The Educational Potential of Visual Novel Games: Principles for Design

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Abstract

Despite the increasing interest in computer games for educational purposes, there are genres with untapped potential for teaching, such as narratively driven, Japanese-style visual novel games, which is the focus of the present article. The aim is to set design principles for educators attempting to create visual novel games for their teaching purposes, by exploring the research question '*What is the educational potential of visual novel game narratives, and how can this be translated into game design principles for educators?*' We explored the possibility of creating learning opportunities inside games by utilizing learning design theory and learning theory principles, as well as concepts related to learning, identity and narratives. Next, we conducted *close readings* of popular Japanese visual novel games localized for English-speaking audiences, and used examples from these games to elaborate on the principles. By combining the findings from both steps, we have proposed the following design principles: (1) Easy access to educational subject matter, (2) Exemplification of topics and 'defamiliarization' of the familiar, (3) Creation of well-developed characters that promote identification, (4) Use of branching narratives that are interesting for learners, (5) Use of a structured and creative design for learning, (6) Clear goals and strategies for assessment.

Introduction

Visual novels, a predominantly Japanese genre of narratively driven games with an emphasis on player choices, have recently risen in popularity. These games might also have implications for education. Computer games have been used for educational purposes since the 1970s (Papert 1980), but this topic has received considerably more attention in the last few years (Boyle et al. 2016). Young people are now able to use their interest in games in their academic learning processes (Ito et al. 2013), and this is a preferred way of learning for many students looking for alternatives to traditional classroom lectures (de Freitas 2006).

The mobilisation of the motivation to learn is an important aspect of students' learning processes, since being motivated and engaged will help the student focus on what is to be learned and, thereby, learn (Illeris 2007a). Thus, the underlying aim is to use the motivating and engaging aspects of computer games for educational purposes (Gee 2007; Gibson 2010; Prensky 2001).

For educators interested in exploring games for learning, commercial off-the-shelf games are a good starting point for discussion and reflection; alternatively, games that are made specifically for educational purposes can be used. Recent developments have also presented the possibility for educators themselves to design and create computer games for learning, but this is still a relatively new field (Kafai and Burke 2015). For teachers to create expedient game-based learning experiences, the properties of computer games that educators and game designers can utilize should be explored.

The present article will focus on a specific genre of computer games for learning: narratively driven, interactive visual novels. By focusing on visual novels, we wish to highlight a genre that has been somewhat overlooked by research on educational games, but that might have untapped potential. Our reasons are as follows: (1) The narratively driven nature of these games makes it possible to explore the narrative potential of computer games in depth, as narratives (provided they are well executed) are central to providing both motivation and learning for students (Malone 1981; Dondlinger

2007). (2) As the visual novel genre is neither well-established outside of Japan (Cavallaro 2009) nor often utilized for educational purposes, despite much research emphasizing on the properties of narratives and learning, it warrants further exploration. (3) As these games involve narratives and choices, instead of extensive sets of game mechanics, it is possible for teachers and indie game designers to design games without extensive programming expertise. The research question we will explore is '*What is the educational potential of visual novel game narratives, and how can this be translated into game design principles for educators?*'

This article intends to explore the educational potential of visual novels and to provide suggestions for design principles. These principles would be useful for game designers and teachers interested in exploring the potential of designing of visual novels for educational purposes.

Visual novels

While there is no consensus on what defines a visual novel, our understanding of visual novels is derived from Cavallaro (2009), who describes them as (1) narratively driven experiences consisting of mainly text, backgrounds, and dialogue boxes with character sprites; (2) illustrations/graphics presented to the player at central stages in the game narratives; and (3) a branching narrative with multiple endings, based on the player's choices. While the graphics presented to players throughout a visual novel are usually through backgrounds and character sprites, events occurring in the game are often illustrated, for example, by portraying the player character and supporting characters together in a scene.

Visual novels also comprise several subgenres. Many visual novels include a romance element, such as *otome* games which are aimed at a female audience, or an adventure game angle where the characteristics of visual novels are merged with game mechanics such as puzzles. While most visual novels have been developed by Japanese game studios, their popularity has been increasing outside of Japan, too, both among players and developers. Recent developments have also made it possible for hobby developers—or educators—to create visual novels without extensive technological expertise. Whereas a basic knowledge of scripting languages was previously required, currently, there are engines available that utilize a drag-and-drop interface and do not require programming, such as in Visual Novel Maker (Degica 2017) (Figure 1). A typical workflow with this engine

