offer players, either as tutorials or as
their first level or two, sandboxes. You can't expect newcomers to learn if they feel too much 
pressure, understand too little, and feel like failures.

Example: Rise of Nations' "Quick Start" tutorial is an excellent sandbox. You feel much more of 
the complexity of the whole game than you do in a fish tank, but risks and consequences are 
mitigated compared to the "real" game. The first level of System Shock 2 is a great example of a 
sandbox-exciting play where, in this case, things can't go wrong at all.

Skills as Strategies

Principle: There is a paradox involving skills: People don't like practicing skills out of context 
over and over again, since they find such skill practice meaningless, but, without lots of skill 
practice, they cannot really get any good at what they are trying to learn. People learn and 
practice skills best when they see a set of related skills as a strategy to accomplish goals they 
want to accomplish.

Games: In good games, players learn and practice skill packages as part and parcel of 
accomplishing things they need and want to accomplish. They see the skills first and foremost as 
a strategy for accomplishing a goal and only secondarily as a set of discrete skills.

Example: Games like Rise of Nations, Goblin Commander: Unleash the Hoard, and Pikmin all 
do a good job at getting players to learn skills while paying attention to the strategies these skills 
are used to pull off. Rise of Nations even has skill tests that package certain skills that go 
together, show clearly how they enact a strategy, and allow the player to practice them as a 
functional set. The training exercises (which are games in themselves) that come with the Metal 
Gear Solid and Metal Gear Solid: Sons of Liberty are excellent examples (and are great fish 
tanks, as well).
UNDERSTANDING
System Thinking

Principle: People learn skills, strategies, and ideas best when they see how they fit into an overall larger system to which they give meaning. In fact, any experience is enhanced when we understand how it fits into a larger meaningful whole.

Games: Good games help players see and understand how each of the elements in the game fit into the overall system of the game and its genre (type). Players get a feel for the "rules of the game"-that is, what works and what doesn't, how things go or don't go in this type of world.

Example: Games like Rise of Nations, Age of Mythology, Pikmin, Call of Duty, and Mafia give players a good feel for the overall world and game system they are in. They allow players to develop good intuitions about what works and about how what they are doing at the present moment fits into the trajectory of the game as a whole. Players come to have a good feel for and understanding of the genre of the game they are playing (and in Pikmin's case, this is a rather novel and hybrid genre).

Meaning As Action Image

Principle: Humans do not usually think through general definitions and logical principles. Rather, they think through experiences they have had. You don't think and reason about weddings on the basis of generalities, but in terms of the wedding you have been to and head about. It's your experiences that give weddings and the word "wedding' meaning(s).

Furthermore, for humans, words and concepts have their deepest meanings when they are clearly tied to action in the world.

Games: This is, of course, the heart and soul of computer and video games (though it is amazing how many educational games violate this principle). Even barely adequate games make the
meanings of words and concepts clear through experiences the player has and activities the
player carries out, not through lectures, talking heads, or generalities. Good games can achieve
marvelous effects here, making even philosophical points concretely realized in image and
action.
Example: Games like Star Wars: Knights of the Old Republic, Freedom Fighters, Mafia, Metal
of Honor: Allied Assault, and Operation Flashpoint: Cold War Crisis do a very good job at
making ideas (e.g., continuity with one's past self), ideologies (e.g., freedom fighters vs.
terrorists), identities (e.g., being a soldier) or events (e.g., the Normandy Invasion) concrete and
deeply embedded in experience and activity.