

5.15 The Role of Game Based Learning in the Health Literacy of African American Adolescent Males

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Abstract. Twenty-first century literacy is more than being able to encode for spelling ability, decode for reading comprehension, and calculate for numeric reasoning. It demands the skills to negotiate the world of technology. Health literacy is lower than general literacy, and general literacy is lower among African American males than the overall population. The authors discuss the prospects of incorporating Game Based Learning approaches into strategies for teaching health literacy. Results of a survey administered to youth to determine their level of involvement in video game playing indicate that key elements must be in place to ensure that a game will be played. These include action, strategy, and entertainment. Future investigation will examine the knowledge level of African American adolescent males of the nexus of certain concepts of climate change and health literacy. Climate change has significant implications for human health. This understanding will produce a scientifically based foundation for curricular and instructional decisions that include GBL. Results of this study will be used to design a video game concept and will contribute to the body of knowledge concerning environmental justice and empower individuals to make informed decisions about their own health and those they influence.

1.0 INTRODUCTION

Problem Based Learning (PBL) or Inquiry Based Learning (IBL) has long been recognized as effective practice in educational strategy [6],[8],[18],[22],[23],[24],[27]. Examples of PBL/IBL include a teacher's judicious use of simulation and role playing. Simulation is a recognized technique to allow students the chance to experience historical events and scientific procedures that might otherwise be unavailable to them. And role playing allows individuals to rehearse scenarios that are likely to occur in their actual employment or social environment. PBL/IBL seems to evolve naturally into Game Based Learning that incorporates the essential elements of simulation and role playing. However, if you design it, will they play it?

In this paper, the authors share the preliminary results of a study that examines the feasibility of GBL to increase the knowledge level of the relationship of climate change and health literacy among African American adolescent males. Specifically, Phase I of the study that addresses the level of involvement in video games among African American adolescent males will

be discussed. Additionally, possibilities for expansion of the concepts of modeling, simulation, and role playing in the design of computer games to increase health literacy among African American adolescent males will be suggested.

2.0 BACKGROUND

As noted, PBL/IBL role playing is not new to instruction in the K-12 arena. But incorporating technology into the process is a relatively new concept and one that is not universally practiced [20]. A critical question addressed in this study is "Can GBL increase the level of health literacy for individuals with a history of health disparities?" Teachers have begun to access video-modeling and its natural companions of simulation and role-playing to instruct students in academic, prevocational, and social skills. *Clover* is an example of a software program developed for middle school students in which they participate in simulations focusing on "social justice, honesty, and conflict resolution" [10].

Wehmeyer notes the success of using video-based modeling and simulation [28]. Examples of interactive videos in the health field include the simulations

of the Health Heroes series developed by Lieberman [11]. Scenarios address the topics of diabetes, asthma, surgery, bronchitis, and smoking. Single or multi-player formats are offered. Other games for health that have been developed include Internet-based virtual environments designed for behavior health care, wellness exercise gaming technology programs, and mobile applications to motivate and support healthy behavior change.

Today, climate change and its implications for healthy living is a focus of national concern. The National Institute of Health has noted that climate change poses a range of problems and has “potentially broad and significant implications for health” (NIH Notice, p.1) [16] in this century. Because of the pervasive concern of the effects of climate change on health [2], the topic is worthy of consideration for GBL. Additionally, health literacy and climate change are mission areas of the National Institute of Health (NIH), the Collaborative on Health and the Environment, the World Federation of Scientists, and the Climate and Health Literacy Consortium.

2.1 The Game’s the Thing

Studies reveal the efficacy of Game Based Learning (GBL) on the acquisition, fluency, maintenance, and generalization of skill sets [3],[4],[19],[21]. Chuang et al (2009, p. 8) [1] note that “computer based gaming not only improves participants’ fact level processes, but also promotes problem solving skills by recognizing multiple solutions for problems” [1]. This is consistent with current neuroscience that advocates the use of instructional strategies that engage both sides of the brain [7]. Although the efficacy of GBL is generally acknowledged as accepted educational practice, the motivation of students to use it cannot be assumed

[29]. The current White House initiative promoting healthy lifestyles that was targeted to African American urban youth relies on the print media of reading and writing. In her Blog posting, *Young Black Males, Learning, and Video Games*, Losh [12] comments on DiSalvo’s work that emphasizes a different approach involving African American adolescent males in the design of video games. Additionally, Losh reports on Bruckman, whose work on gender and computer gaming, contends that looking at masculinity can provide an element of understanding in game design.

2.2 Check the Rock: Ensuring Players Want to Play

Before creating a GBL device to address climate change and its relevancy to health literacy among African American adolescent males, it is first necessary to determine the willingness of such individuals to access the game. What are the key components to promote usage? To this end, a GBL Usage Survey was devised. The survey was based on Whitton’s work [29]. Subjects were students who were participating in a summer program that offers varied academic support services to assist students with transitioning from high school to college. While the survey was administered to males and females across all ethnicities in the program, only responses of those who self-reported as “male” and “African American” are presented. More than 100 students participated. Thirty three respondents reported as African American males. Not every participant responded to all twenty questions. Survey questions were divided into academic and affective domains. Table 1 depicts the frequency and percentages of a sampling of the survey responses.

