



CONSPIRACY CODE

Product Overview

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Introduction

Florida Virtual School (FLVS) and 360Ed, Inc. were brought together by the shared vision of creating a course taught entirely through a game-based environment. The result of their collaboration is Conspiracy Code™ – a revolutionary line of courses that truly embody the best of education and online game-based technology.

For the 97% of teens who play video games on a daily basis, Conspiracy Code creates a new interactive learning environment in which they can collaborate, explore and build life-long skills around core course content. For educators, Conspiracy Code offers an opportunity to engage students in active learning that facilitates development of 21st-century skills (critical thinking, collaboration, and communication) using the efficiencies provided by technology.

By leveraging the strength of this partnership between a leading interactive education development company and a national leader of e-learning solutions for K-12 students, the initial game in the Conspiracy Code series offers tremendous potential for revolutionizing the way students learn and the means by which teachers facilitate that learning.



The Opportunity

Today's public schools face a number of challenges – overcrowding, escalating costs for textbooks and supplemental materials, growing facility maintenance and development – that stand in the way of change. Although these and other hurdles persist, many leaders in our public education system recognize a tremendous need for improving instructional efficiencies while maintaining high standards of quality.

Text-based online courses are a step in the right direction. They offer the opportunity for individualized instruction and address some of the economic efficiency issues. They provide students with the flexibility in pace for both learning and scheduling essential to managing their overbooked lives. However, while these standard online courses are an excellent option, they are not a complete solution.

Since online courses were introduced just a little over a decade ago, technology has evolved and so have the expectations of our youth. Today's students are accustomed to more engaging activities, enhanced graphics, and progressive challenges that stimulate their knowledge and skills. To date, the options for online education have fallen into two broad categories: 1) Fairly static web-based presentation of educational material, and 2) Small educational games that are entertaining but only serve to reinforce a narrowly-focused subset of the materials required for a complete course.

Future online courses will need to offer activities to keep students engaged and opportunities for students to customize or personalize the content. In the future, successful online courses will shift the role of the teacher to that of facilitator, mentor or guide. Teachers will encourage students to dig deeper into content, challenging them to strive for higher academic achievement. They will keep students motivated, and intervene when needed.

After surveying current instructional practices and studying the online learning trends of the past 10 years, FLVS and 360Ed, Inc., set out to create a solution that combined the best economic efficiencies and instructional practices of text-based online courses with the engagement and interactivity of online game-based play.

360Ed/FLVS Solution

FLVS and 360Ed, Inc., have joined forces to provide an innovative, comprehensive answer. Not only is Conspiracy Code a game (providing the desired engagement and entertainment), it is also a complete course that meets state and national educational standards. Students who complete Conspiracy Code will earn high school credit in American History.

Conspiracy Code courses utilize a robust Content Delivery System named SiTi™ (Student interface / Teacher interface). SiTi is essential for downloading and patching the

game (making future fixes, adjustments, additions, or content changes simple to enact), facilitating communication between the students and teachers, maintaining grade books, providing space for announcements and discussion boards, tracking student pacing and progress, and allowing teachers to observe student trends on both individual and aggregate levels.

Conspiracy Code's disruptive nature to education's status quo has already produced a number of benefits:

Benefit 1

Provides a student-centered approach to learning that is designed to INCREASE RETENTION OF CONTENT, CONCEPTS, LESSONS, AND SKILLS.

Benefit 2

Presents a flexible environment that allows students to SELECT PACE OF PLAY. Qualitative and quantitative research shows students perform at a higher level when they can control their pace of learning.

Benefit 3

Presents multi-sensory gameplay and communication mediums to SUPPORT INDIVIDUAL LEARNING and unique learning styles.

Benefit 4

OFFERS A SEQUENTIAL LEARNING PATH to challenge students to master content or concepts before advancing in the course.

Benefit 5

Provides an interactive, simulated environment with "lifelike" scenarios, which increases comprehension, content retention, and academic performance.

Benefit 6

Supplies constant and immediate positive feedback from teachers to boost confidence, reinforce lessons, and strengthen content acquisition.

Benefit 7

Offers a mixed approach to assessments – un-graded, automated assessments, and graded, instructor-evaluated assessments – allowing teachers to focus on mastery of content and concept, as well as development of higher-order and critical thinking skills.

Benefit 8

Provides server-side tracking and evaluation tools that empower teachers to facilitate learning for a larger number of students, each operating asynchronously and at an individualized pace.

