Establishing Guidelines to Convert a Classroom Train-the-Trainer Program into a Digital Game-Based Learning Format

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ABSTRACT

The following research reviews literature, applications, and elements of Digital Game-Based Learning. The need for the research arose from an organization that is facing the challenge of implementing a classroom facilitated Train-the-Trainer session. Time constraints and individual availability have restricted the implementation of this training session, and the leadership within the organization believes that retention and employee performance has been negatively effected. Due to the challenges of a classroom format, the organization determined that a Digital Game-Based Learning format would appropriately address their needs. This format presents task-based training and simulations that allow the learner to transfer job skills to real-world applications.

The study presents information regarding Digital Game-Based Learning and the structure, components and design elements that this organization must consider when converting an existing training program into a Digital Game-Based Learning format. The benefits and

limitations of Digital Game-Based learning are discussed and the researcher details current applications of DGBL.

Through the information obtained from this study, the researcher developed a guideline that is intended for the use of the organization when converting the current training program into the Digital Game-Based Learning Format. The guideline is intended to serve as a starting point for the conversion within this organization. Instructional design, game design and training elements are described throughout the results.

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Chapter I: Introduction

A large wholesale distribution company has been faced with the challenge of training select individuals to effectively conduct on-the-job training. The organization's established practices note that the minimum requirement for each on-the-job trainer is annual participation in a Train-the-Trainer session. This practice is not closely followed and a session has not been administered in over a year. Most of the organization's on-the-job trainers have not completed a Train-the-Trainer session. The lack of completion of this training session has created differences in each department's on-the-job training procedures. As a result, the leadership within the organization believes that retention and employee performance have been negatively affected.

When the Train-the-Trainer session is administered, the organization uses a curriculum by the National Institute for Occupational Health and Safety (Mallet, et al., 2005) and the session is facilitated in a classroom setting. The current training session is supposed to be offered on an annual basis, and is needed if new trainers are promoted or trainers leave the organization. The classroom Train-the-Trainer session is best facilitated with a minimum of four to six participants. The organization has on average seven on-the-job trainers and it is not possible for the organization to have all trainers in the same session at one time. The on-the-job trainers work directly in each department when they are not training a new employee, which limits the availability to attend a training session.

Leadership within the organization has inquired about the possibility of changing this session into a format that would offer a more timely solution for the on-the-job trainers. They would prefer a solution that allows new trainers to complete the necessary training immediately and independently. The solution must also be readily available for all current on-the-job trainers to take annually. The individual who is responsible for facilitation of this session has determined

that the Digital Game-Based Learning (DGBL) format can address these needs because of this format's ability to teach task-based content in a timely and independent alternative.

Statement of the Problem

The Digital Game-Based Learning format can offer many advantages to the organization, such as immediate, independent training availability and task-based training application. Current literature and research details the benefits and basic components of DGBL, but does not include specifications regarding the transfer of an existing training session into this format. As this training format is beginning to emerge, case studies and success ratios are limited. Since DGBL has never been used within this organization, the training individual must establish a method for converting the classroom session into this format, and determine what resources are needed to do so. This study establishes the guidelines to be used in the conversion.

Purpose of the Study

The purpose of this study is to establish a guideline for converting a classroom Train-the-Trainer session into a Digital Game-Based Learning format. The current training curriculum addresses the content and application of material for the learners. The current classroom facilitation method does not meet the need to have this session immediately available and does not allow for independent completion. The new training session must retain the content and application of material but must be immediately available to those that would typically go through the classroom session.

Digital Game-Based Learning has been determined to be the best format to present this training session. Through this format, the organization is able to present the current content in a timely, immediate and independent method. The content presented is based around the job tasks

of an on-the-job trainer and the context of this information can be easily simulated in a DGBL format.

The question that now presents itself is how to transfer that traditional training into Digital Game-Based Learning and further meet the needs of the organization and the learners. The research presents a guideline on how to convert the classroom Train-the-Trainer session into a DGBL format. The guideline that is detailed throughout this document may be used as a starting point for the conversion into DGBL.

Assumptions of the Study

This study assumes that the organization has the technological resources to convert the training initiative into a DGBL format, once the guidelines have been established. The conversion guidelines established through this research assume that the training participants have the necessary technical skills to complete a DGBL program. While the organization has approximately 450 employees, this study is focused on developing a training initiative that perhaps only 10% will eventually utilize throughout their career with the organization.

Definition of Terms

On-the-Job Training (OJT). Training that takes place in the workplace and is directly work-specific.

Serious Games. Games that are designed for a serious purpose, rather than just for entertainment.

Simulations. Games that are designed to imitate real scenarios.

Train-the-Trainer Session. A training session that teaches on-the-job trainers how to effectively conduct training.

Limitations of the Study

The study is limited to the focus of one organization and one particular training initiative. The technical aspects of game programming and development, along with software requirements, are limited in this research.

Chapter II: Literature Review

With the increase in technology and a shift in demographics of the workforce, organizations realize that developing their employees is still an important factor. These organizations are seeking different ways to accommodate the changing preferences and no longer rely solely on the method of facilitating training through a classroom setting.

