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Analyzing Commercial Video Game Instruction through the Lens of Instructional Design

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Abstract. This paper will examine how Gagne's Nine Events of Instruction (1992) may appear, perhaps inadvertently, within commercial games that guide the user from novice to expert player. By employing a qualitative artifact analysis methodology, we examine a popular action adventure video game to determine if game designers encourage players to build game expertise by employing similar events to Gagne's instructional design model. We demonstrate that our artifact of analysis does consistently employ Gagne's events, though often in a manner unique to a digitally mediated space. We conclude that an experiential game setting has the potential to be a platform for instructional delivery.

Keywords: Instructional Design, Gagne's Events of Instruction, Video Games, Digital Media, Game Design.

According to Pew Research Center, 97% American teens ages 12-17 play some kind of video game (Lenhart, Kahne, Middaugh, Macgill, Evans, & Vitak, 2008). In the last year, the global market for games was $67 billion in annual sales (Gaudiosi, 2012) making this the most profitable form of media being consumed today. In comparison, total movie sales ($10.9 billion) and music sales ($16.5 billion), combined, make up less than half of video gaming revenues (Germain, 2012; Collett-White, 2012). Games are *the* new media and will continue to grow as a media as production and resources follow consumption.

Games require action on the part of the consumer. To 'play' any game, first the user must learn the digital world, challenges, narratives, and semiotic system. In essence, players must be constant learners; learning is intertwined with the actions of the game (Gee, 2003). Game designers seem to have generated compelling environments that encourage game mastery as an outgrowth of play. We suggest that by identifying play activities that facilitate learning and relating them to an established instructional design framework, we can reinvigorate an instructional design staple and perhaps discover insights to exploit game environments for more traditional instructional goals.

For the purpose of this paper, we define play as a voluntary activity that is intrinsically motivating and is largely driven by endogenous goals and choices that can have a make-believe quality (Rieber, 1996). Digital gaming media encourages informal learning of complex game goals through play. Extending lessons garnered from achieving game goals to learning objectives not specifically and solely designed for entertainment is a significant challenge to education.

Csikszentmihalyi and Bennett (1971) state, "Play is action generating action: a unified experience flowing from one moment to the next in contradistinction to our otherwise disjointed everyday experiences" (p. 45). This idea of *flow,* according to Csikszentmihalyi (2008), is what provides us with the motivation to continue participating in an activity. Games often have these flow features and players can loose track of time

easily while playing a good game (Betrus, Beissinger, Casperson, & Yoonsin, 2010). Multidisciplinary research in the areas of psychology, education, and anthropology suggest that this kind of engagement can be a powerful force for learning in children and adults (Hirumi, Appelman, Rieber, & Van Eck, 2010). The question remains—as more and more youth are turning to gaming media as their media of choice, what have game designers learned to make games so engaging and is it possible for those elements to be used for educational purposes?

Game designers over the last few years have harnessed *flow* to engage players even in *play* that involves rigorous critical thinking, quick response times, strategy, and continuous use of a series of sophisticated actions. This behavior looks less like schoolyard *play*, and much more like the intense, 'lean-forward', activity where experts enjoy their work despite the *grit* (cf. Gee, 2011) needed to accomplish goals. We assert that games use specific strategies that fit within Gagne's Events of Instruction model, and yet, uniquely, demonstrate how these events can be interpreted to encourage interaction and involvement across media. In recent years, some educators have embraced play in instruction for periods of time, hoping that it would provide motivation for continued learning by more traditional methods (Rieber, 1996).

There are some tasks commonly found in games that create *flow* and encourage *play* and, perhaps, those approaches can inform broader, more traditional instructional activities. While the argument can be made that commercial games are not designed for learning, their success is reliant on the game's ability to effectively teach players how to play the game. Expert levels of play require complete and total mastery of the subject area of the game, game mechanics, and external tools and social resources for display and collaboration with other experts (Steinkuehler & Duncan, 2008). Progress through gaming media requires that players master a steady stream of new challenges and elements that push what they have learned, but still require past mastery (Gee, 2003). Researchers and educators are quick to point out that these learning tasks are often selected as a means to a specific end: improve game play (Moore & Hsiao, 2012). They do not involve transfer of knowledge or application in settings beyond gamespace (Wainess, Kerr, & Koenig, 2011). However, it is difficult to overlook the potential that *play* combined with Csikszentmihalyi's *flow* can have on instruction.