includes preparing a script; adding scenes, characters, dialogue and choices; and choosing backgrounds and characters (Visual Novel Maker 2019). The games can be exported as downloadable files or web content that can be easily accessed by players, or—if developed by teachers as part of a course—integrated with other class material.
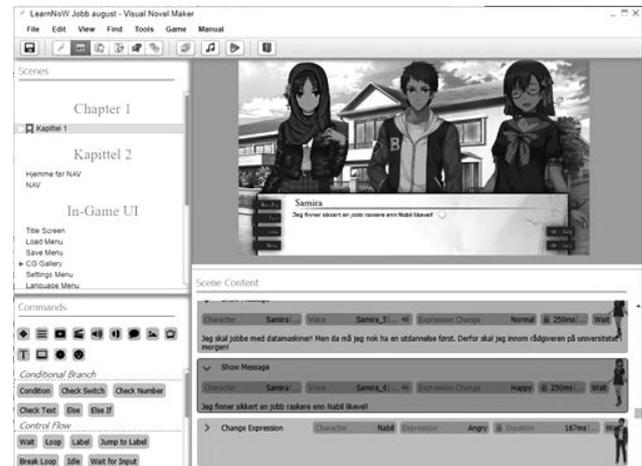

Figure 1. Screenshot of Visual Novel Maker (Degica 2019) being used for the creation of an educational visual novel

Designing games for learning: Theoretical perspectives

This section will explore (what we consider) to be the central learning considerations informing the design of educational visual novels.

Learning design and learning paths

When designing for learning, at least six of these factors should be considered (Hiim and Hippe 2007): the students' prerequisites for learning, the learning environment (in this case, a game for learning), specific learning goals from the relevant curriculum, content (the knowledge that students must be introduced to and interact with in order to reach the learning goals), learning processes (learning activities the students must engage in to learn), and the evaluation processes (to know if the students have achieved the learning goals). The aim is constructive alignment (Biggs 1996), that is, coherence between the learning goals, the learning activities and the evaluation processes.

When designing for learning within a game, the factors that matter are the content (what should be learned), the learning activities (how it should be learned) and the evaluation processes (if it was learned). In order to guide the student in her learning process, learning paths (order and connection between learning activities) must be

created inside the game (Weitze 2016a). The narrative can provide context and meaningfulness for what is to be learned along the learning path. For example, a narrative can present a complex problem in a way that helps the student/player to learn about the subject matter.

Consider a scenario where the learning goal is 'What cultural aspects are important to consider when applying for a job in a foreign country'. A game designed for this could present a meaningful learning environment involving a workplace and two characters who play the applicant and the employer. The narrative could provide relevant opportunities related to the current subject matter and learning goals to help reflect on 'how to behave socially appropriate in various problematic situations. The game could provide several relevant choices with different consequences that would have different outcomes. A player would reflect on the pros and cons of various arguments/choices, and create hypotheses about the outcomes of various actions. The player would then reflect on how to solve the introduced problems, by investigating and experimenting, and being evaluated on the choices based on preferred or unwanted consequences. In such a situation, the student would learn regardless of whether she chose the 'right or wrong answer'. Playing this game would ideally enable the player/student to test her hypothesis, observe connections and understand the causality between various choices. This creates new knowledge and an opportunity to learn by playing/doing in the game (Aldrich 2005; Grotzer and Tutwiler 2014; Weitze 2017).

Designing for deep learning processes

Games for learning often stay within the jurisdiction of introducing the student to new information/knowledge about a subject that they are expected to remember. It could prove difficult to support students' deep learning processes in educational games, because apart from remembering information, students are required to work at higher levels of cognitive complexity, through mental activities such as thinking, reasoning, problem solving and decision making (Knauff and Wolf 2010). According to Bloom's taxonomy, as revised by Anderson and Krathwohl (2001), the following are the progressively ordered levels of cognitive complexity: remembering, understanding, applying, analysing, evaluating and creating. The stages represent the range of simple to more complex levels of cognitive cognition, and at the same time, a movement from the concrete to the abstract. To master the learning goals, for example, a new concept, method or process, a student should not only be able to

remember what she has learned, but also gradually be able to understand the concept and, later, be able to apply the concept in relevant settings, analyse similar concepts or methods, evaluate and finally reach a level of mastery of the new concept. At this final step of mastery, the student may be able to create new concepts or ideas based on the learned concept and make their own contributions.

In a good learning game, we must create learning activities to help the student learn through the various steps of cognitive complexity. The game must provide learning activities, create learning situations and create learning paths, so that the student is required to understand a new part/depth of the concept/method/theory in order to move on in the game. The game should enable learning situations and activities that provide the student with the possibility of applying, analysing, evaluating and, perhaps, even creating based on new concepts. An interesting question is if and how these cognitive complex learning processes can be supported in visual novel game narratives and, also, if these can be used to develop design principles for learning games.