This chapter examines the development and facilitation of training, including the benefits and limitations of training methods. Digital Game-Based Learning is defined, the components of DGBL are described, and the benefits are examined. The cost associated with DGBL, the current applications and a look at organizations that are currently using DGBL is further explored.

Training Development

As Tony Bray (2006) defines in his book *The Training Design Manual*, training is "any form of process designed to facilitate learning in the target audience" (p. 4). Designing training involves a structured process that has been given the generic name of ADDIE for each of the five phases of the process: analysis, design, development, implementation and evaluation (Carliner, 2003).

The analysis phase is aimed at understanding the nature of the problem you are trying to solve so that the training solution is appropriate (Combs & Peacocke, 2006). During the design phase, the course and training objectives are determined along with the training facilitation method and structure of the course. Through the development phase, content is determined and training material is developed. Once the previous stages have been completed, the training course now moves to implementation, which is then followed by the evaluation phase to determine whether the training has achieved the intended objectives (Carliner, 2003).

The delivery or facilitation of training can be described by three main categories: trainer-led, self-study or a blend of the two (Bray, 2006). These three categories all have their advantages and disadvantages. Though trainer-led courses provide an opportunity for participants to interact with each other and discuss questions or comments, this method can be costly and each trainee may have a different level of knowledge. The self-study option allows trainees to move at their own pace and acquire skills when they need them, but this method has a high drop-out rate. While a blended approach maximizes flexibility, this approach can be high in cost and time (Bray, 2006; Combs & Peacocke, 2006).

Within these facilitation methods, there are several ways of communicating the learning content within the training course. Carliner (2003) describes the five most common strategies as the classical approach, mastery learning, discovery learning, hands-on exercises and performance without instruction (p. 101).

The classic approach is best described as the instructor broadcasting the content through a form of lecture which works best for information that must be transmitted (Carliner, 2003). The mastery approach is best used when the learner must fully master the subject to successfully complete the job. This approach is simply stated as teach, demonstrate, and practice. The learner must continuously practice until the skill is mastered. Within discovery learning real-world experiences are used to allow the learner to 'discover' the key learning objectives. Hands-on exercises allow the learner to practice the skill with complex equipment or software. Performance without instruction can be described as providing the learner with the information but no actual instruction, such as a job aid. This method forces the learner to use the resource when needed.

While there are several elements of training design, facilitation and delivery, it is important that each training initiative address the appropriate gap in performance (Bray, 2006). Analyzing your learners and their knowledge, skills and abilities will ensure that you are addressing the initiative appropriately.

Defining Digital Game-Based Learning

Throughout history games have been used to teach memorable and lasting concepts. The positive impact of gaming is said to have first been recognized as far back as 3,000 years ago by military organizations (Powell, 2005). One might assume that games are most often used in the context of entertainment, and the power that games have to teach can often be overlooked. However, with the basic components of games being goals, rules, challenges and interactivity (*Game*, 2008), it seems natural that education and training professionals would use games to engage learners and further the learning process.

Adcock (2008) defines DGBL as learning from instructional games delivered via computer-based media. And now, as education and training professionals see the need to incorporate technology into their facilitation methods, the concept of Digital Game-Based Learning is coming to the forefront. Organizations are increasingly turning to DGBL as an alternative training method for material that is dry, boring or technical, subject matter that is difficult, audiences that are hard to reach, complex process understanding and strategy development and communication (Prensky, 2007, p. 20). This method of facilitation can play an important role in presenting material that needs to be learned but lacks motivational factors to do so.

As Van Eck (2006) describes, games are not effective because of what they are but because of what they embody and what learners do as they play them. When managed properly,

DGBL holds a great potential for educational applications through a combination of content and digital media (Deubel, 2006). Educational content with computer or online games holds the potential to teach almost any subject or skill. Through DGBL, many learning techniques can be presented such as practice and feedback, learning by doing, learning form mistakes, and discovery learning. As games can be a means for application of theory into practice, delivering content can be challenging (Corti, 2006). Training initiatives that are focused on delivering large amounts of information may be best suited for the classroom facilitation methods; however, DGBL is ideal for open-ended, task-based learning initiatives (Prensky, 2007, p.28) When the organization is focused on ensuring that the training is directly applied to the job and the learning elements are based on the job tasks, DGBL is a suitable alternative.

Components of Digital Game-Based Learning

The concept of DGBL and its potential in training is only beginning to be realized in the business context (Powell, 2005). In order to appreciate the effective use of DGBL, the components and structure of this training format must be understood. Prensky (2007, p. 119) provides a thorough description of the basic elements of games in his book *"Digital Game-Based Learning"*. He notes that the six key structural elements for games are:

1. Rules: rules impose limits and force us to take specific paths to reach goals ensuring that players take the same path.
2. Goals and Objectives: provides motivation, pushing the learner to achieve or win.
3. Outcomes and Feedback: measures the progress against goals. Feedback provides the positive or negative on what has been done in the game and is almost always immediate. Outcomes can be compared to simply winning or losing.

4. Conflict/Competition/Challenge/Opposition: problems in a game that the learner is trying to solve. This is anything that stands in the way of the learner's progress. Keeping this in synch with the learner's skills and progress is a key to the balance of the game.
5. Interaction: between the player and the game, or interaction with others that are also playing the game.
6. Representation or Story: signifying that the game is about something, abstract or concrete, direct or indirect.