Events of Instruction

Gagne defines instruction as, "a deliberately arranged set of events designed to support internal learning processes," (Gagne, Briggs & Wager, 1992, p.11). He goes on to say that the nine Events of Instruction are intended to be "these external events that are being considered, chosen and represented in the communications and other stimulation offered to the learner. Their purpose is to bring about the kinds of internal processing that will lead to rapid, obstacle free learning" (p.11). If this is the case, and we see this kind of learning as a feature in digital gaming, than we would expect to find that games employ the events effectively, even if they use novel strategies to do so.

Gagne's events are not intended to be a rigid sequential list of requirements but rather as a recursive tool that can be used out of sequence and with varying frequency throughout the instruction process (Hirumi et al., 2010). The events are designed to be adoptable and malleable to any instructional setting.

As an educational psychologist, Gagne sought to stipulate the typical instructional events needed for effective learning to take place, which provides us with a systematic 'checklist' of key design steps to consolidate the instructional design and delivery process (Good & Brophy, 1990). While Gagne's seminal work in this area did not account for the new media resources and tools for instruction that are emerging today, these nine events, listed below, are still used and relevant for instructional designers within digital settings. Moreover, they should still apply in new media settings.

By examining emergent game design through the lens of Gagne's Events of Instruction, our intent is to not only confirm that these events are still relevant in digital media, but also to explore if game designers are abandoning, adding to, or complementing these events in interesting ways. Becker (2008) postulated that game elements can directly and indirectly embody all elements in Gagne's Nine Events of Instruction. By using the commercial game *Phoenix Wright: Ace Attorney,*

Gagne's Nine Events of Instruction

1. Gain Attention
2. Inform of Objectives
3. Stimulate Recall
4. Present Stimulus/Lesson
5. Provide Learner Guidance
6. Elicit Performance
7. Provide Feedback
8. Assess Performance
9. Retention and Transfer

Figure 1. Gagne's Nine Events of Instruction (Gagne, Wager & Briggs, 1992).

Becker (2008) argued that games are a medium that is potentially apt for the implementation of many classic instructional models, yet the models may be *embedded* in the ongoing play of the game. Further, Gunter, Kenny, and Vick (2006) suggest that in non-educational games, event three (stimulate recall) and event nine (retention and transfer) are often non-existent, but the remaining seven events share numerous commonalities with the principle components traditionally seen in game design.

We propose that a deeper method of artifact analysis will demonstrate that all of Gagne's events are evident, however these events may be embedded in the game-play throughout the game.

Methods

This study uses artifact analysis methodology to explore the alignment with commercial games with instructional design principles. Artifact analysis is an unobtrusive method to collect information of interest that provides rich and thick descriptions of the artifact of interest (Norum, 2008). We modified Norum's methods for artifact analysis to use Gagne's Events of Instruction as the theoretical framework for analysis of a gaming media artifact.

For a compelling study, we sought a gaming media artifact that would be generally accepted as both relevant within the user market, or a 'successful' game, and is regarded as a challenging game or one with a complex semiotic system for players to master. After reviewing the top selling 50 games, we purposefully chose *Batman: Arkham Asylum* due to strong sales, recognition as for its critical acclaim and various nominations and awards including Game of the Year (Gaskill, 2010). We also enjoyed a lower cost to researchers due to its 2009 publish date and subsequent sequels. *Batman* requires forty to eighty hours of game play to complete the primary objectives of the game; includes multiple play goals (story, action, exploration, and achievement); and requires players to use progressively complex strategies to overcome in-game challenges. Finally, *Batman* is a commonly known brand and as such can be expected to meet the commonly held expectations of the genre. Participatory fans, like those surrounding the *Batman* franchise, will often extend play, repeat play, build machinima, explore other media, and/or participate in online social networks outside of this time (Jenkins, 2009) to expand their interactions with the brand.

Our analytic process treated the game Batman as the target artifact for examination of both content analysis and constructed semiotic meaning. Though artifact analysis can vary, and it's findings are unique to the single artifact, Norum's (2008) approach to artifact analysis allowed us to gather a thick description of the media with a focus on learning designs included to teach the player the game itself. Norum outlines an iterative process to "infer meaning and make judgements" (p. 24) between researchers by: 1) determining elements of the artifact of interest, 2) applying appropriate questions to the nature of the artifact, 3) identifying themes and patterns, and 4) relating the artifact to the focus of the research.

A digital game is not entirely text, nor is it entirely symbolic so we organized our analysis of the artifact to include text, audio, interface design, and symbolic representations appropriate to the media. Any combination of these delivered media, designed to instruct or guide the player, was coded as an element. For instance an element could be an effort to direct a player to press a particular button. This may be announced with a combination of an arrow pointing at a button, pulsing lightning around the button, text on the button and across the middle of the screen, and a 'ding' sound announcing the need to press the button.