Implementation

Genre

After extensive research, thought, and discussion, the development team concluded that the game genre for the Conspiracy Code courses would be dependent on subject matter. For instance, a physics course would be more easily developed using simulations, while geography courses would be best created using an ‘exploration’ game mechanic.

Since history has a feel similar to storytelling, the decision was made to pursue a standard point-and-click adventure game for the American History course – the first course to be released in the Conspiracy Code series. Point-and-click adventure games are characterized by being heavily story-dependent, with a predominance of character interaction, dialogue, and puzzle-solving forming the majority of the game experience. Given that American History courses require the incorporation of a large amount of data, the Conspiracy Code design team felt that a point-and-click adventure game would present that knowledge in the most engaging environment. The team also planned to use the characters in the game to serve as ‘interpreters’ of history and provide the higher-order thinking examples that are desirable in modern educational approaches.

High Concept

During the pre-production phase of the first Conspiracy Code course, FLVS and 360Ed, Inc., conducted extensive focus group testing in order to better understand the tastes of the specific audience in question (high school students). Based upon the results, the team developed the high concept for the American History course (Note: As defined by game developers, ‘high concept’ is the underlying premise that places the game’s story in a context that the broadest possible audience will find engaging). Everything from the



storyline to the musical style, appearance of the characters, and gameplay mechanics was vetted against a random sampling of student volunteers. The fictional setting of a near-future city in the midst of a conspiracy-based takeover was determined to appeal to a broad, non-gender-specific audience of 15-year-olds. Conspiracy-based fiction is especially present in a great deal of pop culture media.

The game’s exaggerated cartoon-style aesthetic was chosen in part for its appeal to the target audience. Using cartoon-style characters also met the goal of creating a course that placed the fewest possible hardware burdens on the end user; cartoon-styled assets are easier for a machine to render and animate than the photorealistic constructs of higher-end computer games.

The American History game takes place in the fictional locale of Coverton City, where an organization known as Conspiracy Incorporated is in the process of revising historical records in an attempt to support their eventual conquest of the world. Their belief is that rewriting history will ease resistance towards a gradual political takeover. Two high school students, Eddie Flash™ and Libby Whitetree™, are teamed with a sentient computer known as B.E.N. (Bio-Electronic Navigator). Students play the game as these characters, rooting out Conspiracy Incorporated’s agents and correcting the damage they’ve inflicted on history.

Features

Clue Finding – Various tools in the game allow students to discern the location of computer records which have been targeted for corruption by agents of Conspiracy Incorporated. Because these records are often under observation by security guards or enemy agents, students are drawn in by gameplay that tasks them with safely locating and collecting the affected historical records. This targeted data, when collected, is displayed to players in the form of ‘Interactive Information Modules,’ described below.

Interactive Information Modules – These modules contain the bulk of the historical course content. The information, written by FLVS Subject Matter Experts, has been entered into standard web pages and can be viewed within the game engine as well as SiTi. When students first receive and open the files, all information is accurate.

However, once closed, the information files can become corrupted in a number of ways. One of the student’s challenges will be to correct the information – these ‘corrections’ take the form of un-graded assessments.

Note-Taking – In order to aid Coverton’s anti-Conspiracy resistance movement, students use a note-taking system where they synopsize the contents of the records they’ve received and reply to educator prompts. Effective note-taking makes the process of restoring corrupted data easier, and strengthens students’ writing skills. Notes are viewable by teachers and are taken into consideration when assessing each student’s progress. This affords the course an additional level of academic integrity, as each student’s notes will be unique.

Environment Navigation System – The game’s environments are large and complex; a simple objective mapping feature provides students with diagrams that allow them to clearly see where they are and what other rooms exist in their current location within the world. Students may access this navigation system at any time through their characters’ high-tech wristwatches.



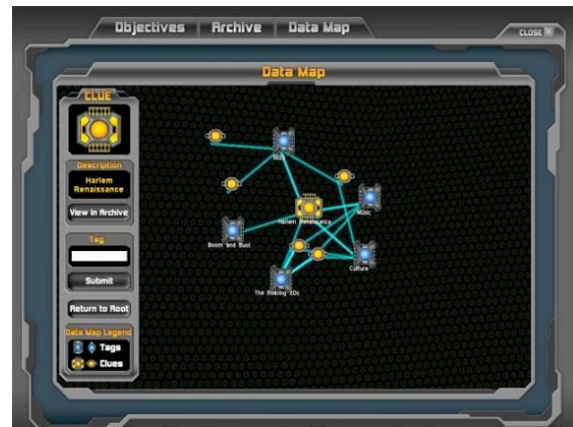
Interrogation – When students encounter people within the game world, they can use Interrogations to separate enemy agents from ordinary citizens. Based upon the storyline premise of the game, all

enemy agents have been brainwashed to spread disinformation about history. All agents provide students/players with information that relates to the clues being collected in that mission. Students must separate fact from fiction in order to identify and flag enemy agents. Once a student identifies an agent, they can either be avoided, or removed from the game. During focus group testing, students were highly engaged by the interrogation feature.

