

Sylverine: A Cross-Cultural African Educational Game

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Abstract

Educational games are games explicitly designed with educational purposes, or which have incidental or secondary educational value. All types of games may be used in an educational environment designed to help people to learn about certain subjects, expand concepts, reinforce development, understand an historical event or culture, or assist them in learning a skill as they play. Game types include board, card, and video games. An educational game is a game designed to teach humans about a specific subject and to teach them a skill. As educators, governments, and parents realize the psychological need and benefits that gaming have on learning, this educational tool has become mainstream. Gaming is interactive and teaches us goals, rules, adaptation, problem solving, interaction, all represented as a story. Our project is designed to introduce a game that would project ancient Heritage, civilisation and lifestyle of the beautiful cultures of the under acknowledged African continent.

Keywords: Artefacts, Adventure Role-Play Games (ARPG), Interactive Fiction, Attention Relevance Confidence and Satisfaction (ARCS), Role-Play Games (RPGs)

1. INTRODUCTION

Educational video games can motivate children and allow them to develop an awareness of consequentiality. Video Gaming can't be effectively defined without the word "simulation". Gaming and simulation goes totally hand in hand has to be defined together. The Simulation and Gaming journal defines Simulation and gaming in its broadest meaning, "to encompass such areas as simulation, computerized simulation, internet simulation, gaming, simulation/gaming, serious games, educational games, training games, e-games, internet games, video games, policy exercises, day-in-the-life simulations, planning exercises, debriefing, analytic discussion, post-experience analysis, modeling, virtual reality, game theory, role-playing, play, active learning, experiential learning, learning from experience, toys, augmented reality, playthings, structured exercises, alternative purpose games, edutainment, digital game-based learning, immersive learning, brain games, social impact games, games for change, games for good, synthetic learning environments." (Hall, Jeremy and Benita Cox (1993)). A simulation game attempts to copy various activities from "real life" in the form of a game for various purposes such as training, analysis, or prediction. Usually there are no strictly defined goals in the game, with players instead allowed to freely control a character. Well-known examples are war games, business games, and role play simulation. From three basic types of strategic, planning, and learning exercises: games, simulations, and case studies, a number of hybrids may be considered, including simulation games that are used as case studies. Comparisons of the merits of simulation games versus other teaching techniques have been carried out by many researchers and a number of comprehensive reviews have been published. An educational game is a game designed to teach humans about a specific subject and to teach them a skill. As educators, governments, and parents realize the psychological need and benefits of gaming have on learning, this educational tool has become mainstream. Games are interactive play that teaches us goals, rules, adaptation, problem solving, interaction, all represented as a story. They give us the fundamental needs of learning by providing - enjoyment, passionate involvement, structure, motivation, ego gratification, adrenaline, creativity, social interaction and emotion. The benefits of educational games as researched (Maier, F. H., & Grössler, A. (2000)) emphasizes on the promotion of individual discovery in learning from the learner's own perspective to produce a more integrated view of the broader context within which socio-cultural concepts fall and to increase student motivation by bridging many gaps which conventional teaching methodology are unlikely to fill.

Game-based learning is an expansive category, ranging from simple paper-and-pencil games like word searches all the way up to complex, massively multiplayer online (MMO) and role-playing games. The use of collaborative game-based role-play for learning provides an opportunity for learners to apply acquired knowledge and to experiment and get feedback in the form of consequences or rewards, thus getting the experiences in the "safe virtual world". The built-in learning process of games is what makes a game enjoyable. The progress a player makes in a game is through learning. It is the process of the human mind grasping and coming to understand a new system. The progress of understanding a new concept through gaming makes an individual feel a sense of reward whether the game is considered entertainment (Call of Duty) or serious (FAA-approved flight simulator). Games based learning provides versatility for more than one learning style, and also can affect cognitive and psychomotor skills. We want to build a mobile/video/computer game that will be highly informative and available for gamers from the ages 8-80, it would grant the gamer the ability to continue at any point of the game and would run on most platforms, iOS, Android, PlayStation, Xbox and PC.