Elements were first experienced by the research team as individual learning elements. The team then met to make judgments to identify all of the parts that made the designed element instructional. We asked questions, modified from Norum (2008), for digital media from the analysis process: What constitutes the designed features of this element? How is it structured? When/how does it appear to the player? Does play affect the appearance of the element (player activated)? What is overtly shown? What is absent? What does this mean to the player? What is the context of this element?

Next we identified themes, patterns, and common symbols used repeatedly by the game designers across elements. We then reviewed each learning element and coded them using Gagne's Events of Instruction with rich descriptions explaining how they effectively instruct the player via the digital experience. Finally, the team reviewed elements and chose exemplars to share in the findings below that would illustrate instructional design elements used in the game that could be used in other digital media contexts.

Analysis began with the research team *playing* the game itself for over 160 combined hours (requiring assistance from veteran gamers to finish). During our initial play, we maintained collective journals of observations and specific examples of instructional design embedded in the game itself. After a full play-through of the game, we returned to the *first hour of play* and collectively replayed it 19 more times. This first hour is the core instructional part of the game. The instructional objectives are to establish player understanding of the controls, core game mechanics, usable tools, play-mode

options, and introduce feedback and trophies for both novice and expert play.

After individual game play, researchers gathered for analysis of the data on a weekly basis over a three-month period. Progressively, all data was operationalized to identify the Events of Instruction; evaluate coherence of framework in digital media; conduct a cultural analysis of the artifact; and interpret application and use of instructional design events. Data points were limited to observations that could be identified and shown in the artifact itself (using a screenshot, award, or completed sequence of play). Final working of the data included identification of clear and compelling points to illustrate digital instructional design. Data was sorted into nine themes that mirror the Events of Instruction.

Findings—Organized According to Gagne's Principles

Gain Attention

Batman: Arkham Asylum makes extensive use of Gagne's first principle of instruction, which is to gain the attention of the learner. In addition to using sound production to gain immediate attention, *Batman: Arkham Asylum* employs a system of cinematic cutscenes to introduce new tasks or sections of the game. These cutscenes use three dimensional rendering and professional voice acting to create an immersive experience. Cutscenes orient the player to the next task that will be required of them and express both the narrative and challenge the player will face. Movie or cutscenes require minimal skill from the player, unlike actual gameplay, watching a cutscene requires no manipulation of controls, yet often clues to successful play are embedded in the narrative presented.

A movie is used to gain attention and orient the learner at the beginning and at key checkpoints throughout the experience. After some guidance on how to move the avatar (Batman) through the space, the player is left with directives from non-player characters to chase down the Joker and protect Gotham from a full breakout crisis.

This scene progresses in player perspective to effectively 'zoom in' on playing *Batman*. First players see the world, then hear the news, then cut to a shot of the Batmobile, then the game places the camera in an over-the-shoulder (typical in action games) perspective that cues the player that they *are* Batman. Along with cinematic 'zooming', the sequence clarifies the objective, the role, and gives clear direction to continue down an elevator shaft to hunt the Joker.

Inform of Objectives

When it comes to describing the goals of the game, *Batman: Arkham Asylum* uses expository story telling interspersed with player controlled progressions. The game alternates between cinematic cut scenes and basic movement training. To advance the introductory sequences, the player must master the controls and skills of Batman the character. Narrative is played out during the cutscenes and the player is given a narrative story in which to frame objectives and new key characters. These help to clarify actions that he or she is expected to learn or problems that he or she expects to solve.

Narrative delivery is seen in one of the early cutscenes with the Joker. After entering the Asylum, the Joker escapes and taunts Batman with the main objective of the game, "I'm getting bored of you, why don't you come and find me?" Another example of this is also seen in the cutscene where the player is expected to learn how to use the detective mode. The player is then given the goal as objectives (Figure 2). The term objective is used in the sense of a goal to be accomplished and should be contrasted with learning objectives which describe what the learner will be able to do upon the conclusion of instruction.

Batman also uses pop up cues (Figure 3) to help guide the player with non-narrative objectives, like learning the controls of the game. Developing facility with game controls and mapping them to gameplay is an implicit learning objective. When a specific combination is needed to pass an obstacle, the game uses a

Figure 2. Player was given a new objective to rescue Commissioner Gordon (Batman Arkham Asylum, 2011).

Figure 3. Cue of how to use the counter action (Batman Arkham Asylum, 2011).

visual reminder of the combination on the screen to remind the player of the technique in question. Initially these are in the form of pop up instructions like, "Use 'W' to move forward" that prompt the player to master movement controls and later special detective and combination moves that add options to playing the Batman character. In addition, these pop-up cues direct the players attention to the in-game badge system, 'Riddler trophies' (exploration rewards), and optional goals the player can choose if they appeal to their play/learning style.