Learning, identity and narratives

A key concept related to the educational properties of visual novel games is identity. If characters are well designed, players may project their own ideas and values into the player character, that is, identify with the character, which is central to reflecting on and learning from the outcomes of their choices (Gee 2005). Accordingly, many learning theorists relate learning with identity. For example, in his social theory of learning, Etienne Wenger (1999) expresses how learning in a community of practice may influence who we are, and thereby our identity, as we discuss and negotiate how to think about and act in various relevant situations. Additionally, we may engage in deep transformative learning processes that change our worldview to an extent that part of our identity is changed. Such learning processes may change us in a way that makes us think new thoughts and make new choices (Illeris 2007b). Identity is a strong concept that is a part of our daily life, and 'stepping into another person's identity', or imagining that you are someone else, as it is possible to do in a game, can contribute to a personalized learning experience that may motivate and engage the player deeper into the game.

In visual novels, identity is closely related to *narratives,* which can be seen as 'a succession of events', the basic components of which are the 'chronological order of the events themselves (story), their verbal or

visual representation (text) and the act of telling or writing' (Egenfeldt-Nielsen, Smith, and Tosca 2008 Kindle location 4602). Whether it is for teaching historical topics (Kee 2011) or fostering a discussion on ethics (Staaby 2015), narratives are central for promoting motivation and learning in games. A well-designed narrative may lead players to seek solutions to problems (that are within the player's reach) (Rieber 1996), as well as provide intrinsic motivation for learning (Dickey 2005; Dondlinger 2007; Malone 1981) and opportunities for 'reflection, evaluation, illustration, exemplification, and inquiry' (summarized in Dickey 2006, p. 248).

Methods

A discussion on visual novels and their learning potential was the inspiration for this study: When talking about visual novel games that we have played and liked, we found that many made us learn, analyse and reflect upon dilemmas and important historical or societal topics. As educational researchers with an interest in design-based research and learning technology, we therefore wanted to explore the possibilities that visual novels had for education. This interest was also driven by the ongoing project *LIM: Language, Integration and Media* at the Norwegian University of Science and Technology, a core aim of which is to find innovative solutions for learning about migration and promoting integration of newly arrived migrants. Our goal was to create a visual novel for this purpose. First, we would need a set of design principles that we could use to create learning opportunities in our game, and this is the premise for the present article.

Our methodological approach has been inspired by the design-based research method (Barab and Squire 2004; Reimann 2011), which provides a toolkit for iterative design, implementation and development of learning resources in collaboration with practitioners. A design-based research project typically involves: (1) Reviewing literature and (in our case) analysing games to map design principles and gaps in the literature, (2) Developing learning resources in collaboration with practitioners, (3) Iterative testing and refining of learning resources, and (4) Analysis of findings and academic writing.

In this article, we present our findings for the first step of this method. We began by exploring the possibility of creating learning opportunities inside games by utilizing learning design theory and learning theory principles, as well as the principles behind learning, identity and narratives. When choosing visual novels for

the analysis, we focused on those that were well-known and easily available outside Japan, and localized to English. While our selection includes otome games (games developed primarily for a female audience that include romance components), pure dating sims (which many will associate with visual novels (Cavallaro 2009)) were excluded. We did, however, include games with various thematic genres, such as historical fantasy, thrillers, drama and crime. The article will utilize examples from the following games: *Hakuoki: Kyoto Winds* (Idea Factory 2017) and *Edo Blossoms* (Idea Factory 2018)*, Collar × Malice* (Otomate 2017)*, Code: Realize–Guardian of Rebirth* (Otomate 2014)*, Phoenix Wright: Ace Attorney* (Capcom 2006) and *Amnesia: Memories* (Idea Factoy 2015)*.

We went back to the games we had played through and wanted to study further, in order to examine them for relevant and potentially educational elements. Our experiences from the first playthroughs of the game, as well as the literature reviewed in the first part of the study, functioned as guidelines for locating relevant sections. Our approach was to conduct close readings, through an 'examination, deconstruction, and analysis of a media text' (Bizzocchi and Tanenbaum 2011, 1), of these parts of the visual novels. This mostly involved focused readings with our theoretical framework as analytical lenses (Bizzocchi and Tanenbaum 2011), based on the previously described concepts regarding learning design, identity and narratives. We focused on the games' narrative, but in interplay with the games' semantic architecture, including elements such as the game mechanics, game interface, and game art (Flanagan and Nissenbaum 2014).

Learning principles for visual novel games

This section will present design principles for visual novels that might be utilized for the development of educational games.