As Prensky (2007, p 128) notes that these components are for games of all mediums, he further discusses that transferring games into DGBL provides a more responsive environment, better representations, differing levels of challenge and the ability to be customized to the learner. These elements offer organizations an environment for training initiatives that are not best suited for a classroom environment, such as task-based training and real-world simulations.

Through Corti's (2006) white paper "Game Based Learning: A Serious Business Application", he describes the elements of DGBL as follows:

- Games have realistic environments allowing the user to explore options
- Games have clearly defined rules, clear objectives and clear outcomes.
- They are adaptive and interactive.
- Games require a level of cognitive application from the user that exceeds reading text and then regurgitating facts.
- Games are also genuinely enjoyable, leading to improved attentiveness and positive feelings.

These components allow for DGBL to be used in a variety of corporate training purposes ranging from simple tasks to management skills ("How Employees Can 'Play'", 2007). Later in chapter 2, examples of how companies are harnessing this technology will be described.

As DGBL is all about combining the power of games to captivate the learner for a specific purpose (Corti, 2006), a balance between the needs of the curriculum and the structure of the game must be created in order for the intended outcomes to be achieved (Van Eck, 2006). Content must be established and integrated into this format for the best results. Since DGBL uses the principal of play for instructional strategies, having the right kind of content and context is vital to the success of achieving the learning objectives (Van Eck, 2006 & Billhardt & Kolb, 2008). Through the game *RollerCoaster Tycoon*, learners are required to manage and monitor business activities, and apply principles of engineering (Van Eck, 2006). Although this game does not cover instruction in all these areas, the content of the game allows the learner to apply previous instruction in a context that furthers the learning objectives.

When developing or deciding on how to integrate DGBL into training practices, several elements need to be considered. As with any training initiative, the learning outcomes are established and analyzed. The first requirement in understanding how to integrate the medium of DGBL is knowledge of what the learner needs to know in order to effectively interact with the game itself (Van Eck, 2006). As this concept is newly emerging into organizations, it is imperative to remember that not all learners have the same working knowledge of digital media. As Deubel (2006) describes, the choice to use DGBL must be made while keeping the needs of the learners in mind. Games should not take up too much time or replace certain types of training initiatives (LaMotta, 2008).

Adcock (2008) provided a closer look at the instructional designer's perspective stating that games provide an environment for problem solving, and a place for trial and error. Games offer challenge and feedback, creating a cycle of confusion which can lead to assimilation of knowledge. The game should be properly integrated into the lesson, with other learning activities that allow the learner to use the knowledge gained from the game. Choosing the right game for the right situation is the determining factor of effectiveness.

Training Benefits and Limitations of Digital Game-Based Learning

Digital Game-Based Learning is a powerful tool, when it goes beyond the enjoyment factor and can achieve the intended learning outcomes (Billhardt & Kolb, 2008). As much of the research has established DGBL as positive in the educational arena, proponents are now supporting this format throughout the corporate training field. As digital games provide deep engagement and offer motivation (Deubel, 2006), the learner is able to address visual, aural, read/write and kinesthetic preferences. Effective digital games can use a series of visual representations for the visual need, along with vocal narratives that address the aural need and text to address the read/write need. Although online learning has addressed these areas for years (Drago & Wagner, 2004), digital games are incorporating a more interactive method of training as well as the ability to address the kinesthetic needs. E-Learning, as is frequently implemented, does not provide the interactive, experiential level of learning that DGBL can provide (Corti, 2006). Most adult learners need and appreciate some form of "feedback" that informs them of their progress and, while losing can be disappointing, this form of feedback allows the learner to understand how to win (Billhardt & Kolb, 2008). The structure of DGBL allows for consistent feedback, where most common e-learning alternatives do not provide an adequate amount of feedback.

When considering DGBL in the education and training field, this technology offers the broad learning benefits of enabling customized learning, offering motivation, promoting long-term memory and transfer of learning to practical applications (Deubel, 2006). Digital games provide the immersive environment, providing motivation and a safe place for failure ("How Employees Can 'Play'", 2007). These games have the ability to keep employees interested longer than classroom training lectures, and still provide the opportunity to learn in a competitive and social environment.

Corti (2006) takes a closer look at some of the key potential benefits that DGBL has to offer:

- Performance improvement can be a direct result of appropriate DGBL relating to employee knowledge and skills
- Allows employees to understand the interdependence within an organization
- Realistic scenarios in DGBL can offer competency testing
- Evaluation of potential new hires using DGBL to test how well they perform in roles or situations
- DGBL has the potential to offer a high level of learner assessment
- Motivation and the possibility to overcome reluctance to training

As DGBL presents many benefits to the training field, the limitations must also be recognized. If structured improperly, the goals of the game may not be consistent with the goals of the training initiative (Deubel, 2006). DGBL should be used in conjunction with other learning or training activities, allowing the learner to use the knowledge gained through playing the game (Adcock, 2008). Classroom education and training still provides the focus on real, valuable discussions; while DGBL can offer simulations to assist in those discussions, it cannot

replace the element of face-to-face interaction (Powell, 2005).