The implicitness of learning objectives is one of the unique methods of implementing instruction through a gaming experience. Gagne's Events of Instruction implies an explicit introduction of learning objectives to the learner. It is an empirical question to determine whether implicit or explicit learning objectives are superior in terms of achievement and motivation. However, it is clear that game designers often mask their learning objectives by embedding them within gameplay.

Stimulate Recall

In order to stimulate the recall of prior knowledge, *Batman: Arkham Asylum* utilizes a reminder system that is similar to the way that the information is initially presented. If the player struggles later in the game, the pop-up reminders (above) return to help the player – requiring programmer attention to tracking performance and having the game recognize when the player requires recall help. This can be seen in the Counter Punch action as depicted in Figure 2. This is also an example of Gropper's progressions (providing and then fading cue support).

Notice in Figures 3 and 4 that the player is shown in yellow what button to press, but also in 'lightning bolts' when to use that button. These two visuals occur together when the player is not using the 'counter' to prevent damage to the player and the software determines that the player needs a reminder lesson.

Once again, stimulating recall is accomplished explicitly through cutscenes and implicitly through cues provided to the learner in real-time. The immediacy of cuing is completely contextualized at the micro-level of gameplay.

Present Stimulus / Lesson

Batman: Arkham Asylum presents material to be learned by the player within the play of the game in a variety of ways. The first is in information that is gained during the cutscenes, as noted above. Along with clever challenges, the player is directly addressed to learn new lessons. This direct approach is used more commonly at the beginning of the game. In addition, *Batman* uses non-player characters, or Batman engaging in self-dialogue, to describe what new action or strategy Batman could utilize to complete a particular goal. For

Figure 4. Pop-up instructional design in Batman (Batman Arkham Asylum, 2011).

instance, when tracking a bullet shot at Batman, he may say to himself that he should look for clues by using detective mode. This method of presentation is shown in concert with a pop-up showing what button to press for detective mode – or a scanning function the character uses to find clues. Often, the non-player character Oracle describes how the method can be utilized to follow trails that will allow Batman to track certain non-player characters. Oracle is in radio communication with Batman throughout the game, but is used primarily when new lessons are being introduced, and the player can listen in on a directive conversation. Stories have been suggested to provide a uniquely appropriate method for relating content with one's cognitive structure (Schank, 1995). *Batman* utilizes a story trope to provide context to the game. Game dialogue is used to inform the learner of stimulus material.

The second presentation type in *Batman: Arkham Asylum* is a just-in-time style of instruction that shows the keyboard and mouse combinations for a specific action that can be taken by the player as Batman. As noted above, these instructions pop up on the screen as certain movements became possible for the player to perform, as evidenced in Figure 4. The player is expected to use the combinations and to access the skill listed. This allows the player to do what the player was told at the top of the screen. This general presentation style is used in instructing the player to navigate combat and detective sequences, but is not a separate tutorial or instructional design, it is embedded in the play of the actual game.

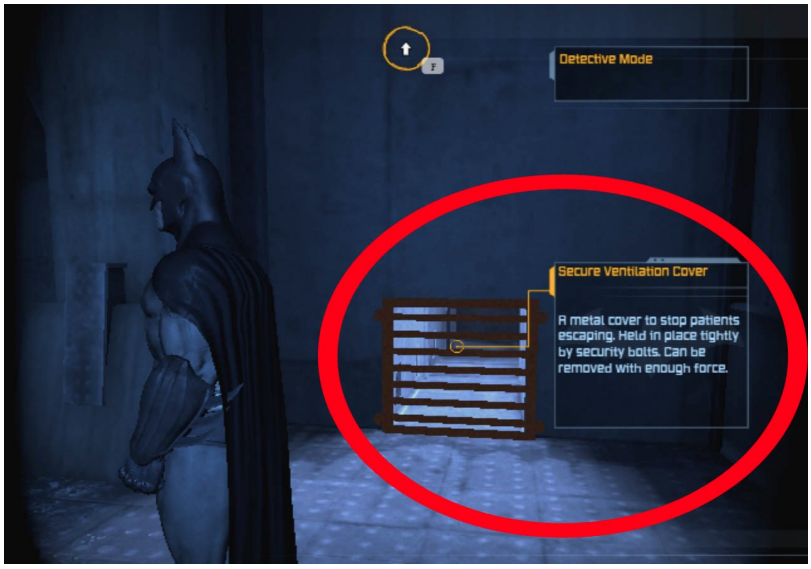

Figure 5. Detective mode learner guidance in Batman (Batman Arkham Asylum, 2011).