Integrating educational content into games

When designing a game for learning, the teacher/designer must plan specific learning goals for the students (Hiim and Hippe 2007). Based on these goals, the knowledge about the subject matter (the content) can be presented in various ways, for example, through the actors, the scenes and narrative (Weitze 2016b). Further, there should be opportunities to gain new knowledge and develop skills and competencies by interacting, reflecting, pursuing challenges, making choices and experiencing

feedback in the game in order to learn (Anderson and Krathwohl 2001; Hiim and Hippe 2007; Weitze 2016b).

Educational content can be integrated by allowing the protagonist to engage in conversations about relevant topics with other actors in the game. This will help the player receive new knowledge about a subject. In *Hakuoki: Kyoto Winds,* information about historical figures and political issues is often obtained by *overhearing* dialogue between other characters. Additionally, dialogue with characters might also be used to make players view information they already know in a new way. In the *Phoenix Wright* series, for example, the protagonist's sidekick often helps the player by summarizing the obtained information and providing hints about how to piece the clues together if they fail to solve the case.

An alternative strategy is to provide players with an option for reading more about a topic. This is frequently done in a way that does not interfere with the gameplay, and in many cases, it does not affect the gameplay experience, whether or not players utilize them. This gives the player a chance to read about certain topics, and sometimes, utilize this to make well-informed choices when confronted with a dilemma. In the games we studied, this was done in different ways, such as by the addition of an encyclopaedia, a glossary or a dictionary, and options to read more about items or characters in the game. A clear example of how this might tie to learning goals can be found in *Hakuoki: Kyoto Winds* and *Hakuoki: Edo Blossoms.* These games, set towards the end of the Edo period in Japan, include an encyclopaedia (Figure 2) that gradually is filled with entries that connect to events in the game. These can be related to the political situation in the current time period, important historical figures who are also prominent in the game story, geographical locations where the game events take place, objects and items you encounter in-game, and challenging concepts (such as concepts related to social interactions and politics).

According to Gee's principle (2007) *Learning just in time* or *Learning on demand*, further information about words or topics can be made available to players at relevant places in the game. That is, instead of reading about a seemingly random or unrelated topic, a player can access information directly related to what is currently happening in the game. Thus, the learning content is situated in a larger context that makes what she learns meaningful and, thereby, easier to remember and understand (Anderson and Krathwohl 2001).

While this feature is common in visual novel games, it is often (though not always) not utilized in a way that affects gameplay. Instead, it is presented as an optional source of information for players who wish for more knowledge about certain words or topics.

This way of introducing knowledge could become part of a deep learning process, if the game also creates learning activities in which the learner is invited to use the knowledge and engage in thinking, reasoning, problem solving or decision making in relation to the learning goals (Anderson and Krathwohl 2001). This can make it possible for the learner to understand, apply, analyse or evaluate the new knowledge in various situations and, perhaps, develop skills and competence in the subject matter.

While searching for more information in visual novels is often voluntary, educators and educational game designers might still build in content in a way that makes it necessary for the player to look up, read, understand and reflect on the information that is presented, in order to make correct decisions and move on.

Thus, useful concepts can be introduced in a way that is integrated with the gameplay. Such a design would help students to understand and make relevant connections, and may even spark interest in learning about a topic at a later point.

For example, a game player who later visits Kyoto might recognize several topics on the information boards placed at historical places around the city from the game he played, and thus, be able to connect the in-game information and narratives with real-world events (Figure 2).
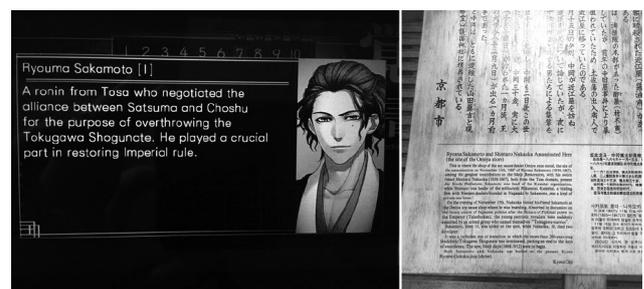

Figure 2. An encyclopaedia page and a real-world information sign about a historical figure in *Hakuoki: Kyoto Winds*

Design principle 1: Integrate easy access to content

• Integrate educational content into the games by creating dialogues in the game about relevant areas of a subject or issue. This will support the player in their quest to receive new knowledge.

• Give the players an opportunity to access information about people, places, items and events, especially information related to the learning goals.

• Design challenges and choices in such a way that the player needs to seek information, and then to understand, evaluate and reflect on how to use this information to move on in the game.