2. WHY GAMING?

In this part of the world, we bother ourselves with the playing part of the game rather than the creation and business part, so we may be too blind to see the entrepreneur values of being a game developer. In a 2013 report released by Entertainment Software Association (ESA), Consumers spent \$21.5 billion on game software, hardware and Accessories, 59% of Americans play games and the ratio of male to female gamers are 52:48 percent.

3. TYPES OF COMPUTER GAMES

Although there's no authority to theorize types of computer games yet, we have all games going into three major categories, which are: for learning, for business and for recreation and these categories depends majorly on the perception of the Gamer but in a more psychological state, this categories intertwine spontaneously. We can still breakdown any of these categories into types and genre. In the actual sense, a lot of people can't really differentiate between Game types and Game Genres; this could be attributed to the close similarities between them. According to (Lindsay Grace (2005)), Game type can be defined as a description of game play, while game genre is seen as a description of the narrative content of the game. Therefore based on this definition, we can align all computer games into the following types:

3.1 Action

These games offer intensity of action as the primary attraction or focus. Reflex response is the primary skill needed to play these games well. According to ENTERTAINMENT SOFTWARE ASSOCIATION (ESA), this type of games constituted 32% of bestselling games of 2013. The most common action games are shooters (Doom) and stealth (Metal Gear). Action games also include most sports titles.

3.2 Adventure

Games under this category offer exploration and puzzle solving as the main focus. These games historically offered the most engrossing story, although their popularity has declined in the last 2 decades as ENTERTAINMENT SOFTWARE ASSOCIATION confirms that they constituted only 7% of games sold in 2013. Reasoning, creativity, and curiosity are the most common skills required of a good adventure game player.

3.3 Puzzle

These games offer puzzles as the primary attraction to games. These games are most commonly released on low budgets via the web. The people who play these games tend to be the oldest population of the game playing community. One of the most successful puzzle games is the famed Tetris, Lemmings and Minesweeper.

3.4 Role Playing

Games that offer the player an opportunity to immerse themselves in the character's situation. Role Playing Games (RPG) continues their rich history in storytelling by embracing innovative ways to vary and report story. Characters tend to be rich, game play is long, and character management is technical in RPGs. According to E.S.A, RPGs constituted about 13% of worldwide sale in 2013. Famous RPGs include Baldor's Gate, Fable, Might and Magic, Neverwinter Nights, Ultima, and World of Warcraft.

3.5 Simulation

The primary game play element of a simulation is its ability to match real world situations. Simulations seek to provide enjoyment through re-enactment. Combat simulations and race car simulations are relatively popular in this game type. Simulations may also include social situation simulation such as Sims and Leisure Suit Larry1. Major games include Gran Turismo and the Tycoon games.

3.6 Strategy

Strategy games entertain through reasoning and problem solving. Early strategy games (e.g. Civilization) did not use much storytelling, although more recent games rely heavily on quality narrative. Games such as Command and Conquer are examples of story based strategy games. Strategy games have the largest success on the ENTERTAINMENT SOFTWARE ASSOCIATION list with a large percentage of 38.4% of total game units sold in 2013.

3.7 Hybrid

Most games built in this decade can't be majorly ascribed to one game type. They aim to be connecting all the dots in gaming. An Example is the famous God of War Game which is both an Adventure and also Role-Playing game with a little of Puzzle and Strategy.

4. COMPUTER GAME GENRES

Game genre explains the way a story is narrated. A genre is the narrative style that affects the structure of the story, the depth of character, and other storytelling elements. For anyone roughly familiar with pop culture they should not require an explanation with the following genres below:

4.1 Drama

This is a genre with a storyline that intrigues its audience. It's usually a genre suitable for all ages as its major concern is family. An example of a game with this genre is Max Payne.

4.2 Crime

This is a genre that has to do with law and outlaws and is usually more suitable for adult viewers and examples are Grand Theft Auto and Saints Row.