Cost of DGBL

Throughout the last few years, the cost and complexity of developing DGBL has decreased (Leveckis & DiRomualdo, 2008). However since the impact of DGBL and the return on investment is hard to measure, organizations may be reluctant to implement this alternative.

Start-up costs can be small, starting from less than $100 for off-the-shelf solutions and more complex games with a technology partner don't have to go beyond five figures, quoted by Mark Oehlert in the article "How Employees Can 'Play' to Win at Learning" (2007). As the off-the-shelf alternative is the most cost effective, this approach involves taking existing games and integrating them into the learning initiative, however the topics may be limited and content can be inaccurate or incomplete (Van Eck, 2006).

The reality of the cost is explained in by LaMotta (2008) in her article "Gen Y's Corporate Games". Most programs may have a starting cost around $250,000; some companies may even spend millions of dollars creating DGBL. However this cost may not be higher than other training methods when considering the cost of hiring trainers, employee travel, training center cost and printing training material.

Digital Game-Based Learning Applications

The use of DGBL in training initiatives can be applied to a wide variety of subjects or issues. Financial management, sales training, marketing and project management training are all areas that have seen application of DGBL (Corti, 2006). These applications can be made to realistically represent the environment or system that is relevant to the learner in their career.

While the application of subject matter in DGBL can vary greatly, the type of game used in the application is also critical. Roughly, games can be categorized into action, adventure,

fighting, puzzle, role-playing, simulation, sports or strategy (Deubel, 2006 & Prensky, 2007, p. 130). Adventure game themes are often used to engage the learner in active and reflective thinking (Mohammed & Mohan, 2007). The major qualities of challenge, fantasy and curiosity are exemplified in this type, as well as other types of DGBL. Adventure games are recognized as one of the earliest computer games (Prensky, 2007, p. 130).

Leveckis and DiRomualdo (2008) provide an additional category of games, specifically pertaining to video games as multiplayer formats. This format can be applied to the categories listed above and has a tremendous potential in corporate learning because it allows for collaboration and competition among peers.

A Look at Current DGBL Implementations

As discussed earlier, the concept of DGBL is beginning to emerge and be recognized as a training format. Some organizations have already realized the impact and power DGBL can have on employees. A closer look at the organizations that have implemented DGBL can further the understanding of this concept.

Hilton Hotels integrated a program that is based off of the role-playing simulation concept to train employees on how to interact with guests and determine appropriate responses to the guest. The interactions in the game are determined by guest reactions and calculated against the existing hotel's standards (Salazar-Moreno, 2008). Through DGBL, Hilton Hotels was able to present a training alternative that offered the learner practical application that could not have been accomplished in the classroom. The ability to role-play and provide the learner with a customized situation and score allows for the immediate integration of information to the job task. Hilton Hotels is currently in a beta test of this interactive training, but a senior manager has noted that this program provides real-world interactions that a lecture cannot provide.

Organizations like Cold Stone Creamery and Quiznos have developed simulations to train their employees. The examples include an ice cream scooping game and a game that simulates building a submarine sandwich called SubCommandor ("How Employees Can 'Play'", 2007). These task-based games provide the employee with an opportunity to develop and master the skill before entering the job. Cold Stone Creamery has noted that this tool can be extremely helpful as a supplement to one-on-one training, citing that 25% of their employees had downloaded the game within the first week of release.

Billhardt & Kolb (2008) discuss the game that has been integrated into Harvard Business School, entitled The Global Supply Chain Management Simulation. This game provides real learning as players discover mistakes made in building a functioning global supply chain. The game uses humor while praising the player's performance and pointing out mistakes, allowing the learner to reflect without exposing the mistakes to peers or superiors. Through the explanation of the context of the situation, this game has been successful as learners are able to accept the deviation from reality.

Sun Microsystems uses a DGBL format to introduce new employees to their company and teach the employee about the company's history, values and structure. This game format allows the employee to acclimate to their new working environment as Sun Microsystems is a large technology and networking company (Billhardt & Kolb, 2008).

Further statistical examples provided by Billhardt & Kolb (2008) highlight evidence that DGBL can drive actual learning. One trainer who used a simulation based on Hollywood Squares saw a 34% increase in passing rates, while another study shows that students who played one simulation designed as part of an introductory business and technology course had an average test score of 91.5% and those who did not play averaged a score of 12.32%.

Summary

Digital Game-Based Learning offers an alternative format to the classroom training design that has traditionally been implemented within organizations. As the process of designing any training initiative requires consideration of the content and context of information, the training must appropriately address the gap in performance. When using DGBL in training, organizations must consider the limitations as well as the benefits. The organization involved in this study will experience the benefits of immediate and independent training created through the DGBL format. This format also offers advantages in teaching technical skills that can be used on the job. While this format addresses the learning styles of visual, aural, read/write and kinesthetic, it lacks the social interaction that the classroom format provides. This organization must consider how to address the interpersonal needs, along with personal feedback that can be achieved through classroom training.