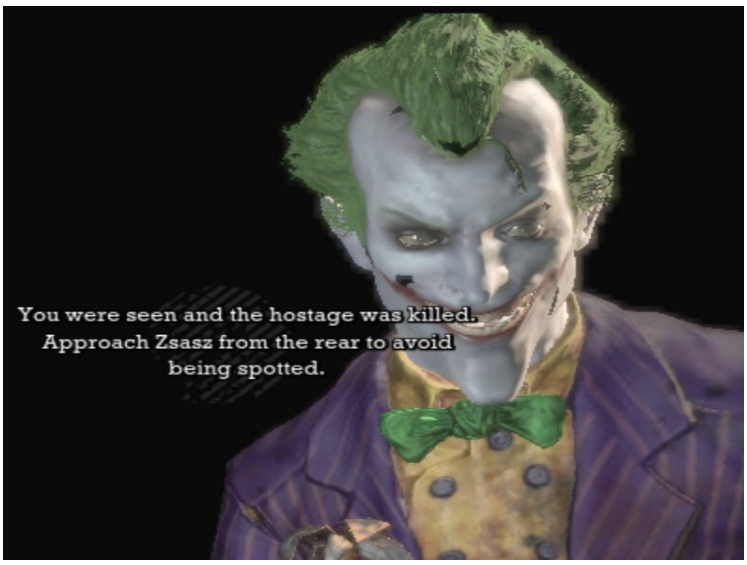

Figure 6. Screen seen by player upon dying while facing Zsasz (Batman Arkham Asylum, 2011).

Provide Learner Guidance

Detective mode, once taught is a key resource for providing learner guidance. At any time in the game, Batman can switch to a lens called detective mode. This transforms the entire view of the world into grey and blue tones, but makes usable objects stand out in a glowing red-orange color. In this mode the player is able to see contextual clues about what they were meant to do next by looking at the different color highlighting on objects. There were also small written reminders on different objects about their abilities as well as side pop-ups. If the player is in regular mode and presented with a grate, they are just given the option of opening it when they come close enough to the grate – without the additional information (Figure 5). Learner cues are always present, but require the learner to activate it with a single click of the button. Again the guidance is not overt, but ever-present and built into the experience of the game.

When a player dies during gameplay, he or she is given timely feedback on where they went wrong. This is depicted in Figure 6. This example shows what when wrong in-game, "You were seen and the hostage was killed," which reiterates the primary objective of the sequence. The second portion, suggests a strategy to the player, "Approach Zsasz from the rear" that can help the player with a new tactic if they need a new direction. In this particular example, approaching from the rear requires a more subtle, and Batman-like, set of actions.

The difference between this and most forms of instructional feedback is in the delivery method. The instructional sentence was small on the screen, where the feedback (after defeat) is prominent on the screen, provided immediately after an error in play, and accompanied by villain mockery – that is a kind of reward to experience. The game is segmented and a variety of villains appear, based on which 'chapter' the player is working on. Each has multiple audio clips so repeated failure is mildly rewarded with new audio and animation. The cost of failure is otherwise very minimal and only delays play a few moments. The player is quickly returned to their most recent save point and is able to try again.

Elicit Performance

Batman: Arkham Asylum makes heavy use of eliciting performance from the players. After each skill is presented, the learner is given a sequence in which they can practice their newly acquired skill several times. Skills also compound throughout the game. These practice opportunities are at an easier level then the general gameplay, yet players can choose to enter a practice mode for combat outside the game. Creating a non-narrative practice portion of the game is slightly different from providing cues within the main game. Players must choose to exit the game to enter the practice sessions with the intent to improve their performance specifically and knowing that it will not progress their in-game progress in any way.

Batman cycles back to core skills and players are expected to use new skills alongside earlier learned skills. Each introduction of a tool or ability builds a new set of possibilities and combinations for the player that exponentially increase performance options and choices for the player. For example the addition of a zip line is in itself a new performance requirement to use, but it incidentally introduces new ways to 'take down' opponents, crash through walls, navigate the space faster,

and overcome obstacles that may have previously been blocked in the game.

