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Privacy, Pedagogy and Protocols

A Preliminary Report on a Cross-Border Alternate Reality Game to Teach Digital Citizenship

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Abstract

Blind Protocol is an elaborate alternate reality game (ARG) that pits two schools against each other in mock cyber engagement. The month-long game's key objective is to unmask the rival school's identity and location using in-game tools and gradually acquired knowledge on issues surrounding online privacy and security. The game was co-designed by Paul Darvasi (Toronto, Canada) and John Fallon (Fairfield, CT), and its first iteration was played in January – February 2015. The teacher presenters will review student feedback and report on the virtues and pitfalls of addressing an evolving and hot-button topic as a sustained, embodied and narrative-driven game.

An Embodied Approach to Privacy, Security and Digital Citizenship

As the world rapidly digitizes, the issue of online privacy and security has become a widespread and fundamental concern. By virtue of participating in online life, an individual exposes their identity, reputation and finances to the unpredictable intentions of corporations, governments, criminals, activists, and even pranksters. State sponsored surveillance and cyber attacks, hacktivism, corporate data gathering and criminal schemes all exploit a world that is increasingly dependent on computer networks. The lack of physical immediacy in online interactions renders these potentially harmful entities nearly invisible to the uninformed user.

A recent study by Common Sense Media reports that teens spend an average of 9 hours a day consuming media, much of it online (Common Sense Media, 2015). Considering how much time youth spend online, it is critical that schools actively cultivate the skills and awareness for healthy and secure participation. Students should understand the issues and consequences involved with the decisions they make online. North American curricula sometimes addresses basic topics associated with online privacy and security, but this is complicated by the rapid and ongoing changes in the way that youth engage with media.

Blind Protocol is an alternate reality game designed to instruct on privacy and online security by means of an embodied and ludic narrative. Leveraging the benefits of game based learning (Gee, 2003; Dickey, 2005) the month-long cyber engagement simulation was enacted across national borders between two high school classes and ended with them trying to uncover each other's identities. The natural attributes of an ARG fit well with the topic of online privacy and security. ARGs blur the lines between truth and

fiction, are geographically pervasive and asynchronous, rely on networks and emphasize code breaking, all features that coincide with the real world operations of online privacy and security. Also, the game's narrative allows for a plot to generate awareness of the larger geopolitical and economic forces at play in a wired world. Ideally, the formal structure of the game would reinforce and support the content in a suitable and relevant way. This type of embodied learning allows students to experience the fragility of their privacy by giving up seemingly innocuous information that exposed them with surprising speed and accuracy – the same type of information that students freely give up daily with little thought or even awareness.

A Brief Overview of Alternate Reality Games

Blind Protocol's closest gaming relative is the alternate reality game. Although *Blind Protocol* makes several diversions from the traditional ARG formula – sometimes out of innovation, sometimes to better align the game with pedagogic principles – its core gameplay would be familiar territory for any experienced alternate reality game player. However, alternate reality games are a niche community in the game world, and even gaming enthusiasts might not be familiar with some of its relatively arcane elements.

ARGs, in their modern form, were born in the 1990s with the growth of the World Wide Web, and they were more or less the creation of tech savvy, creative marketers who took advantage of the still mysterious, yet accessible, nature of the nascent Internet to create unique interest in the content they were representing.

ARGs utilize both digital and real world platforms to engage the player, leveraging elements such as social media, email, phony websites, hidden items, false documents and telephone calls (Szulborski, 2005). The game's use of real world paraphernalia, actors and multiple channels of communication blur the lines between truth and fiction. A core convention of the genre is the denial that a game is being played at all, popularly referred to as the "This Is Not a Game" ethos. The creators, or "puppet masters", do not explicitly acknowledge they are running a game, and many players enjoy the high level of immersion. It bears adding that players do not typically act or roleplay in an ARG, but tend to play as themselves.

Players progress by solving difficult puzzles, code breaking and overcoming complex challenges. This aspect of ARGs aligns with the notion of encryption as a central consideration in matters of online privacy and security. Game activities are carried out in a variety of physical spaces, extending beyond the precincts of the classroom and even the school. Players must often gather disparate components, information and resources to crack the codes, essentially searching for needles in virtual/physical haystacks. Much like a cyber analyst, an ARG player sifts through and analyzes volumes of data in order to discover a pattern or crucial piece of information. Typically, players tend to band together in online forums to pool their resources and solve these difficult puzzles. All of these activities involve a meaningful use of critical thinking, creativity, collaboration and resilience, cornerstones of 21st century learning.