Through the examination of current uses of DGBL, the literature provides solid examples of how other organizations are harnessing this alternative. While many of the examples highlight a variety of applications and teach various skills, there is a lack of information on how the organizations designed and structured the training into the overall goals of the organizations. A gap exists on the long-term learning transfer from DGBL into practical applications. Research states that DGBL can offer a simulation of real-world situations, but does not detail the further integration of the information into the actual real-world application.

The literature presented provides the foundation for the design of DGBL. Design and structural components of DGBL are presented in a thorough manner, allowing for the basic understanding of the design of this training format. There is a lack of information and literature

regarding current training sessions that have been transferred to the DGBL format, creating an opportunity for the research presented in this document.

Through the next chapters, the researcher takes a closer look at ways to apply the structure and components of DGBL mentioned in this chapter to the current training initiative of a Train-the-Trainer classroom course.

Chapter III: Methodology

The purpose of this study is to establish a guideline for converting a classroom Train-the-Trainer session into a Digital Game-Based Learning format. The current Train-the-Trainer session focuses on the application of on-the-job training tasks. Through instruction the learners are able to apply the content of the session to the real-world job situation. The focus of this training session relies on the practical application within the learner's job. DGBL offers the learning context that allows for the needed simulation of the task application.

The study results use existing data and principles of DGBL in conjunction with the established Train-the-Trainer program to determine the appropriate steps to convert it to DGBL format. The study identifies the elements of training that must be met, and clarifies standards for the training.

Data Required

By examining current research and design principles of Digital Game-Based Learning, the structure, components and design of DGBL were identified. By reviewing the current literature, the researcher was unable to find conversion practices for established classroom training sessions to the DGBL format. The literature provides a solid understanding of the components and structure of the design of DGBL, but does not offer the practical application of converting an established training program to this format.

Marc Prensky's "*Digital Game Based Learning*" (2007) was reviewed, along with research from Purdue University (2007) on DGBL design practices. Other articles and published research was used to validate Prensky's recommended principles, along with basic principles of instructional design.

Once the structure, components and elements of DGBL design and instructional design framework were identified the researcher then analyzed the current Train-the-Trainer program. This classroom-based Train-the-Trainer program relies on already established curriculum.

Digital Game-Based Learning Structure, Components and Design

In Marc Prensky's Digital Game-Based Learning (2007, p. 119), the author identifies the six structural factors of a game. These factors can easily relate to the structural design of training initiatives. The six factors are:

1. Rules
2. Goals and Objectives
3. Outcomes and Feedback
4. Conflict/Competition/Challenge/Opposition
5. Interaction
6. Representation/Story

These structural factors provide a broad understanding for game design. As each of these factors needs to be developed into greater detail, they serve as a starting point for comparison to the traditional classroom-based Train-the-Trainer program.

Prensky (2007, p. 133) further describes several principles of good game design. While these principles are general, they must be kept in mind when determining the direction of the DGBL initiative. Good game design is balanced, creative and focused. While good games can simply be clones of other games, its important that it presents something original, challenging but fair, and with little distraction from the content. The design must also contain tension, energy and character that provide the player with continued interest and intrigue.

Research provided by Purdue University (2007) describes design documentation requiring educational games to include instructional design, game design, art, programming, data analysis, and logistics. The research was developed by a subject matter expert, instructional designer and a game designer. As each one of these steps is crucial, this study presents information with the main focus of bridging instructional and game design from classroom-based training to game-based learning.

The first element of Purdue's instructional game design documentation describes the instructional design of the learning initiative. Since this study uses a training initiative that has sound instructional design, much of this area is already developed. However, it is important to understand the elements of this portion of game design, as they are similar to any training initiative's instructional design. The Purdue researchers describe the elements as follows:

- Audience analysis: the current skills of the learner and how those skills relate to the content
- Entry Behaviors: pre-requisite behaviors for the game; the player must have this knowledge prior to playing the game and it will not be covered in the game.
- Instructional goals: the broad goals that the training initiative, or game, intends to achieve.
- Instructional objectives: performance objectives, how they are measured, under what condition and minimum level of achievement.
- Assessment items: there must be an assessment for each learning objective, and each assessment should only test one learning objective. These assessments often map the learner to the next specific objective.

- Presentation strategy: with all the previous elements defined, the presentation can now be determined. For many games, presentation strategy drives the design, mechanics and narrative of the game.

When determining presentation strategy, it is important to consider the type of game that best suits your learner, organization and resource constraints.

Prensky (2007, p. 319) describes the types of games as simple question and answer games, off-the-shelf games, email games, game templates and custom games. The simple question and answer games can be easily designed and come in several formats. This format can be as simple or complex as the organization determines. The off the shelf games are already developed games and can often times be modified to include your particular content. While you have little control over the modes or determining game play, this option is appropriate when your content is easily inserted to the already developed game. Email games are simple and inexpensive. Often email games are structured by emailing the participant questions, quizzes or exercises that require their response and some measure of completion to progress in the game. Game templates provide the trainer with a structure and the trainer is then able to insert the content into the game. And the last type is defined as custom games. This format is the most time-consuming and costly as it involves a custom designed game for the organization. While many organizations do not have game programmers on staff, this alternative is often done by outside companies (Prensky, 2007).