4.3 Fantasy

Younger gamers are more accustomed to this genre as it builds an imaginary world and puts the viewer in that world. Examples are Kingdom Hearts, Fable and Elder Scrolls.

4.4 Horror

This describes a storyline that would instill fear into you. Horror genres are usually rated Mature by the Entertainment Software Rating Board (ESRB). Examples of this genre are Resident Evil, Evil Dead and Dead Space.

4.5 Mystery

This genre is all about solving mysteries and a perfect example of this is Indigo Prophecy.

4.6 Science Fiction

This genre majorly deals with stories of the future or technologies of the future and examples are Doom, Half Life.

4.7 War and Espionage

This genre as the name implies deals with elements of war and battle. Famous examples are Metal Gear and Call of Duty.

4.8 Western / Eastern Frontier

These are games that have a storyline of the classic age, the early civilization age. Examples are Red Dead Revolver, Ninja Gaiden and Six Guns.

Game genres could go on and on from Historic to Romance but this is the little bit we would list out here. Just like Game types, it's also important to realize that only a few modern games fall neatly into a single category of game genre. Modern games take the best of all worlds and incorporate them into a thoroughly entertaining collection of game mechanics and storytelling conventions. The Grand Theft Auto series, for example, could be described as having a drama, crime, fantasy genre and an action, role-playing game type.

5. ADVENTURE/ROLE-PLAY (HYBRID) GAMING

Adventure and Role-play games (ARPGs) are more advanced part of the gaming spectrum as they demand a lot more logical thinking and persistence from the gamer. ARPGs are the coming together of two types of games, the Adventure and Role-play. From the creation of this Hybrid type of game to its final game play on the platform of the player, it entails a lot of thinking, physics and consistency. Originally the term role-play referred to acting out a role for therapeutic reasons. The psychiatrist Moreno, who coined the term role-play in the 1920s, asked his patients to act out their problems instead of talking about them. Role-play became a common tool to approximate 'real life' experiences in disciplines such as psychotherapy, organizational change and education.

Every game has inbuilt features which collectively constitute the virtual environment. The internal features of ARPGs consisting of Environment, Context, Theme, Plot and Characters. These features have been discussed in detail in XXX, 2010. These features are designed by the game builder to create the Terrain and this is more detailed in Adventure/role-play games due to the complexity and effort of the game developer to produce a life-like terrain that's both interesting and stunning to the player.

5.1 ARPGs attributes and Learning Technique

ARPGs have many attributes detailed below that are associated with how people learn:

5.1.1 Social

Games are often social environments, sometimes involving large distributed communities. It is not the game play

per se but the social life around the edge of the game that carries much of the richness in terms of the game's meaning, its value, and its social and cultural impact.

5.1.2 Research

When a new player enters a game, he or she must immediately recall prior learning, decide what new information is needed, and apply it to the new situation. Those who play Adventure/Role-play games are often required to read and seek out new information to master the game.

5.1.3 Problem Solving

Knowing what information or techniques to apply in which situations enables greater success, specifically, problem solving. This often involves collective action through communities of practice.

5.1.4 Transfer

Games require transfer of learning from other venues—life, school, and other games. Being able to see the connection and transfer existing learning to a unique situation is part of game play.

5.1.5 Experiential

Games are inherently experiential. Those who play games engage multiple senses. For each action, there is a reaction. Feedback is swift. Hypotheses are tested, and users learn from the results. (Marc Prensky(2001))

One of the leading examples according the report released by GameSpot (2013) of ARPG is the Elder Scrolls game. Although a personal view highlighted some shortcomings such as:

i. Narrow Cultural Selection

The Game picked Influences from several races and cultures all over the globe (Medieval, Roman, Nordic, Ancient Japanese, and so on) but failed to pick from the rich and widespread cultures from the African continent.