Table 1 Video Gaming, Climate Change, Health Effects

Are you a video game player?	Yes	No
	N=28 (85%)	N=5 (15%)
How motivated would you be to learn, using video games?	Very much motivated	Not so motivated
	N=26 (81%)	N=6 (19%)
How many hours per day do you play video games during the school day?	One or less	Two or more
	N=15 (48%)	N=16 (52%)
How many hours per day on the weekend do you play video games?	One or less	Two or more
	N=8 (26%)	N=23 (74%)
What extent do you consider climate change to be an environmental problem?	Quite a problem	A medium problem or less
	N=25 (78%)	N=7 (22%)
What extent do you think climate change may affect human health?	It is very likely	It is a medium possibility or less
	N=27 (87%)	N=4 (13%)

Other information captured through the survey indicates that 84% of respondents play video games for entertainment, 10% play because friends or family play, and 2% play to learn more. Fourteen percent of those who noted they did not play games reported that games were not available to them. Eleven percent preferred “other leisure type activities”, and 7% thought playing video games “would waste your time.” Forty-seven percent chose an “action” game as a favorite type, 20%

chose “adventure and role playing”, 17% “simulation”, 13% “strategy”, and 3% “puzzle”. When asked to name games that were played the most often, respondents replied with examples of those in the sports or battle categories. Finally, participants were asked to describe what they have learned about the earth’s environment while playing a video game. Responses included concepts on pollution, nature and technology, weather patterns, destruction by humans, and “nothing.” Participants also noted that playing video games enabled them to learn a number of aspects about human health. These included damage to the body, energy, the importance of exercise, dehydration, and the role of medication. However, a majority of respondents replied with “nothing”, “none”, or “N/A”.

2.3 Capturing the Dream Team

Fantasy is an aspect of successful games. Fantasy employed in instruction can result in mastery of content as well as the thinking skill accessed for such mastery. The lives of students with environmental challenges as well as those who work with them are filled with reality checks, limitations, and boundaries. Gaming about one of those realities, maintaining good health, could afford such individuals not only an enhanced knowledge base about how climate change affects health, but also a degree of empowerment to those who may believe they often have “no say.”

In 1983, Williams [30] proposed that fantasy offered “. . . a new point of view and a new means of remembering information, and it can produce a ‘gut level’ understanding that goes much deeper and will be remembered longer than the verbal presentation of a text or lecture” (p. 117). Experiential learning that involves both hemispheres of the brain is vital to student success. Accessing potential experiences through

computerized role-playing games could afford individuals the opportunity to rehearse what has been presented as a viable model of a climate change/health literacy scenario. Players could likewise experience the results of choosing certain alternatives for overcoming encountered obstacles, as well as take action to help prevent the occurrence of events that cause health problems.

2.4 Putting It into Play

A variation of the concept of Massively Multi-player On-line Role-playing Game (MMORPG) could address the objective of making informed healthy choices. The persistent world of the game is the changing climate and its challenges to human health. And, different players (students, parents, professionals) would assume different roles.

Using Nintendo's "Hydlide" as a model, consider the following revision of the scenario [9]. "You play the role of (insert name) the (insert position: teacher, parent, student, health professional, etc.), a committed advocate for HEALTH armed with nothing but a diagnosis, prescription, and nobility of purpose. As the game begins, you sit in the center of a room surrounded by others who will from time to time attack your proposals. You will attack them back . . . and so the pursuit for HEALTH is on!" Progressing through the game, the player encounters common health related problems with alternative choices of solutions that could then yield either further "obstacles" or open passages for advancement toward a path to healthy living. These obstacles include (but are not limited to) a misdiagnosis, limited resources, no insurance, unhealthy environment, job demands, and personal obligations.

Additional instructional modules could include units on extreme weather events and changes in temperature and

precipitation. What are the effects on health of heat waves, hurricanes, tsunami, and severe drought? Flood destruction results in mold and mildew, contaminated food and water, and lack of shelter. Severe drought results in scarcities of food and water. What are the health outcomes of these occurrences? Heat stress, stroke, asthma, respiratory disease, malnutrition, starvation, and other concerns resulting from air pollution, disease carriers and contaminants are examples of how climate change can harm the public's health. A primary learning objective is that game players would acquire a knowledge of how a lack of clean air and water, as well as unhealthy living conditions are made worse by adverse effects of climate change. Another learning objective is that a player would gain a skill set to make informed decisions about health and its relationship to the environment.