The next step described in Purdue's (2007) research covers the actual game design. The first portion is the game concept, which includes game description, genre and platform. Through the instructional design phase, the presentation strategy should be identified in order to help

develop the game description. While the game description is very broad, this allows for an overview of the game.

Prensky (2007, p. 130) divides game genres into eight categories and notes that often the genres can overlap each other. The genres are identified as action games, adventure games, fighting, puzzle, role-playing, simulation, sport or strategy. In conjunction with the game description, the genre should be identified. The last element of the game concept is to determine what platform it should run on such as a PC, console or perhaps phone (Purdue, 2007).

The next portion of game design is identified as the game mechanics (Purdue, 2007). Core gameplay is described as the actions taken by the player and how they influence the game. Determining the modes or how many different settings will be available within the game follows the core gameplay. The game flow is then determined to show how the game will be organized, how the player will progress and where the assessments will be integrated. The characters and elements must be identified as well as how they contribute to the game.

User interface and game narrative conclude the game design portion of the instructional game design documentation (Purdue, 2007). The screens, menus and functionality of the interface should be identified. The narrative is essential for the engagement of the player.

Sections 3 and 4 of Purdue's (2007) documentation describe the art and programming portion. The art portion includes the user interface appearance including color scheme, resolution and fonts. This also includes what the game elements should look like and the sounds or music included in the game. The programming portion details all technical requirements of the game.

While the programming portion of game design is crucial, Prensky (2007, p. 319) describes five categories of games that are available to organizations: simple question and answer games, off-the-shelf games, email games, game templates and custom games. As

previously mentioned, the presentation strategy should identify the type of game. Each of these categories requires different levels of programming.

The last elements of game design documentation should include the instructional data analysis and the logistics of the game (Purdue, 2007). The design must provide data that can be analyzed to determine the effectiveness of the game. The logistics must include who contributes or participates throughout the process and implementation of the game design.

Instructional Design

When researching the principles of instructional design, Robert Gagne's (1985) 9 steps of instruction provide a framework for presenting learning material. These nine steps are used by the researcher in conjunction with the current curriculum to ensure that the new learning method achieves and follows the proper steps of instruction. The nine steps are as follows:

1. Gain attention: grab the learner's attention so that they will remain interested in the learning objectives.
2. Inform learner of objective: state what the learner will be able to accomplish and how they will use the knowledge.
3. Stimulate recall of prior knowledge: it allows the learner to build on what they already know.
4. Present the material: content should be organized meaningfully, and typically explained then demonstrated.
5. Provide guidance for learning: instructions on how to learn the content
6. Elicit performance: let the learner do something with the new knowledge
7. Provide feedback: analyze the learner's behavior and provide specific and immediate feedback.

8. Assess performance: test or measure whether the lesson has been learned.

9. Enhance retention and transfer: review the lesson, provide additional practice or put the learner in a transfer situation.

Train-the-Trainer Structure and Objectives

The current course is set up into 6 sections, comprised of learning objectives in each section. The objectives are currently met through a combination of lecture, discussion and hands-on activities.

The first unit details coaching and includes self-assessments relating to coaching readiness and defining the characteristics of a coach. The objectives are achieved by discussion on coaching, completing an independent activity to identify positive and negative characteristics of coaches and the completion of a personal assessment.

The second unit's objectives are for the learner to demonstrate an understanding of the coach/trainee relationship, demonstrate good communication skills and describe the roles of a coach, trainee, supervisor and company.

The structure of the third unit includes a higher level of activities and learner participation than the first two units. The objectives are intended to cover demonstrations on how adults learn, effective coaching, effective assessment and completing a coaching checklist.

Building on the knowledge of the first three units, the fourth chapter engages the learner in the activity of building a training outline from a scenario provided in the material. The assessment of this task is provided simply by group discussion and evaluation.

Both objectives in unit five involve demonstrating skills within the classroom setting. The learner is to first use the principles of adult learning in an exercise, then use role playing to

demonstrate coaching skills. The performance of this activity is measured by the participants in the class.

The final unit provides a wrap-up of the information presented in the previous units. The main objective in this unit is to evaluate the training and learning that occurred through this course. This is achieved through discussion and individual completion of a course evaluation.

Methods

1. The first step that the researcher completed was a review of literature regarding the structure, components and design practices relating to DGBL, along with a review of instructional design principles.
2. The data was gathered and compiled to identify the elements and guidelines of DGBL.
3. The current curriculum was then analyzed to identify the structure and learning objectives of the course.
4. The researcher used the information obtained from the current curriculum to identify what elements transfer into the DGBL format and what other elements must be addressed.

Through this process, the researcher was able to establish guidelines that will assist with the transfer of this training program into a DGBL format. The established curriculum provides the organization with the development, design, implementation and evaluation aspects of this classroom format. By using this data, the researcher was able to combine the researched structure, components and design principles with the curriculum to establish a guideline for the transfer into DGBL format.

Chapter IV: Results

The purpose of this study is to establish a guideline on how to convert a classroom Train-the-Trainer session into a Digital Game-Based Learning format. The organization that has requested this data faces the challenge of implementing a classroom Train-the-Trainer session due to time and availability of employees. The organization needs a format that addresses the need for immediate availability, along with independent completion. The structure of DGBL also offers the opportunity for task-based training that this training session is based on. Leadership, along with the individual responsible for developing and delivering training, have chosen the DGBL format to address their needs.