ii. No Health Promoting Strategy

The Elder scroll franchise is an Action Adventure/role-play game which would let players sit at it for hours. The fastest recorded timeframe to complete the Elder scroll: Skyrim is 90 hours which is approximately 4 days of nonstop gaming and this is quite hazardous to human health. In 2010, it was recorded that a Man died of brain seizure after playing a game for 90 hours. Medically we are not allowed to stare at the computer screen for 5 hours without taking a break and this healthy idea has been incorporated into games like Candy crush on android and iOS that allows you to rest for 3 days after completing a group of levels.

iii. Little Educational Value

Elder scrolls theme has no educational undertone to the series; a student player is learning almost nothing of his environment of reality as he advances but a writer or game designer could gain creative knowledge from the gameplay.

6. SOCIOCULTURAL FACET IN PRO-GAME DESIGNS

6.1 SYLVERINE

The outcome of this work is an ARPG computer game (construct) called 'Sylverine' The construct is designed to be both entertaining and at the same time educative in context. As it should instill the player with morals typical to African culture as well as influences from other races and at the same time it should be healthy. Due to its fantasy genre and level mechanics, Sylverine would contain extensive environmental details, and cross cultural models of ancient African heritage. The Levels in this game is mimed from a yet-to-be-published literature: "Sylverine's Wrath: Dawn" written by Adegbenro Oluwatobiloba the project is based on the beginning of the book which is more of role-play, adventure and strategy. No violence is allowed in this version of the gameplay. The player is allowed to have an adventurer experience of African environments and cultures while picking up historic items and significant artifacts at various levels.

6.1.2 MakeHuman Modelling Application

MakeHuman is an open source human modelling software used majorly to model humans and humanoid characters. MakeHuman allows you to create meshes of your objects as well as build skeletons which can be used in animation as well as the game engine. The Main character Sylverine was created using this application. MakeHuman enabled us to create human features like hair color, eye color, skin and private parts.

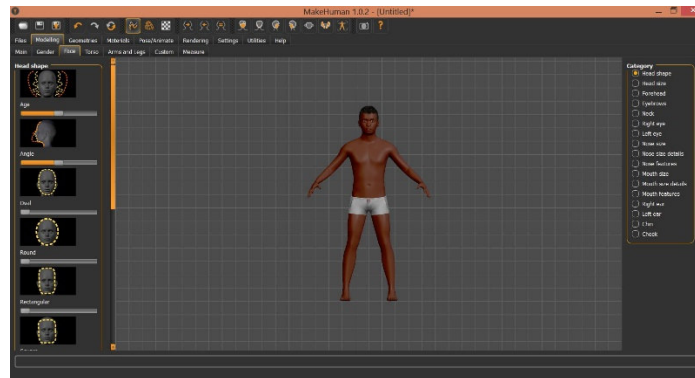


Fig 1. MakeHuman Model-Sylverine Character (African teenage boy)

6.1.3 Unity 3D

Unity 3D is a game building engine that allows you to build high definition objects and a world class gaming experience which can be ported to several platforms. Unity is quite convenient to use and implement, this is the reason we picked it over blender which was formerly intended. Unity 3D works with Unity script, Java and C#. Unity 3D was used to develop the environment for our project and also the scripting of the movements within the game. It's a complex application for amateurs like us but with a lot of help from a more professional game builder we got beyond a lot of obstacles. Unity 3D was also used in building the animals and almost natural movement of wind, water and the air movements in the game.