Character Interactions – For the purposes of providing an engaging atmosphere, furthering the storyline, and informing players about what actions to take next, a diverse assortment of computer-controlled characters was created. Each character has a unique personality that is both engaging and functional.

Data Archive – Every Interactive Information Module a player collects is stored in an archive that is accessible at any time.

Data Map – A unique form of information referencing assists students in both data organization and associative thinking. The Data Map tool was developed to allow students to group content modules according to their own personalized associations. Content is connected by requiring the student to tag each module with an associative keyword that can then be joined to one or more related subjects. This mapping system is open-ended and makes it easier for students to locate required information. Using their Data Map, students can form connections between the collected information – an activity that is used as a form of higher-order assessment. This provides further academic integrity to the course because every student’s map will be individualized to the way they think.



Agent Elimination – In order to accomplish certain goals within Conspiracy Code, such as removing enemy agents from the world, a unique set of engaging concept games are woven into the course. These activities offer an arcade-style entertainment interaction while strengthening educational concepts. For example, in order to remove an enemy agent, the player must compete against them. They are challenged with correctly identifying missing words from a historical sentence; the enemy agent will drop a series of words down on the player, and by moving the cursor, the student can complete the sentence with a correct answer. If successful, the enemy agent is removed from the game. In order to complete Conspiracy Code, enemy agents must be identified and removed.

Assessments – Aside from the Data Map, Note System and Interactive Information Module assessments, students are also assessed by regularly-scheduled verbal interviews conducted by teachers, culminating higher-order thinking mission assessments, and

segment exams. Students submit authentic, written or project-based assignments at the end of each mission. At any phase of the course, the teacher can impose ‘roadblocks’ in the game if, through observation and evaluation, it is determined that a student’s pace or progress is unsatisfactory. These ‘roadblocks’ require the student to perform specific tasks before being allowed to resume gameplay.

Content Management System – The entire game is monitored and administered through an integrated content management system in which students can obtain a high-level overview of their progress. They can use this system to communicate with FLVS faculty, view announcements, submit written assignments, and participate in chat-board discussions. A faculty mode allows teachers to review grade books, monitor individual student progress, and study comprehensive statistical trends.

Theory

According to Le Tellier (2007), in order for short-term memory to be moved to long-term memory, four components must exist: the context connection, the cognitive connection, the character connection and the classroom connection.

The gameplay design and assessment architecture of Conspiracy Code courses are modeled around the 12 principles set forth in the Caine and Caine research of brain/mind learning. All educational content and delivery was created and approved by FLVS Subject Matter Experts and pedagogical doctorates from the University of Central Florida. The course is aligned with both state and national standards and content is at a Flesch-Kincaid reading level average of 11.6. The design team also considered findings from Le Tellier’s work on how to strengthen and build long-term memory.

Conspiracy Code maintains a high-context connection by keeping the students excited, motivated and enthusiastic about the gaming environment. These cognitive connections include reinforcement through deliberate strategies—such as clue collection—designed to challenge the student's current level of achievement throughout the course. The dynamic, entertaining story genre is effective in helping students build context connections and engage in character play. Character connections give students a sense of ownership and help maintain the integrity of the gaming environment.

Pedagogical foundations

Cognitive neuroscience research (CNR) and related brain-based learning (BBL) principles serve as the pedagogical foundations for Conspiracy Code. CNR and BBL principles were used to inform the design of Conspiracy Code because, unlike behavioral and psychological explanations of human learning, physiological research and theory emphasize the role of human emotions during the learning process; a key to game-based learning.

Specifically, 12 principles of brain-based learning posited by Caine and Caine (1997) and based on neurological and biochemical studies of human learning and the brain were used to generate game design guidelines for Conspiracy Code. The guidelines were then applied to design the educational aspects of Conspiracy Code as well as integrate and balance the educational and entertaining aspects of the game in order to ensure it is both effective and engaging.