The researcher developed the guidelines by examining and reviewing literature regarding the structure, components and design relating to DGBL and instructional design. Once these elements were identified, the researcher examined the structure of the current curriculum and facilitation guide for the Train-the-Trainer session developed by the National Institute of Occupational Health and Safety (Mallet, et al., 2005). The information obtained from the current curriculum, in combination with the elements from the established literature and design principles were used to form guidelines to be used in the conversion of this training program.

Conversion Guidelines

With the previously described data, the researcher combined the necessary elements to establish a guideline or template for the conversion of an already established curriculum to a Digital Game-Based Learning format (Appendix A). The researcher has contributed a portion of the information needed into the guideline.

The guideline developed separates the conversion and design of DGBL into 6 major sections: overview, description of each unit, game mechanics, art and programming, data analysis and logistics.

The overview section contains the basics of the plan. The first field states the current course name, followed by the name of the game. While the name of the game can be the same as the course, it is important to appeal to the learner and present an intriguing name. The audience analysis describes the current skills that the learner has, and the entry behaviors should note any knowledge needed that will not be covered in the game. Rules of the game set limits and ensure that the learner progresses accurately through the game. Rules can change and be developed throughout the game design process. The presentation strategy details how the game is presented to the learner. This area should note what type of game is used (simple question and answer games, off-the-shelf games, email games, game templates and custom games) and a general description of the presentation. The game concept portion further details the description of the game, genre and platform.

The next portion of the guideline lists each unit. As the unit is broken down, the current classroom learning objectives are listed. Those objectives should then be converted into a game objective. While these are similar, it is important to consider how the game can achieve the objective in a game format. The measurement or achievement of the objective must be determined, along with the minimum achievement that is allowable to progress to the next unit. The unit is further broken down into Gagne's (1985) nine instructional steps. This provides a framework in the development of the unit.

The game mechanics section details three areas of the game including the actions, modes and flow. The actions that the player is able to take consistently throughout the game need to be

identified. The different modes of play include the different settings that the player will encounter. The flow of the game determines how the player will progress through the game.

The section that details the arts and programming of the game should include what type of interface each section contains the elements in that section, the music and sound and who will be doing the programming or how the programming will occur. This element is also directly linked to the type of game the organization has chosen. If the organization determines that an off-the-shelf game is appropriate, the programming could be minimal.

The data analysis is described as what the organization will do with the information obtained through the game. It may certify the employee in that area, or possibly determine advancement or promotion, or the organization may chose to use the information in a different way.

The logistics section should list all involved parties with regards to the design, implementation and evaluation of the learning initiative. List the party, their capacity or particular responsibility to the process, and a tentative timeline.

As this guideline was developed to assist in the conversion of an established curriculum into a digital game-based format, it is essential to remember that through the development phase each section may be altered to address the needs of the course. The research provided is intended as a starting point for the conversion while providing game-related elements that must be considered.

Through the final chapter the limitations of the research will be discussed. The researcher will provide conclusions and recommendations for further research and application of the subject matter.

Chapter V: Discussion

Through research of established literature and developed curriculum, conversion guidelines were established for how to transfer a classroom Train-the-Trainer program into a Digital Game-Based Learning format. The current situation that an organization is facing presented a challenge for administering the classroom-facilitated training session. Because of this challenge, the DGBL format was chosen as an alternative. The researcher presented literature relating to DGBL, as well as other elements of training design and implementation. In combination with the literature reviewed, instructional design elements and the elements of game design, guidelines were established.

Limitations

As this research is intended for the direct use of the Train-the-Trainer course that was established by the National Institute for Occupational Health and Safety, the study is limited to the structure of that course. This study is also limited to the general use within one organization. The research provided does not detail the technical aspects of game development including programming or software requirements.

Conclusions

Digital Game-Based Learning is emerging as a widely accepted training alternative. It is important that organizations consider the implications of using DGBL. While most organizations realize the value of training their employees, the return on training investment is hard to measure and validate. Training departments are forced to work within the means of the resources available and determine training approaches as necessary. By understanding the potential that DGBL can have for employee training, organizations will be able to embrace and incorporate this technology in the future of their training programs.

As DGBL, e-Learning and other technological training methods have been developed, it is vital that the organization also acknowledges what these methods do not provide for the learner. Training departments must be aware that through technology and learning alternatives, learners often miss out on the social learning aspect and the interpersonal skills that accompany classroom training sessions. The organization must be ready to balance these needs with the technological opportunities in order to accommodate the development of their employees.

Currently, a large amount of research exists on the concept and benefits of DGBL; however, there seems to be a lack of research with respect to a training department's ability to develop or transfer existing programs into this format. Is this training method strictly limited to the development by game programmers and designers, or is there a future within training departments to be able to develop their own DGBL? Will the training profession need to balance their knowledge and skills in the area of classroom training development with the ability to design and delivery training in various mediums?