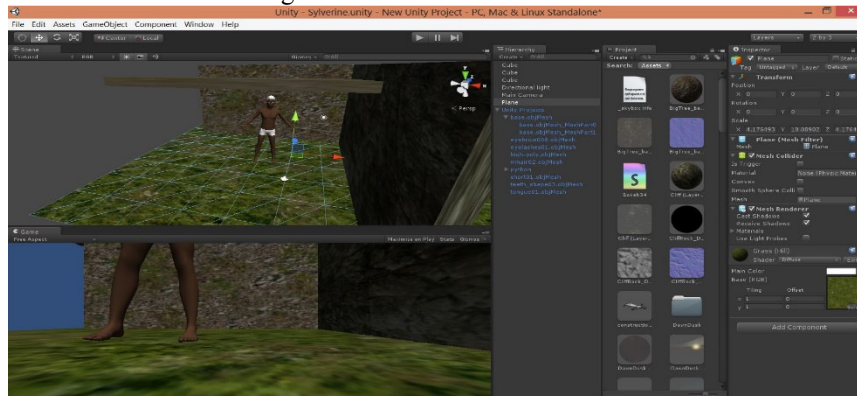


Fig 2. Game Engine

6.2 The Game Engine (The Iceberg beyond Vision)

The game engine is a fundamental part of this project or any game project. This is the main power house or life force of the entire application. The Game engine entails the processing unit of the application as a whole. It combines algorithm, architecture and requirements to give an output used by the player and displayed on the interface. The engine works just like the processing unit of the computer, it manipulates inputs in line with constraints and extensions posed on it by the algorithm by which it was designed.

The Architecture of the project falls under the ARCS (Attention, Relevance, Confidence and Satisfaction) strategy as a game based learning process in which the user is both alert, retentive and at the same time not bored of his/her activity.

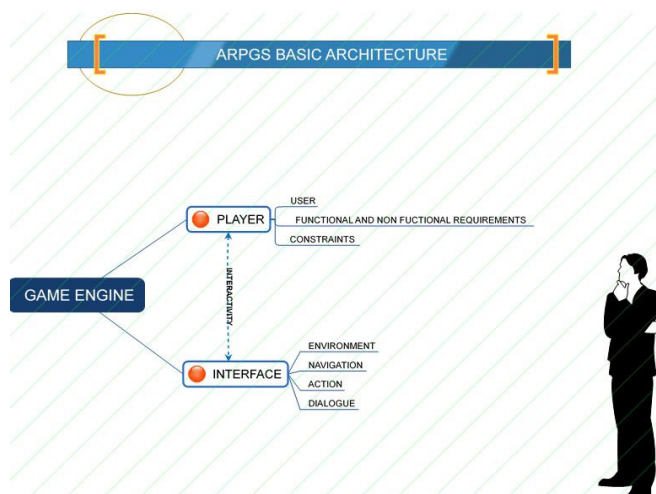


Fig 3. Sylverine's basic architecture

7. FUNCTIONAL REQUIREMENTS OF SYLVERINE

These are a set of features the system is expected to have on a general level, these requirements are:

Req_1

Software shall have the capability to save the game state from a menu.

Req_2

Software shall have the capability to return to a saved state by loading a file.

Req_3

Software shall have the ability to associate user profiles with saved game files.

Req_4

Software shall allow the player to choose file names.

Req_5

Software shall have a Main Menu that will have a Load option.

Req_6

Software shall prompt the user to create a profile that is stored in the "Profiles" directory.

Req_7

Software shall have a Pause/Resume feature.

Req_8

Software shall support panels, menus, buttons, sliders text boxes and pictures.

Req_9

Characters shall have at a minimum these attributes [morals, courtesy, agility, vitality]

Req_10 (Modified)

The AI shall be able to play in response to the main character.

Req_11

Software shall include default music.

Req_12

Software shall operate correctly in the absence of music files.

Req_13

Software shall support DirectSound and a variety of sound formats, particularly .wav and .mp3.

Req_14

Software shall support a main menu with these entries:

New Game

Options

About

Exit

Req_15

Software shall support the following options:

Change Resolution

Sound

Volume

8. NON-FUNCTIONAL REQUIREMENTS OF SYLVERINE

These are features that differentiate our application from others out there in the market, these features are:

Req_16

Software shall support a tool tip to provide information to the player of the game.

Req_17

Software shall include a user's guide.

Req_18

When a user starts the game, he will be provided with new and load options.