By addressing these principles, educators establish three conditions that are thought to be fundamental to higher-order thinking and complex learning, including: (a) relaxed alertness, (b) orchestrated immersion, and (c) active processing (Caine, Caine, McClintic & Klimek, 2005). Table 1 lists the 12 principles of brain-based learning as they relate to the three fundamental conditions.

Relaxed Alertness:

- Principle 2: The brain/mind is social.
- Principle 3: The search for meaning is innate.
- Principle 5: Emotions are critical to patterning.
- Principle 11: Complex learning is enhanced by challenge and inhibited by threat.

Orchestrated Immersion:

- Principle 1: All learning engages the physiology.
- Principle 4: The search for meaning occurs through patterning.
- Principle 6: The brain/mind processes parts and wholes simultaneously.
- Principle 10: Learning is developmental.

Active Processing:

- Principle 7: Learning involves both focused attention and peripheral perception.
- Principle 8: Learning is both conscious and unconscious.
- Principle 9: We have two ways of organizing memory (one stores isolated facts, skills, and procedures and the other engages multiple systems to make sense of experience).
- Principle 12: Each brain is uniquely organized.

Table 1 – Brain-based learning principles related to three conditions for complex learning.

Conspiracy Code is designed to create an optimal emotional climate for learning by promoting a sense of relaxed alertness. Cognitive neuroscience research suggests that there is an optimal emotional state for learning that is affected and moderated by fear and pleasure centers in the brain. Students who achieve this state feel competent and confident, and are intrinsically motivated. By presenting students with a series of highly challenging—yet non-threatening—activities, Conspiracy Code grants them ongoing opportunities to experience competence and confidence accompanied by motivation linked to personal goals and interests.

Cognitive neuroscience research also indicates that the human brain learns through experience. Physical experience with the world engages students’ senses and creates optimal opportunities for learning. Conspiracy Code immerses players in complex learning events that allow them to interact with knowledge in ways that are both concrete and physical. Conspiracy Code also orchestrates immersion by calling on students to

connect new terms and concepts with what they already know in order to fuel the search for an understanding that is deeper and more complex than what is found in non-immersive learning environments.

To optimize and reinforce learning, Conspiracy Code stimulates the active processing of experiences through questioning, feedback, and focusing students' attention and stimulating their peripheral perceptions at the same time. Students are continually required to identify characteristics, see relationships, analyze situations, make critical decisions, reflect, and communicate their understanding in unique ways.

Time and Achievement Research

In both the gaming version of American History and the traditional online version of the course, two teachers will be tracking their time with the Paymo.biz project tracking application in the following areas: time spent in assessment and evaluation, time spent interacting with students, and time spent troubleshooting technical issues. Students in both course versions are also tracking the amount of time spent active in the course, in assessments and evaluations, and interacting with their teachers. In addition to time tracking, achievement data will be collected and compared upon semester completion, and a qualitative oral survey will be administered to students with a focus on retention and engagement. A similar survey will be administered to the teachers in order to assess their level of engagement as a facilitator and to identify any areas that might warrant further training or modification. The data will be analyzed separately and used as a comparative evaluation between the traditional online course and the gaming version of the course.