Finally, ARG players are motivated to overcome these challenges to uncover a story. As players collect more information to solve the puzzles, they also acquire snapshots of a developing narrative. The story begins with the "rabbit hole" – or the initial event or strand of information that invites the players to

enter into the pervasive fiction of the game. This could be a phone number for a Sentient Machine Therapist on a movie poster for Steven Spielberg's 2001 film *AI: Artificial Intelligence* (as it was for the influential ARG, *The Beast*), a news article that purports to be real but is woven with strange references to unbelievable events, or a Youtube video that appears to get "hacked" and a surprising message appears. Eventually these narrative fragments – diary entries, voicemails, emails, photos, and even direct contact with live "characters" – coalesce to form a complete story.

Blind Protocol's Game Structure

Blind Protocol deviates from the traditional ARG structure in several ways. For one, it has been reformed to accommodate two competing teams. ARGs are typically collaborative experiences: a self-organized thinktank of enthusiasts working together to overcome the game's challenges together. However, for a large portion of the game neither team was aware of the other's existence and believed only their class was participating.

The game took place over four weeks and was the complete focus of the class for the duration of that month. It began with a rabbit hole and its mirrored execution is indicative of how the game was run in tandem. On the same day, Darvasi and Fallon engaged their respective classes in a discussion on cybersecurity. A doctored video appeared to be paused as the teachers each left their respective classrooms to answer a fake call. Once the teachers left their rooms (and they did not return), the "paused" video resumed, apparently hacked by HORUS, the central entity/antagonist. After introducing itself, HORUS proceeded to conscript the students and launch the game. Narratively, HORUS is secretly a rogue artificial intelligence seeking to understand human computer interactions, but players only discover this at the game's conclusion. Like many traditional ARG rabbit holes, the video provides the essential information to begin the game: basic narrative, context of the puzzle progression, and the first set of challenges.

Blind Protocol is organized into four distinct stages of progression, or "ranks". As the students progress through the challenges issued by HORUS, they "ascend" and are given more privileges and content within the game. The challenges are in line with readings and artifact production related to the topic of online privacy and security. HORUS's identity is a mystery and a central narrative hook throughout the game. Darvasi and Fallon assumed identities as unwilling agents of HORUS, who admitted knowledge of "The Program" but made it clear that they were merely carrying out HORUS's cryptic orders. This allowed the teachers to easily stay "in character" while facilitating the game's progress in and out of class.

Phase 1: Acolyte

The emphasis in the Acolyte phase was on collaboration, critical thinking and problem solving. This phase began as soon as the rabbit hole video ended. The students were pressed into what HORUS calls its "Program" and worked to assemble four pieces of data that had been hidden around the campus. To find these, students self-organized and worked both independently and collaboratively to synthesize the information and problem solve. The game provided directives, boundaries, and limits but also urged students to progress on their own, with the teacher's role simply being monitor and minder.

Phase 2: Analyst

The Analyst phase requires the students to hone their research skills. Contained within the final data cache was a guide which delineated the requirements needed to ascend to the next rank. Their primary objective was to compile a database of articles, links, videos, podcasts, and more on a wide variety of cybersecurity related topics. They were given a lengthy list of specific "targets" which guided their research around major people, organizations, current events, and concepts in the cybersecurity world. The scope could be as specific as finding five published articles on Edward Snowden and as open-ended as collecting three news broadcasts on cybercrime.

Phase 3: Architech

After the database was created, this phase required students to produce artifacts based on their inchoate knowledge of privacy and cybersecurity issues. This was an opportunity to develop a deeper knowledge on specific topics that interested them. The guide acquired by the students in this phase was a rubric with dozens of different assignments or "Artifacts" they could create for HORUS. Students could explore the topic of their choice at their own pace. To further allow students an independent work structure, Darvasi and Fallon implemented a pass/fail grading system that required students to show mastery of the media form and content they were producing.