Increased performances are also encouraged with an award system that recognizes when the player makes use of Batman-like behaviors, combinations, unique solutions to challenges, and/or overcomes especially challenging aspects of the game. For instance, a sneak attack takes much more time than a direct attack, even eliciting patience in the player, but it is more in tune with the Batman character and is recognized with unique animations, awards, challenge directives, and non-player character response audio (in addition to their heart rate increasing if you are inspecting them in detective mode). Expert play is encouraged by rewarding the player with production art, 3D models of all in-game characters, and a collection of audio files that tell back-story--none of which are needed for completion of the game, but are nevertheless delightful additions and collections to complete. Players therefore have a choice on how to proceed, but are rewarded for role-play, exploration, and repeated efforts to master content at an expert level.

Typically improved performance is not the product of failure, but in a highly engaged state, or in activities that the learner is committed to, failure is an acceptable state toward increasing outcomes of performance. Players can learn from failure and the attention put on fail states in the game provides evidence that game designers have accounted for, and likely designed for, multiple failures. For example, boss fights routinely have multiple stages to the fight. Mastery of the first stage may require multiple attempts for a novice player just to see the 'skills' of the villain and to develop response strategies. Once mastered however, the villain will change tactics mid-challenge (usually when the player has had a set number of successful 'hits' or successful strategies) and win with these new tactics. Part and parcel of Batman is to lose boss fights multiple times in order to see these stages to the fight, master each portion, and ultimately over come not just a single opponent, but multiple, and progressively more difficult, stages to the challenge. Designers invest time to include humorous taunting, tips, quick reload times, and unique 'defeat' animations to make each failure mildly rewarding.

Provide Feedback

A variety of positive feedback is given when players progress and overcome challenges within the game. First, by defeating opponents, the player is able to clearly see their improvements and gain a firm grasp on what actions are effective and which are not. The player successfully getting through various sections in the game is a sign of success and improvement in skills and abilities. The narrative of the story is also a form of feedback that advances the player through a compelling and twisting mystery style plot line.

Throughout play, sound effects are used for feedback tools. When the player as Batman strikes or otherwise injures an opponent, the opponent makes a grunting sound that indicates that they have been hit. The same is true of the player as Batman. The sounds in the game are used to let the player know when enemies have hit their avatar.

It should also be noted, that surrounding the game itself, we identified a community of expert gamers that took the time to video capture segments of game-play and post them online for others to review and comment on. The best exemplars of puzzle solutions, strategies, or displays of expert play, were rewarded with a higher 'hit count', or number of views, and positive comments from other players. This external online community is an easily overlooked, but core social aspect to gaming media as part of a larger participatory culture (Steinkuehler & Williams, 2006; Jenkins, 2009). Though the production company doesn't overtly design this space, it actively served to motivate this research team toward expertise and participation.

Finally, as each element of play rewards Batman-like thinking and solutions, we agreed that progression through the game correlates with a 'fiero' like realization that you are becoming and thinking more like Batman. Without a clear moment that we could identify, however, this form of internalized positive feedback was consistent and authentic to our research team, but difficult to document in the analysis.

Assess Performance

There are several ways in which performance was assessed during Batman: Arkham Asylum. The first way is through the game's level of completeness. All progression in the game requires a new level, or use, of skills, strategies, and mastery of the semiotic system. To reinforce a sense of story progression, the player is shown the percentage of the game completed whenever they began playing on their saved game screen. Core story elements are essentially rewarded by progression, however an assessment of expertise is layered in by providing feedback for exceptional play as well.

The achievement system shows both novice completion of essential skills and tasks, but also includes a layer of 'badges' that recognizes expert and highly demanding optional challenges. The optional awards thus serve as a gauge of performance that highlights progression and completion rather than deficiencies in performance. Players are cued to potential expertise by being able to see awards (greyed out), what they are for, and they can build a self-assessment of performance and internally generated set of goals. For instance, members of the research team built small mental "to do" lists

Figure 7. Achievement and award assessment in Batman (Batman Arkham Asylum, 2011).

when we entered the game space and would briefly leave the space for new goals when challenges were completed in-game.

Another method of assessing and rewarding performance is also available through the experience point system in which the player can unlock certain upgrades after they had gained points through defeating opponents. (Figure 7) New gadgets are uniquely rewarding, and provide completely new options within the game--making them awards and challenges at the same time.

To contrast this, boss battles are challenges for the player in which they are faced with a villain, who is notable within the Batman universe. They are both end-of-chapter challenges *and* rewarding for Batman fans to encounter. These are performance assessments as well: each villain requires a unique use of skills, gadgets, timing, and control of the character to be defeated. The challenges include overcoming Scarecrow, Poison Ivy, Killer Croc, Zsasz, Harley Quinn, and the Joker – each requiring a completely different set of solutions. During these battles the player has to use their tools to overcome an opponent that is different and much more difficult than the simple lower level non-player characters that they encounter. Player-generated 'walk-throughs' can be found online for players that get stuck, but even watching these does not serve to bypass the embedded performance assessments. These battles stand as tests to the player and, once the player finished a boss battle, they are 'passing' part of the game.