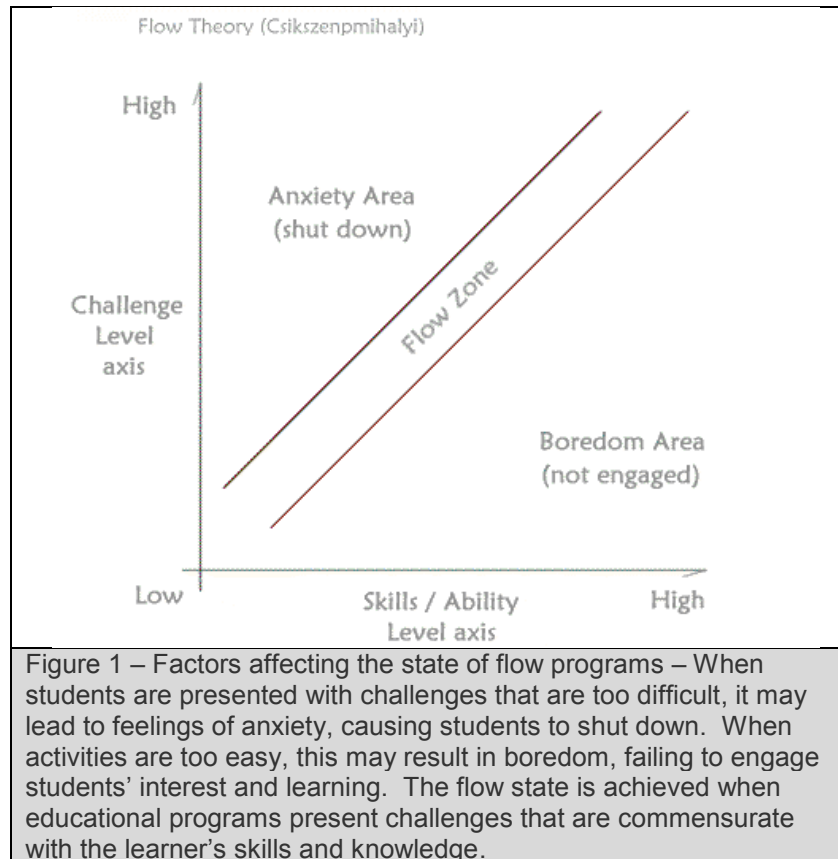
Flow Research

Understanding the Flow State of Video Game Players using Psychological Measures

To facilitate game-based learning, Conspiracy Code presents players with a series of challenges that are designed specifically to induce a state of "flow." The primary purpose of this study is to determine if and to what degree the game induced "flow" among target learners.

Initially, a set of game design guidelines were generated based on Caine and Caine's (1997) 12 Principles of Brain-based Learning to integrate the educational and entertaining aspects of Conspiracy Code. Game designers applied the guidelines to create three essential conditions within the game for complex learning: (a) relaxed alertness, (b) orchestrated immersion, and (c) active processing. This investigation represents the beginning of a series of studies examining the psychological and physiological impact of the game on student learning and motivation.

This study brings together recent theoretical and empirical work in cognitive neuroscience to study the concept of relaxed alertness and related “flow experiences.” Flow is defined as the complete and total involvement in a given task (Csikszentmihalyi, 1990). As shown in figure 1, educational games must strike the proper balance.



Research Objectives

- 1.0. Determine valid and reliable measure of flow
 - 1.1. Identify related neuro-architecture and physiological processes
 - 1.2. Measure physiological changes
 - 1.3. Refine measures and establish reliability
 - 1.4. Establish concurrent validity with related psychological measures

- 2.0. Generate, validate and test game design guidelines
 - 2.1. Adopt brain-based learning principles
 - 2.2. Generate and validate game design guidelines
 - 2.3. Design and develop game
 - 2.4. Test and refine game

- 3.0. Refine guidelines and formulate instructional entertainment theory
 - 3.1. Analyze results

- 3.2. Review research and literature
- 3.3. Refine guidelines
- 3.4. Formulate theory over time and instances

Methods

Instruments

This study will use psycho-physiological sensors to measure changes in participants' body and brain that are associated with flow, including:

- Electrocardiogram (ECG or EKG). Measures variability in heart rate.
- Galvanic skin response (GSR). Measures the electrical resistance of the skin.
- Encephalography (EEG). Measure electrical activity along the scalp produced by the firing of neurons within the brain.
- Eye Tracker. Measures eye position and movement.

Procedure

A total of six students from the target learner population with experience playing Conspiracy Code will participate in the initial neurological study. Specifically, three students will complete the procedures in the sequence below. The other three will reverse the order of the games (educational or commercial).

1. Students will complete a 36-item survey designed to measure a student's disposition to flow experiences (DFS-2.pdf) (5 minutes)
2. Staff will set up monitoring equipment on student and calibrate measures (30 minutes)
3. Staff will provide students with a brief tutorial of the educational video game (5 minutes)
4. Students will play the specific segment of an educational video game (20 minutes)
5. Students will complete a 36-item survey designed to measure the experience of flow (5 minutes)
6. Staff will provide students with a brief tutorial of the commercial video game (5 minutes)
7. Students will play the commercial off-the-shelf video game (20 minutes)
8. Students will complete a 36-item survey designed to measure the experience of flow (5 minutes)

Summary

As can be seen, Conspiracy Code offers a unique solution to the realm of online, interactive education. The project combines the engagement of a computer game, the expertise and pedagogy of educational specialists, and a robust set of tools on the server

side that allow comprehensive monitoring and participation by trained instructional specialists.

Currently in beta, the game's effectiveness is being measured both in the lab (via neurological testing) and in the field. Early results are both promising and exciting. Even as empirical data continues to be collected, the game system is being adapted and expanded for use in other courses. It is the goal of FLVS and 360Ed, Inc. to develop an entire suite of game-based courses that will eventually change the way we think about online education.