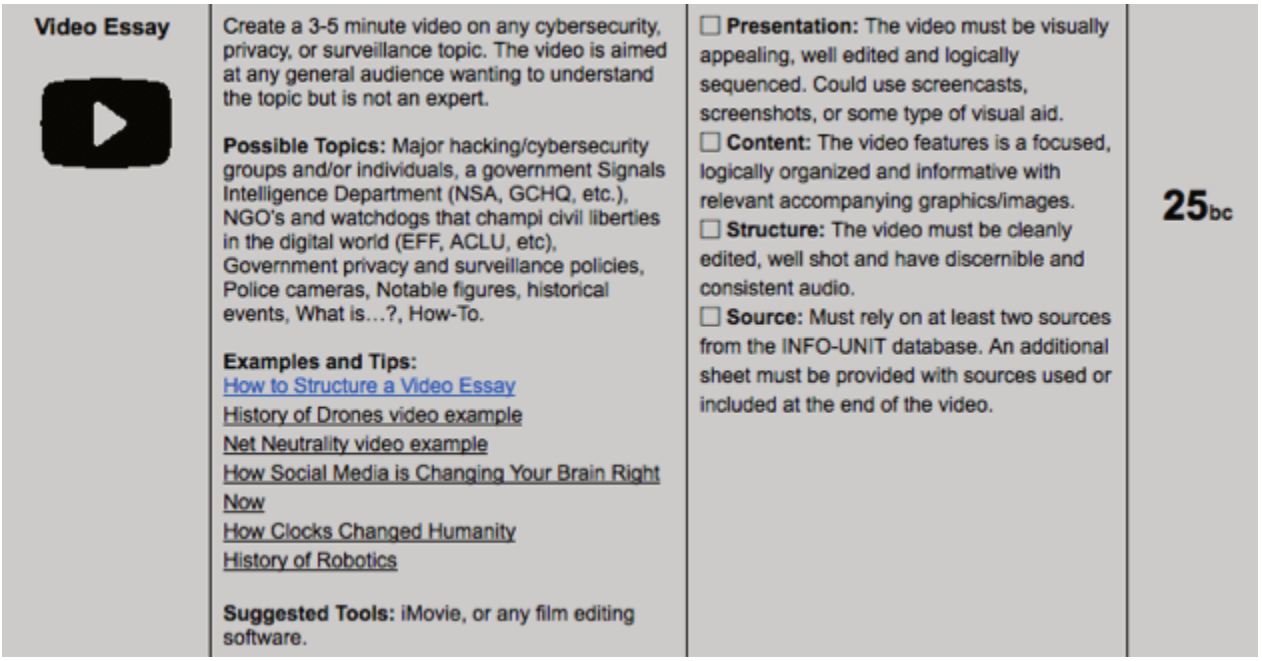

Figure 1: One of many "Artifact" options students could choose to create

Students could develop an Artifact (research paper, video essay, presentation, infographic, etc) on a self-selected topic and once they felt confident their artifact met all requirements they submitted it for approval. Artifacts could be submitted multiple times for acceptance without penalty. This was partially inspired by the traditional ludic structure of video games: you are encouraged to attempt success multiple times, adjusting your progress and using failure to learn. Once the Artifact was accepted by HORUS,

students were rewarded with in-game currency of “bitcoins” which corresponded with another document they were given at the beginning of this phase: The Catalogue.

The Catalogue was modelled after the real life NSA ANT Catalog which was a clandestine shopping list of intrusion and espionage gadgets and programs for NSA agents. Similarly, this Catalogue contained fictional “cyber-weapons” to engage with their as of yet undisclosed adversaries and could be purchased with their earned bitcoins. However, their targets were revealed not to be their classmates as they expected, but a secret group of participants who could be anywhere in the world.

Phase 4: Operative

As Operatives, the students were now pitched in mock cyber engagement based on strategic procurement of information. The objective was simple: discover the identity of the other team before they do the same to you. The Catalogue featured a series of protocols to “hack” an enemy player and “force” them to follow a simple command. All communication was necessarily transmitted to and from the teachers to limit direct interaction between students. Each protocol had a specific deadline and a severe penalty was levied if it was not carried out.