Retention and Transfer

Batman: Arkham Asylum provides enhanced retention and transfer through copious practice and a spiraling learning design. Once a skill is learned and the initial practice opportunity has passed, continuous chances for practice are rooted in the game-play. Once a player learns to grapple using gargoyles, there are regularly gargoyles in various locations as an option for the player to use. These gargoyles are integrated into the game-play and are not discarded once the player has learned how to use them. Later in the game, the player uses the same technique to climb scaffolding in an attempt to rescue Commissioner Gordon.

There are also transfer situations. For instance, while the player might have learned to grapple using gargoyles, they are later expected to apply these abilities to walls and other objects. In addition, skills learned in the first instance of *Batman: Arkham Asylum* are also key game mechanics in the follow up *Batman: Arkham City*. Retaining and transferring knowledge from one game to the next provides useful expertise within the game. Simple movement mechanics are also common across all first person adventure games like *Assassin's Creed, Call of Duty, Fallout,* or *Dragon Age* and served as useful references for our research team. These navigational skills are instructed for novice players in Batman, but expert players can transfer their navigational literacy from one game to the next and progress very quickly through beginning levels.

Discussion

Each of Gagne's Nine Events of Instruction were identifiable within *Batman: Arkham Asylum*. *Batman* clearly requires learning to master, and game designers developed an instructional design that artfully and effectively gains the player's attention, informs, stimulates recall, presents stimulus, provides guidance, elicits performance, provides feedback, assesses performance, and rewards retention and transfer of gaming mastery.

Using Gagne's Events of Instruction as a framework for assessing a game we argue that *Batman* is a strong model of an instructional design in addition to being an award winning and top selling gaming media.

Our analysis showed two strengths with the instructional design that we suggest are uniquely amplified by the digital nature of the instructional design and can be universally applied to digital media instruction. Namely *Batman: Arkham Asylum* was exceptional at encouraging trial and error, and embedded, context specific support.

Trial and Error

Batman engages the player through successive opportunities for practice with particular focus of trail and error. Failure is a design feature easily accommodated and encouraged as part of gameplay. Expectation failure is a memory technique common to games and learning. Schank, Berman & Macpherson (1999) in their Learn By Doing instructional model, suggest that expectation failures like those in Batman, are a critical component in memory. In Batman: Arkham Asylum, there is little consequence to failure, and the player is encouraged to fail over and over with unique villain comments, animations, and low retry times. Refining and adjusting after each attempt allows a progressive sense of progress despite failing attempts.

Boss fights especially had stages within a single fight that built an expectation of failure when encountering a new challenge. We found that failure is expected, welcomed and encouraged in *Batman.* This has also been identified as a quality across gaming media by Juul (2009) and he suggests that failure as a learning tool is a unique opportunity for designers within digital media spaces. The expectation of, tolerance for, and overcoming of failure is learned and worthy of many professional expertise-building activities.

This failure process, referred to as expectation failure, encourages calculated adjustments that eventually lead the learner to success—which is then indexed in memory to be applied to future challenges. Failure provides a reason for practice. As the learner experiences failure as a common element throughout the game and makes adjustments to their game play, they learn how to be more successful in future game challenges. In fact they can fail right up until they ask for support.

Player Activated Supports

The feature referred to as the detective mode, can be toggled on and off at any point during game play, but the player must activate it. Four of the five help examples above require that the player activate the help feature within the game. We consider these in-game features to be embedded in the game by the designers. We find it useful to point out that *Batman* respects the learner by providing help when 'requested' by player activation. This form of on-demand help uniquely provides feedback when *it is wanted*, not when it is pushed by the instructional design.

Research shows that learning a skill is facilitated to the extent that instruction *tells* the students how to do it, *shows* them how to do it for diverse situations, and gives them *practice* with immediate feedback, again for diverse situations (Merrill, 1983; Merrill, Reigeluth, & Faust, 1979). This *just-in-time* feedback ensures that help is just a click away and supports Keller's ARCS model of motivational design (Keller, 1983). by instilling confidence and satisfaction in the player.

As players master one level using the help mode, they are able to generalize or transfer the skill to the full range of situations they will encounter throughout the game (Keller, 1983). We suggest that this learner-activated approach to feedback is part of what attracts players to challenges in games, while distancing learners from test scores and instruction. Specifically, we noticed in our own play that feedback was not welcomed from fellow players when our research team felt they were 1) already seeing venues for new play strategies, 2) wanting to fail in order to see new animations, 3) or were feeling mild frustration with competency. In these instances, feedback was seen as annoying and unwelcomed.