Exemplifying topics and promoting reflection through 'defamiliarizing' the familiar

When teaching about a subject matter, we often use practical examples and stories as a way of exemplifying and illustrating the general knowledge/theory in order to help the learner understand and relate to the topic of learning. In the context of game-based learning, knowledge can be exemplified by placing relevant narratives in fantasy worlds. Fantasy worlds can help us understand our own world more clearly (Pu 2012), since the presentation of a topic in a fantasy setting may emphasize its significance. In educational games, the narratives can be a vehicle for the student's learning path through the game (Weitze 2016a). Thus, visual novels—those drawing upon historical topics and those set in contemporary or fantasy settings—may create narratives that illustrate specific subjects and make them come to life, or portray current topics in a way that promotes discussion and reflection.

The games we studied demonstrate the potential of using narratives in historical settings and fantasy worlds for educational purposes. The previously mentioned *Hakuoki* series, historical games, starts in 1863 and explores the end of the Bakumatsu period, providing various perspectives of the political tensions. Another example is *Code: Realize - Guardian of Rebirth,* which is set in an alternate reality, the Victorian era, and utilizes a fantasy setting to thematise several serious topics and ethical dilemmas related to war, genocide and technology, that may also be relevant today. Thus, creating a fantasy setting for a relevant topic, referred to as 'defamiliarizing' the familiar, might be a relevant way for players to reflect upon current topics from the perspective of today's society.

We wish to emphasize on the visual novel *Collar ×Malice*, which on the surface seems to be a straightforward detective story, with the protagonist collaborating with five male characters with previous or current ties to the police force to stop a terrorist organization from executing a large-scale terrorist attack in Shinjuku (Figure 3). As the story progresses, she uncovers the backstories of people involved by listening to their stories: the teenager trying to go on with his life in a district controlled by terrorists, the people fighting them, and the members of an organization who believe terrorism to be necessary in order to restore a tainted Japan. Thus, a topic that is relevant to the society of today is placed in a different setting, prompting the player to explore this topic from various perspectives.
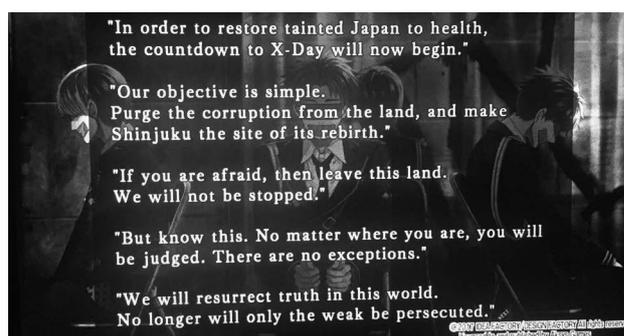

Figure 3. The prologue of *Collar ×Malice*

For educators and game designers, this shows the potential of using games—especially game narratives—to present and exemplify various topics in relevant historical contexts, with the aim of engaging the player in the learning experience. A topic may, however, also be exemplified and presented in a fantasy world, to help the player understand more timeless and general issues related to the current topic.

In both cases, the use of narratives, combined with the challenges and choices in the game, may spark deep learning processes as the player analyses, evaluates and reflects on the issues she is presented with and engaged in through the game. Studying opposing viewpoints could also be a way of imagining how historical events might have changed if some events had played out differently (Simons 2007).

Design principle 2: Use narratives to promote reflection by *exemplifying topics and 'defamiliarizing' the familiar*

• Create narratives that exemplify specific topics or issues in historical settings to make the subject come to life.

• Create narratives that exemplify and promote reflection on specific subject areas or contemporary societal issues in fantasy worlds as a way of emphasizing on the significance of the subject.

Creating characters that promote identification

Creating characters that players can identify with is considered central to promoting reflection and learning in computer games (Gee 2007b). In visual novel games, however, the story is often told from the perspective of an unvoiced protagonist. The player character often has little backstory, and consequently, the player has the opportunity to project her own ideas/experiences onto the character (Cavallaro 2009). However, visual novels' utilization of narratives, voice-acted dialogues and visuals creates many possibilities for three-dimensional, well-developed characters, that can be used when creating educational games.

It may be argued that visual novels have a similar shortcoming as other games, in that they are often rather limited in terms of the diversity of the characters. While the characters in the visual novels we studied did seemingly belong to a rather homogenous group, in terms of skin colour (for example), there are examples in the games that can be used as inspiration: *Code: Realize – Guardian of Rebirth* includes characters from different nationalities who have complex backstories, including a storyline thematising (within a fantasy setting) what it is like to belong to a minority group during wartime.