(Game starts with a scroll-up video, followed by main menu screen)

Req_19

Software shall support the following software/hardware:

- Windows 7 or higher
- 1500 MHz CPU
- 2 GB
- 500 MB 3D Accelerator
- CD ROM
- DirectX 9

Req_20

Software shall support a global system clock to synchronize events in the game.

9. HARDWARE AND SOFTWARE REQUIREMENTS

The Application is currently playable on Microsoft Windows while other platforms like Linux, Ubuntu, and Mac OS X are also portable.

Application software required for easy execution of the software include the following:

1. DirectX 9.0 and above
2. Java Runtime latest version

9.1 The Supported computer systems

The type of computers intended to be used are micro-computers such as laptops and desktops with at least 500 mb dedicated video Random Access Memory (RAM). Keyboard or Joysticks and Gamepads to bring about an exciting gaming experience.

The proposed system is built around all the components in the theoretical framework and takes in consideration the needs of the African gamer. We'd break down the entire project into some certain parts which are:

10. GAME DETAILS

i. The Start-Up Video

Sylverine will have a startup video which will allow the player to skip after 5 seconds of video play. Video will start in a dark screen with the following text scrolling across the screen.



Fig 4. Start-up video

ii. Menu

The main menu contain new which allows player create a new profile, load which allows player to start from checkpoint, options allows player change the game display, about displays information about the builders and exit allows the player to exit the game.



Fig 5. The Main Menu

iii. The Environment

The main environment of the game will be a large terrain with towns, streams, farms, mountains and forests. It has a very vegetative environment with bamboo trees, palm trees, native trees and a lot of grasses and corn field to show the verdurous nature of the African terrain.

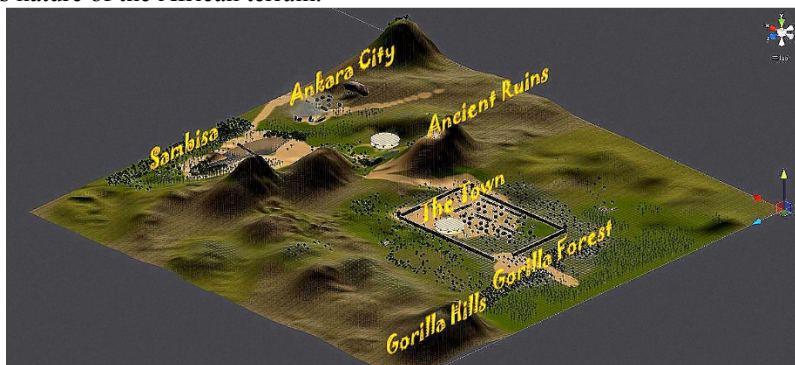


Fig 6. The Environment

iv. Members of the Town

The Town is inhabited by a lot of people who are either serving in the temple or attendants of the main character (Sylverine).



Fig 7. Members of the Town

The environment has designed to contain objects and items such as:

1. Benin pendant mask
2. Bronze head from Ife
3. Maasai shield of Kenya
4. Egogo
5. Staff of Oranmiyan
6. Intricate bronze ceremonial pot
7. Nok rider and horse terracotta
8. Bronze head of Queen Idia

- 9. Yoruba beaded crown
 - 10. Ikogosi Waterfall
 - 11. Pop-Up displaying Artifact History
- v. **Images Showing the Details**



Fig 8. Benin pendant mask



Fig 9. Ikogosi Waterfall



Fig 10. Staff of Oranmiyan



Fig 11. Pop-Up displaying Artifact History

11. CONCLUSION AND RECOMMENDATION

The concept, design, construction and implementation of this project clearly demonstrates that games are applicable to every aspect of our lives. There is no age limit to our project as it can be played by different people. It also shows that technology from one area can be applied to another field as we have demonstrated in this project and that games are also a means of learning which if included in curriculum could boost students' interest in certain subjects and fields. Having gone through the design and implementation of this project, we came up with the following recommendations:

Primary Schools and High Schools can use our game as a teaching aid for Social studies and History classes. And in the nearest future, Tertiary Institutions would be able to include it into their Curriculum.

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