Yet in order to design digital experiences that are both challenging and achievable, it is inevitable that various learners will need some guidance at some point. By placing control of feedback on the learner, and making it an ongoing resource, feedback on-demand was found to be welcomed, relieving of frustration, and highly informative for new approaches. The adage to 'Only give advice when asked' held true in this study and we encourage an expanded investigation into this singular phenomena across games, genres, and digital media for better and more game-like instructional design.

An unexplored element of player-activated instruction is the contextual community of practice that players develop without direct guidance from game designers. These game communities have been explored to some extent already (Steinkuehler, 2006) and include walkthroughs, forums, hint guides, and videos that support the learner. These are common for top shelf games, yet the game designers do not necessarily have any part in their creation or maintenance. We consider them to be assumed on-demand supports that permit the designers to create challenges that may not have direct or embedded instructional aids or solutions in-game. However our focus here remains on embedded supports.

Strong Correlation to Principles of Instruction Design

We find that the nine Events of Instruction are each seen multiple times within the game. This is consistent with Gagne's theory in that the nine events are recursive, non-sequential, and can be applied both at the lesson and the overall curriculum level. However, Gunter et al. (2006) contend that, "It does not appear that an entertainment-based game analog exists for event three (stimulate recall) or event nine (retention and transfer) that keeps the spirit of Gagne's work," (p.11). In analyzing Batman through the lens of Gagne's nine Events of Instruction, there is evidence to suggest that event three (stimulate recall) is implemented throughout the entirety of the game in both overt and embedded ways. The reminder system stimulates game-player recall by reminding players of keyboard and mouse combinations through overlays at critical points in the game, however the player needs to display repeated failed attempts in order to activate this help mode. This would mean that successful players would never see events to stimulate recall if recall of skill is not needed and it would be easy to imagine that an expert gamer would never see these stimulants. We propose that the absence of overt and forced stimulants does not imply that they are not part of the instructional design in the digital media, only that they are artfully provided when needed and that the media itself uses data inputs to determine the learners' need for stimulants.

Finally, event nine, (retention and transfer), is also used extensively throughout *Batman: Arkham Asylum*. Drill and practice are implemented throughout the game to develop the basic knowledge and skills required to play the game and take the player to a level of automatic and errorless performance. Transfer is also evident as the player learns to apply the skills learned in one part of the game to other parts of the game.

In this artifact analysis, we only look at a single game Batman: Arkham Asylum as an exemplar of successful commercial games. We accept that a small focused study, such as this, study can be criticized by its lack of representativeness, generalizability and restrictive nature of the research design (Yin, 2008). Yet due to multiple replications of single case studies, evidence from multiple cases is often more reliable, results and conclusions derived from this design are more powerful, so that the study in general is more robust (Herriott & Firestone, 1983). Future studies can build this base of understanding and defining of effective instructional design within the emergent media of digital gaming. The failings of a single artifact analysis are also indicative of the need for collecting a larger spectrum of data and thus leveraging the external validity and reliability of research conclusions.

As digital media has become more prevalent, there has been an increase in literature looking at designing digital media instruction. We suggest that through meta-analysis of existing instructional design models, it is possible to find many combinations of instructional tools that address the specific needs of digital media. By examining these combinations, models that have been proven over time to be effective design tools can be used effectively to meet the changing needs of instructional designers working with digital media.

Using artifact analysis we looked at learning in *Batman: Arkham Asylum* through the lens of Gagne's Nine Events of Instruction. We find that all nine Events of Instruction are integrated, both overtly and embedded within, the design of the gaming media. Moreover we suggest that these design choices can be adopted and applied in any setting mediated in a digital setting toward improved learner-centered instructional design.

We found that by encouraging failure as a natural learning state, players experience expectation failure without consequence. The just-in-time persistent help created by the detective mode feature in *Batman: Arkham Asylum* provides contextual information about the game environment. Players are able to control the detective mode with a click of a button to quickly assess their situation within the game.

Ultimately, we find that there are natural parallels between instructional design and video game design. It appears that the game focuses uniquely on applied practice, story telling, and embedded and contextualized support to further gameplay and assist in the generation of "flow". We encourage the examination of traditional instructional designs in an attempt to use and experiment with these attributes to leverage the attractiveness of gameplay for the learner. Though the two fields appear different at first glance, there is a great potential for both of them to inform and improve each other in the future. We suggest, that in future instructional design that these events are not just additional, but core game events that cultivate mastery of the digital space, problem solving, and trial and error learning.

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