For educators and game designers, the main takeaway is that educational visual novels have the potential for the creation of deep, well-developed characters with solid backstories. They can, thus, create characters that different players can identify with, for example, by portraying characters with minority backgrounds in an inclusive way, with regard to how the character looks and their backstory. This possibility to identify with in-game characters would empower players with minority backgrounds, and transform their experience of inclusion in a positive way (Illeris 2007b). If done well, this can contribute to promoting identification for a larger group of players, by making them feel that they belong to a community (Wenger 1999).

Tools like *Visual Novel Maker* make it possible to utilize pre-made assets, which might be modified in various ways to promote identification for the target audience. Focus group interviews conducted with players from mostly migrant backgrounds in the project *LIM: Language, Integration, Media* indicated that they would like more characters with traditional costumes such as the hijab.

In the example below, the authors used Photoshop to modify characters in a way that would promote identification for the target audience, based on the focus group interviews (Figure 4).

> **Design principle 3: Create well-developed characters to promote identification**
>
> • Utilize visual novels' potential for narratives, visuals and voice acting to create well-developed, three-dimensional characters.
> • Collaborate with target audiences to make sure that minority characters are portrayed in a way they may identify with.

Figure 4. Modifying characters in *'The job game'*

Creating branching narratives that allow players to pursue their interests and learn

A common characteristic of visual novel games is *branching narratives*. While a game often begins with a common main narrative, it will frequently split into branches, thus creating the possibility to follow various paths. Each of these paths usually follows one specific character, and therefore, the player will experience completely different storylines depending on the path she chooses. This is different from games that only give the *illusion* of branching stories and let the player make choices that only briefly trigger a side route or different dialogue, before moving back to the main story path (Sheldon 2013). Another feature of visual novel games is that choices made within each branch may also lead to very different outcomes for the protagonist, and not all paths ends well.

In game-based learning, the aim is to create narratives that are inherently interesting, since this may motivate players to pursue solutions to problems in the game (Rieber 1996). The inquiry on how to create interesting learning experiences for the player/learner is also relevant for teachers. When teachers plan learning activities, they

take the students' prerequisites for learning into account (Hiim and Hippe 2007), and accordingly, choose relevant content and learning activities that centre on the students' life world, to make the learning experience interesting for them.

Another principle of learning that is related to the experiences that may be afforded in games is called *experiential learning*, which argues that we learn through experience (Dewey 1916; Kolb and Kolb 2011; Ord 2012), whether they are good or bad.

Thus, though learning through experience may not always be pleasant (if our choices and reflections do not lead us to where we hoped to go), it will often spark important reflections and help the learner understand that although she did not solve the task completely as intended, she still learned in the process of trying.

In order to provide interesting learning experiences, players must be given the option to experience the parts of the story they find most appealing, as well as to view the story from multiple perspectives if they choose to. In *Code: Realize – Guardian of Rebirth*, for example, stories of characters from Victorian literature are explored: Arsène Lupin, Abraham Van Helsing, Impey Barbicane, Saint-Germain and Victor Frankenstein. Each path takes the story in different directions, each centred around one particular character. This design lets the player experience different things, and learn things about the character and problem at the core of the story that they might not have otherwise learned about.

In the *Hakuoki* games, following the character route of the commander Toshizo Hijikata will provide insights into the battles that the Shinsengumi, a police force supporting the Shogunate, took part in. On the other hand, following the route of the character Ryouma Sakamoto, who *opposed* the Shogunate, provides another perspective of the conflict.

For educational visual novels, this has at least two kinds of potential for learning: First, the players can follow the directions that interest them. For example, in a game teaching historical topics, a player might choose to explore the era she is interested in, and in a game about European explorers, the player might choose which journey to embark on. Alternatively, the player/learner may learn different things based on which route she chooses. She may also choose a 'wrong path', learning in that process as well, and reflecting on it when faced with another decision. In fact, one of the greatest potential of games is that they allow players to try—and fail—in a safe environment (Gee 2007; McGonigal 2011).

> **Design principle 4: Create branching narratives that allow the players to explore their interests and learn**
>
> • Facilitate motivation for learning, by using branching narratives that allow players to explore the paths that they are most interested in.
> • Create opportunities to learn by providing various paths with different consequences that will spark the players' reflection and help her learn from good as well as 'bad' choices.

Being structured and creative when designing for learning inside narrative games

While most visual novels are not designed specifically for learning purposes, they may include mechanics that might inspire deep learning processes. When we design for learning, the aim is to help the player/learner to reach the learning goals by working with the content through engaging in learning activities, and maybe even being evaluated in the same process (Biggs 1996, Shute 2011). Another important aim is to help the learner to achieve deep learning at high cognitive complexity levels (Anderson and Krathwohl 2001).