Analysis of the findings of this first phase of the study should provide suggestions for how the game should be crafted to target African American adolescent males successfully. It is anticipated that these young men will also be involved in the design of the game. Results of a climate change and health literacy survey administered to the same group of participants focused on gathering information on what youth know about the relationship between climate change and their health and about some of the personal choices they make. These findings will also be incorporated into the game design. Investigators are collaborating with personnel in the University's Center for Gaming and Simulation about the development of the actual game. This collaboration will determine the structure of future interviews and surveys to be administered to groups and analyzed to identify variables. Such collaboration will also provide technical support and

guidance for the development of the game.

What approach should be used with adolescent African American males to ensure participation in health literacy GBL? Whitton [29] has concluded that students will access games to learn if they are convinced that using such games is the most effective way to learn the material. Her study found that there was no evidence to surmise that playing games was motivating in itself to learn. The players needed to believe that such "play" was the best way to learn the content. The investigators' approach is the integration of the health and environmental science standards of the curriculum required by the State Department of Education into a user friendly serious gaming format.

To engage learners in GBL, a number of factors must be considered. A primary consideration is the recognition of the human factor. Teachers who use GBL must be culturally aware and culturally responsive to the need for enthusiasm about the GBL process. They must be available for face to face affirmation when requested, and they must acknowledge that their African American adolescent male students often hold fast to the idea that "the body is first and foremost in identity" [12]. Investigators will continue to explore what needs to be different about the game to target African American males. This might entail the provision for a passion for sports; visual, tactile, and kinesthetic experiences; emphasis on right brained approaches; a mechanism for family engagement; and an emphasis in body centric athleticism.

3.0 DISCUSSION

The PEW Internet and American Life Project (2009) reports that 99% of boys and 94% of girls ages 12-17 access technology as a social activity. Included

in the PEW Project is Lenhart's (2008) [10] study, "Teens, Video Games, and Civics". She further notes that of the various game genres played by teens, 49% play simulations, 59% play strategy games, and 36% engage in role playing. Of particular note is the finding that 78% of the respondents reported that they "frequently" or "sometimes" witnessed kindness and helpfulness to other gamers by those who were playing. The study also found that general frequency of use was not related to civic and social isolation but actually could lead to greater levels of civic engagement [10].

The provision of an interactive learning tool to increase health literacy among African American adolescent males could allow them to progress in their self-advocacy and social skills while participating in an age appropriate activity. Teachers of a health literacy curriculum might determine that access to gaming devices will become part of a student's program of study. Additionally, Fox [5] contends that becoming a serious gamer could be a transition goal for students and could serve as a social bridge for many students.

The concept of a collaborative virtual environment (CVE) to learn and practice skills has proven successful with various student populations [14]. Simply put, a CVE creates a virtual space in which humanoid avatars can meet and interact. A viable CVE contains some key features. These include "shared context, awareness of others, negotiation, communication, and flexible and multiple viewpoints" [14]. The creation of a health literacy game using CVE could enhance cooperative learning and decision making.

Educators have come to realize the power of social context in affecting the development of ideas [26]. In his discussion of the future of modeling and simulation, Oren (2002) [17] notes that

"In zero-sum games, competition is essential. In non-zero sum games, cooperation is essential. Simulation can be useful in teaching the value and practice of cooperation" (p.121). This is also a valuable asset for social groups. The ability to collaborate with health professionals about one's health status and care is necessary for everyone. It is vital for those numbered among the vulnerable populations. An MMO social group can provide real world simulations and advance the agenda for individuals with a history of being disenfranchised.

4.0 CONCLUSION

The reauthorization of the Elementary and Secondary Education Act (NCLB, 2002) [25] has prodded school districts to develop instructional approaches to ensure that no child is left behind. Content must be delivered in a way that is cognitively and affectively comparable to the diverse backgrounds and learning styles of today's learners. One such approach is the use of Game Based Learning (GBL). A critical question emerging from results of the GBL Usage Survey is how to construct an instructional game that will be used by African American adolescent males. Results suggest that a number of major elements must be considered to craft an efficient and effective game to enhance learning. These include components of action and strategy. Additionally, the design must be entertaining.

Authors of this paper have sought to examine the concept of employing computer assisted technology to enhance the knowledge acquisition and skill application of individuals involved in learning how climate change may impact health. It is suggested that such an approach is feasible and fulfills not only the letter of the law but the spirit of NCLB. However, as worthy as this endeavor might be, critical to the process of research and development in

GBL for attaining full access to any knowledge construct such as health literacy is the need for an approach that blends competence with compassion. "It will not suffice simply to design a knob to match human requirements; the whole system must be designed to take into account the whole human being" [15].

The use of GBL as a method to provide effective instruction is a valuable objective for teaching the relationship between climate change and health. It can ensure that individuals will have a voice in the planet's growth. A voice that ensures the world is left "a little more peaceful, healthier, and richer in biotic life than when we entered it" (Maathai, 2010, p. 194) [13]. Enhancing the experience of African American adolescent males in game based learning could contribute to overcoming the critical global challenge of maintaining good health in a changing climate.

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