The protocols yielded breadcrumbs of information such as a team mascot or a photograph outside a school window, but when combined with the data other students collected, they could quickly form a surprisingly accurate mosaic of identity. In fact, both teams quickly discovered the identity of their opponent with less than three pieces of obtained information. This was the climax of the game and the purest form of the unit’s pedagogical embodied learning goals: they had learned in the abstract about the fragility and importance of privacy, but now it was put to the test through the game’s safely controlled competition and mechanics.

The unit concluded with confirmation that they had successfully unmasked their rivals. An informal discussion followed prompting reflection on what they had learned about the topic and themselves through the game. Students were also administered surveys to comment on their experience. The results of the survey are summarized in the section that follows.

Results, Reflection, and Iteration

Informal teacher observations and student surveys indicate that participants were engaged and the learning outcomes were met. Darvasi and Fallon administered an informal, anonymous 13-question survey to all 36 participants at the game’s conclusion to gather data on engagement, learning, and design feedback. 75% agreed that the game was a “unique way to learn” and would “try it again”. On the other end of the spectrum, 5.5% were “indifferent” to the game experience. When asked to assess how much they learned compared to a “traditional unit” in the class, 14% answered “less”, 36% answered “the same”, and 50% answered “more” or “much more”. Students were also asked to indicate if they felt they had to use a variety of general competencies. 86% reported having to apply critical thinking skills while playing the game, 83% said they used collaboration, 75% believed they applied creativity related skills, while design, digital citizenship, and resilience were reported by 36%, 31%, and 22% of students, respectively.

Individual student feedback illustrated some common trends. Many students emphasized the freedom

they were given during the game. This was attributed to both the freedom to guide their own work in the Architech phase and the physical freedom they were allowed around campus (or beyond) while they were solving puzzles. Puzzle solving was also a clear highlight, as many students reported feeling challenged, excited, and intrigued. Nearly all reported wanting more of those experiences built in, and several commented that their presence engaged them in all elements of the instruction. However, some students reported feeling left out and subsequent iterations intend to foster greater inclusion while puzzle solving.

Surprisingly, many also reported that producing artifacts – often labelled as the "work" by the students – was not necessarily a turn-off compared to the more ludic puzzle solving and even seemed to legitimize the unit in some students' minds. This was surprising feedback; if it turns out to be a consistent result across different groups, it may complicate the commonly held "chocolate covered broccoli" concept that traditional work should not be included in game based learning units because students will reject it.

However, students also reported several issues with the game. A small, but not insignificant, number simply did not feel attracted to the game-based model. Given the appeal of choice in the data and the teachers' experience, a new design would consider offering a more traditional independent study alternative for students who choose not to play. In addition, many reported feeling overwhelmed with the amount of new data they had to assimilate between each phase of the game. A major planned revision will be to create simplified guides to every phase, including videos. Students also indicated that an easily accessible wiki or glossary of game terms would significantly increase their comfort and comprehension as they progress.

A significant element that will have to be reworked is the research and database creation in Phase 2. Students reported that the work balance was unequal: some motivated students shouldered the majority of the database creation, while others "barely contributed", as one student put it in the survey. However, an initial bulk collection of relevant sources within a large topic might not be a good fit with the workflow of 21st century students. The database was mostly unused and ignored during artifact production. Both groups of students did ad-hoc research once they began working on a particular artifact by finding and utilizing sources that they specifically needed and then moved on. This phase will be completely overhauled, as it did not develop the intended foundational knowledge base for the students to build their subsequent work upon.

Student feedback was essential for gauging the game's success. The responses confirmed the assumption that engagement would generally be high when delivering the unit as an ARG. Darvasi and Fallon are confident there is a foundation to develop and assess this embodied learning method for classroom instruction. However, the complex, layered structure of ARGs can require a great deal of sensitivity to design and player experience, which creates a difficult hurdle. The game's immersion is engaging, but can intimidate even enthusiastic players let alone students who may be experiencing the genre for the first time. In addition, the designers can only run the game once a year, and finding the ideal balance and more accurately assessing learning outcomes will require ongoing iterations.

The enthusiasm and learning informally observed by the teacher-designers during play confirm the value of this type of approach, and points to the importance to continue improving the design and supporting research to more clearly identify tangible learning benefits and outcomes.

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