The trial mechanics of the *Ace Attorney* series are an apt example. The player starts by obtaining information to solve a case**,** that is, to solve a problem. This indicates the implicit learning goals. The player starts investigating in order to solve the problem, by exploring locations to find clues that provide information to understand what happened, collecting evidence (which might be used as argument to back the case, and to learn through reflection in this process), and talking to relevant characters in the game (engaging in a community of practice, achieving new knowledge as well as learning about different points of view on a problem or topic; Wenger 1999). Following this, the players have to piece together the information in a trial section. Here, it is not enough to have collected information. The player has to reflect on and understand it in order to decide on what evidence she should present to support her arguments when trying to achieve her goal of proving the client to be 'not guilty' (Figure 5).

The above example exemplifies the possibilities of designing for learning at different levels of cognitive complexity: remembering, understanding, applying, analysing, evaluating and creating (Anderson and Krathwohl 2001). Visual novels could utilize these mechanics for many subjects: Investigating why a local water source is polluted or understanding how a historical event played out. Depending on the complexity of the learning situation, in terms of the problems, arguments,

implications and number of complex choices that should be made and discussed, the player/learner will be enabled to analyse the situation, apply her knowledge in the learning situation, and in the game or after playing the game, the player may be able to evaluate and compare different outcomes of different choices. This kind of game design takes the learner along a learning path through various learning activities that potentially will let her remember, understand, apply, analyse and evaluate (Anderson and Krathwohl 2001) areas of the subject and, thereby, learn and (hopefully) achieve the learning goals (Biggs 1996).
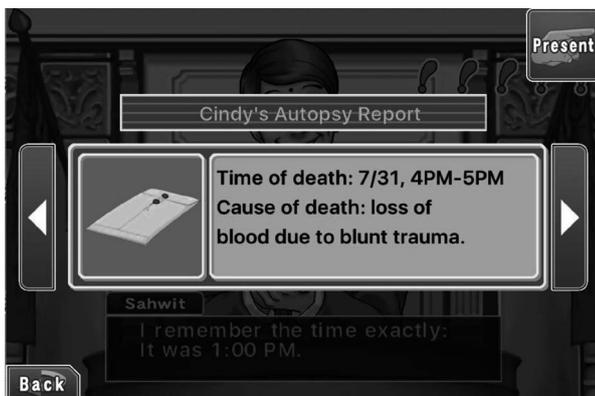

Figure 5. Choosing and presenting evidence in *Phoenix Wright: Ace Attorney.*

Design principle 5: Be structured and creative when designing for learning inside narrative games

- Choose clear learning goals for the game, and then be creative when implementing the content, problems and points of reflection, and providing meaningful and relevant choices that lead to relevant decisions with consequences in the game, since the design of these potential learning situations in the game may help the player learn.
- Use Bloom's taxonomy (Anderson and Krathwohl 2001) as a guide to spark ideas for creative challenges in the game that will help the player/learner reflect, reason, solve problems and make relevant decisions in order to master the learning goals.

Creating clear goals and strategies for assessment

Visual novels often have strategies for assessing the player's performance that will determine the outcome of the story for the player character. This will affect the outcome of the game, that is, whether the player will experience a good ending, a neutral ending or a bad ending. For educators, too, assessment is central to making sure that learners in formal learning situations

achieve the desired learning; therefore, it is necessary to align the assessment with the formal learning goals (Biggs 1996). A main challenge in game-based learning is, however, the assessment of students' learning outcomes in a satisfactory manner (Ito et al. 2013). Several possible solutions have been suggested, for example, formative assessment through in-class discussions about the topics presented in the game (Groff et al. 2016). For example, this could take place as debriefing and discussion sessions facilitated by teachers. Another approach used in many games for learning is *stealth assessment* (Shute 2011). In this approach, the evaluation process is an integrated part of the gameplay and there are two basic assessment mechanics: (1) the student needs to apply what she has learned in the game in order to move on, and (2) the student will get feedback in the gameplay (for example, through illustrated consequences) if she applies the correct knowledge, skills or competencies. In-game prompts aimed at getting the player to reflect on events in the game may also be beneficial, especially if these are well integrated with the game mechanics.