As much of the literature argues a case for games as learning tools and the benefits, objective information and research on the transfer of training into workplace performance needs to be further developed. Research indicates that DGBL has tremendous power in creating simulations or teaching concepts, but the research does not indicate the length of retention of those concepts. Will organizations be forced to consider a regular completion of games to encourage the transfer of the skills into practical applications? Or will one game session create enough knowledge for the learner to apply the information in the rest of their career?

This research provides a starting point for converting a classroom-based training curriculum into a DGBL. The conversion guidelines do not address the technical specifications of the game. The technical specifications of converting a training session into DGBL should not

be taken for granted and will consume a large part of the process. Organizations must be willing to commit to the long term nature of a conversion. Research must be completed on the transfer of the learning objectives from DGBL into the practical application within the workplace.

Digital Game-Based Learning can provide an alternative that meets the specific needs of an organization's training needs. The ability to address the visual, aural, read/write and kinesthetic learning styles is evident through this format. This format is also most appropriate when teaching job tasks or simulating skills that are to be applied on the job, but lacks the ability to teach large portions of content. Other disadvantages of DGBL are still yet to be fully discovered, but will be directly related to interpersonal communication and the social development that is inherent in a classroom training session. Through these implications, organizations will need to fully understand each training alternative that is implemented.

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Appendix A: Digital Game-Based Learning Conversion Guidelines

Conversion of Classroom Based Training into Digital Game Based Learning

Overview

Name of Course:	Coaching Skills for On-The-Job Trainers
Name of Game:	
Audience Analysis:	
Entry Behaviors:	
Rules:	
Presentation Strategy:	
Game Concept:	Description:
	Genre:
	Platform:

Unit 1: What is a coach?

Classroom Training Objective	Game Objective	Measurement / Assessment	Minimum Achievement
• Self-assess individual readiness for coaching • Articulate the definition and characteristics of a coach			

Unit 1 Instructional Steps:	**Method:**
1. Gain Attention	
2. Inform Learner of Objectives	
3. Stimulate recall of prior knowledge	
4. Present material/content	
5. Provide guidance for learning	
6. Elicit Performance	
7. Provide Feedback	

8. Assess Performance	
9. Enhance retention and transfer	

Unit 2: The coach/trainee relationship

Classroom Training Objective	Game Objective	Measurement / Assessment	Minimum Achievement
• Demonstrate the understanding of the coach/trainee relationship • Demonstrate good communication skills • Demonstrate the role of the coach, trainee, supervisor and company			

Unit 2 Instructional Steps:	Method:
1. Gain Attention	
2. Inform Learner of Objectives	
3. Stimulate recall of prior knowledge	
4. Present material/content	
5. Provide guidance for learning	
6. Elicit Performance	
7. Provide Feedback	
8. Assess Performance	
9. Enhance retention and transfer	

Unit 3: Coaching Adults

Classroom Training Objective	Game Objective	Measurement / Assessment	Minimum Achievement
• Demonstrate understanding of how adults learn • Demonstrate understanding of effective coaching • Demonstrate understanding of effective assessment in the learning process			

• Demonstrate how to complete a coaching checklist			

Unit 3 Instructional Steps:	**Method:**
1. Gain Attention	
2. Inform Learner of Objectives	
3. Stimulate recall of prior knowledge	
4. Present material/content	
5. Provide guidance for learning	
6. Elicit Performance	
7. Provide Feedback	
8. Assess Performance	
9. Enhance retention and transfer	

Unit 4: Preparing a Training Outline

Classroom Training Objective	**Game Objective**	**Measurement / Assessment**	**Minimum Achievement**
• Demonstrate the ability to prepare a training outline			

Unit 4 Instructional Steps:	**Method:**
1. Gain Attention	
2. Inform Learner of Objectives	
3. Stimulate recall of prior knowledge	
4. Present material/content	
5. Provide guidance for learning	
6. Elicit Performance	
7. Provide Feedback	
8. Assess Performance	
9. Enhance retention and transfer	

Unit 5: Coaching Practice

Classroom Training Objective	**Game Objective**	**Measurement / Assessment**	**Minimum Achievement**
• Demonstrate skill by using the principles of adult learning • Demonstrate coaching skills			

through role playing			

Unit 5 Instructional Steps:	Method:
1. Gain Attention	
2. Inform Learner of Objectives	
3. Stimulate recall of prior knowledge	
4. Present material/content	
5. Provide guidance for learning	
6. Elicit Performance	
7. Provide Feedback	
8. Assess Performance	
9. Enhance retention and transfer	

Unit 6: Wrap-up

Classroom Training Objective	Game Objective	Measurement / Assessment	Minimum Achievement
• Evaluate the training course through review and course evaluation			

Unit 6 Instructional Steps:	Method:
1. Gain Attention	
2. Inform Learner of Objectives	
3. Stimulate recall of prior knowledge	
4. Present material/content	
5. Provide guidance for learning	
6. Elicit Performance	
7. Provide Feedback	
8. Assess Performance	
9. Enhance retention and transfer	

Game Mechanics

Actions:	
Modes:	
Flow:	

Art & Programming

Unit	Interface	Elements	Music/Sounds	Programming
1				
2				
3				
4				
5				
6				

Data Analysis:		
Logistics		
Contributor	Capacity	Timeframe