Visual novels track players' performance and give feedback to the player in different ways. A very obvious way can be seen is the *Phoenix Wright: Ace Attorney* game, where the player is given penalties for presenting the wrong evidence or making wrong assumptions, and too many mistakes lead to a 'game over' stage. Other games track variables according to the player's choices in the story, often based on how they respond to dialogue and possible interactions with other characters. This can be hidden from the player, or it can be shown in the form of stats, such as the relationship between the protagonist and each of the characters in *Amnesia: Memories* (Figure 6).
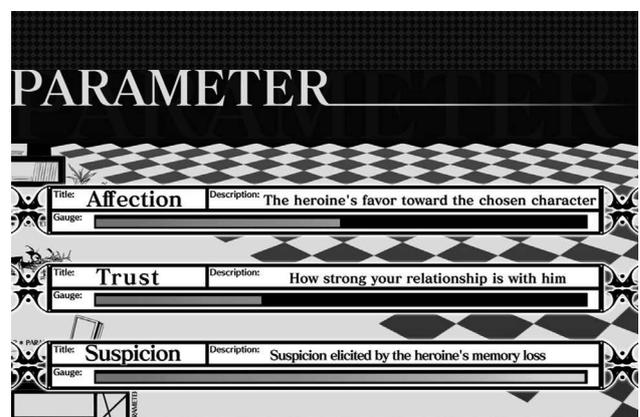

Figure 6. Reviewing parameters in Amnesia: Memories

For teachers and game designers, tracking variables based on the players' choices in-game can provide

possibilities for assessing the learner's progress in relation to the learning goal.

> **Design principle 6: Create clear goals and assessment strategies**
>
> • Implement stealth assessment strategies inside the game that are aligned with the learning goals, or conduct formative assessment through discussion in the classroom based on the game.

Discussion and conclusion

In this article, we have studied visual novels and their potential for educators. After exploring our research question (What is the educational potential of visual novel game narratives, and how can this be translated into game design principles for educators?), we have proposed the following design principles for educational visual novel games: (1) Easy access to educational subject matter, (2) Exemplification of topics and defamiliarization of the familiar, (3) Creation of well-developed characters to promote identification, (4) Creation of branching narratives that are interesting for learners, (5) Structure and creativity in the design for learning, (6) Clear goals and strategies for assessment.

Visual novels have potential for educators and educational game designers; however, there are some challenges that should be discussed. While many of these challenges relate to game-based learning in general, they will be discussed in relation to visual novels.

First, the issue of time constraints is central (Richards, Stebbins, and Moellering 2013). We have argued that technological developments have made it possible for teachers to design their own games that can be utilized in their educational process. However, it is important to find ways to reduce the effort it requires to include educational visual novels in teaching situations. This can be done by finding practical solutions that allow teachers to share the games that they have made, and identifying strategies for using them efficiently, for example, through a dedicated website. It could even be possible to share the games in formats that allow editing of the games that others have made, and tailoring them to specific subjects and target audiences.

A second issue is the mixing of facts and fiction in game narratives. While games, including visual novels, often draw upon historical time periods and contexts, they often mix this with fictional elements. It could therefore be relevant to explore how this will affect students' learning outcomes. In addition, a set of guidelines should be created with regard to what can be included as fantasy elements and what should remain true to historical facts: In short, how can we make sure that the fun part of games is well balanced with their educational value? (e.g. Flanagan, Isbister and Hash 2010). Here, we can learn from designers of historical games: game designer Yosuke Hayashi noted that if your games can help you pass a history test, you are on the right track as a designer (Hayashi 2019).

Having students learn from designing their own visual novels about educational topics, thus engaging in learning as creating (Anderson and Krathwohl 2001), might be as fruitful a learning activity as playing educational visual novels. While not as common as learning from playing games, learning from designing games draws on the philosophy that creating external artefacts, such as games, in projects that students find meaningful, might be a powerful way to learn (Harel and Papert 1991; Papert 1980; Øygardslia and Aarsand 2018; Weitze 2016a,b). This could be a relevant topic for further research.

Earlier in this article, we posed the question of whether cognitive complex learning processes can be supported in visual novel game narratives and, also, if these processes can be integrated into design principles for designing learning games. In this article, we argue that this is possible; however, students' learning processes are complex in nature and many factors might influence the outcome of their learning processes. Therefore, as our recommendations are just design principles, they need to be applied to a narrative game for them to work. We should, of course, consider that it might be difficult for teachers to create engaging learning games that create opportunities for deep learning for students. That is, it might be difficult to create actual possibilities for students to get involved in higher order thinking skills, by making students reflect, analyse and assess and, thereby, learn through playing the game.

Even if teachers and educational game designers succeed in creating engaging learning paths in their narrative educational games with the aim of making students engage in deep learning activities, we still need to test and assess if students have learned what we hoped they would learn. Thus, iterative re-designs might be required before an effective educational narrative game is eventually created.

Our final thoughts are that since the use of games for learning is on the increase, visual novels may be an exciting new genre for both game designers and educators to explore further.

Acknowledgements

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