

# Using Technology to Support Physical Education in High School Independent Study Programs

## Literature Review

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### Terms

Before beginning our review of literature, some basic terms need to be clarified. By “independent study” , we refer to an educational strategy where students meet with an instructor to receive assignments which are completed at another place other than school, usually home. Student-teacher meetings typically take place in an office or school setting on a regular basis; by law, meetings are held at least monthly, but usually take place weekly. A “charter school” is publicly funded school that has a charter of operations granted by another body, most often a school district. By “standards”, we are referring to the national or state Challenge physical education standards. The state of California has not adopted an official standard for physical education; the Challenge standards are designed to give school districts guidance in areas where standards do not exist. (CDE, 2003) The Challenge standards for physical education are:

#### MOVEMENT SKILLS AND MOVEMENT KNOWLEDGE

*Standard 1:* The student will be competent in many movement activities.

*Standard 2:* The student will understand how and why one moves in a variety of situations and will use this information to enhance his or her skills.

*Standard 3:* The student will achieve and maintain a health-enhancing level of fitness.

#### SELF-IMAGE AND PERSONAL DEVELOPMENT

*Standard 4:* The student will exhibit a physically active life-style and will understand that physical activity provides opportunities for enjoyment, challenge, and self-expression.

*Standard 5:* The student will demonstrate responsible personal behavior while participating in movement activities.

#### SOCIAL DEVELOPMENT

*Standard 6:* The student will demonstrate responsible social behavior while participating in movement activities. The student will understand the importance of respect for all others.

*Standard 7:* The student will understand the interrelationship between history and culture and games, sports, play, and dance.

(California Physical Education-Health Project, 2003)

## **The Challenge**

High school students in California are required to complete two years of physical education to receive a diploma. Independent study programs usually do not have facilities for physical education, instructors are not trained physical education teachers, and the team sports that make up the regular course of studies in high school physical education don't apply. Independent study programs often resort to using a time sheet that students' parents sign off on to verify that they have regularly exercised. Unlike the students' paper based assignments, this mode of instruction relies totally on the honor system with no verification other than the parents' word. However, the Independent Study Operations Manual (CDE, 2000) for the state of California clearly calls for a course of study is designed to meet a student's individual needs and is grounded in the standards and the Physical Education Framework (2003).

## **The Opportunity**

While independent study by its nature lacks some of the components of regular physical education programs (team sports, facilities, teacher with a physical education major), it offers opportunities as well:

- Students have the time and opportunity to utilize community resources, such as parks and recreation programs
- Students can do activities with family members
- Students can include activities that regular school programs don't offer, such as rock climbing or water skiing
- Student can utilize web-based learning without the difficulties of a regular physical education program that operates out of a gym and locker room
- Without being locked into a particular class time, students can utilize chat and BBS types of electronic communication to share with their instructor and other students
- Field trips and special study projects can be worked into the student's school week without much difficulty

### **The Action Research Project**

Our action research project investigates the effectiveness of standards-based independent study program that incorporates technology. Literature searches were done on combinations of descriptors/key terms such as "independent study", "physical education", "assessment", "charter school", "high school", "technology", "computer-based instruction", and "online learning". Many of the searches came up empty. While there are thousands of students in independent study programs in California, we

couldn't bring up a single study on high school independent study students, let alone high school independent study physical education. Technology articles for physical education were largely "how to" articles, but they did provide us with ideas on how we could use technology to enhance an independent study program. With these search results, we branched out to other relevant topics, including "assessment", "adolescent", "physical fitness", and "virtual reality".

Our study creates a program that combines physical education and health, primarily aimed at addressing the components of the physical education that would lead to lifelong fitness, having students do at home and the community what they will be able to continue to do as adults. Simulations, in the form of monthly webquests, would be our key strategy. Students would investigate aspects of health and fitness so that students would construct their understanding of what it means to be healthy and fit. Students would share their learning in monthly chat sessions with other students, keep electronic journals, track progress with spreadsheets and graphs, use monitoring technologies such as body mass index scales, heart rate monitors, and blood pressure monitors. Videotape would be used to document and analyze student movements. Work would be documented in the form of electronic portfolios.

### **Literature Reviewed**

In planning a standard-based curriculum, one key component is measuring the students' development and achievement of goals. The adoption of standards for physical education has increased attention on assessment. (Fay & Doolittle, 2002). The use of portfolios in physical education is suggested a number of times in the California

Framework (CDE, 2003), but not discussed. In 1994, Melograno discussed the use of portfolio assessment in documenting student learning, including examples of instruments that students could use to demonstrate their learning, as well as tracking forms for instructors. Smith (1997) suggests the instructor uses a standards-based portfolio card to track student progress, creating a card for each grade level. Corbett-Perez and Dorman (1999) move the responsibility for portfolio maintenance from the teacher to the student in a discussion of using electronic portfolios in health education. An example of this in practice, using computers, is offered by Sinclair (2002).

Cognitive and affective assessment strategies are addressed in an article by Worrell, Evans-Fletcher, and Kovar (2002). The informal assessments, such as teacher interviews with students and student journals, might be adapted to use e-mail and BBS posts. The article stresses the need to teach the social aspects of sport and exercise which points up the need for establishing online communities to make up for one of independent study's obvious shortfalls.

We are concerned about the motivation of independent study students, since they study and workout without supervision. While we didn't find an article about independent study students motivation, articles on physical education student motivation provide valuable input, such as a journal article by two U.S. Military Academy professors (Butler & Anderson, 2002) on "Inspiring Students to a Lifetime of Physical Activity" and Kilpatrick, Hebert, and Jacobsen's writing on self-determination theory (2002). The latter article discusses a continuum of motivation which begins with "amotivation" and climbs through other-determined extrinsic motivations (rewards, pressure, fear), self-determined extrinsic motivation (health aspects, physical fitness,

social aspects, relaxation) and intrinsic motivation (enjoyment, mastery, stimulation). Ideally, the intrinsically motivated student would be our goal, but preceding level's motivators of health, physical fitness, and social aspects are accessible for us as educators. Andy Anderson (2002) wrote a helpful article, geared to elementary, regular education about "engaging student learning in physical education" with a number of suggestions on "hooking" students into physical education. A number of the ideas could be adapted to independent study and technology, such as having students take 8-10 pictures of activities for the bulletin board, which could be transformed into web page assignment., and exploring social issues, such as racism, in books, which could become a web quest. The example he uses for the latter is Jackie Robinson which the National Archives have an excellent lesson on:

[http://www.archives.gov/digital\\_classroom/lessons/jackie\\_robinson/jackie\\_robinson.html](http://www.archives.gov/digital_classroom/lessons/jackie_robinson/jackie_robinson.html)

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The social aspect of motivation suggests an interesting 2003 article by Ransdell, Oakland, and Taylor in which they outline a study they conducted of with mothers and daughters, initiating a three times a week exercise program with the pairs. One group participated at a university-based program while the other participated in home-based program. Both groups adhered to the program at high rates and showed improvement in family relations as well as physical health. The home-based aspect of this program, which included non-traditional activities such as indoor rock climbing, self-defense, and cross-country skiing, is particularly interesting in the context of independent study. Another article (Gabbei & Hamric, 2001) that addressed physical education at home in

the context of doing homework to meet the physical education standards; however, the context is elementary and regular, classroom physical education.

Could better grades serve as a motivator for adolescents? While skeptical that improved academic performance might serve as motivation for teens, a study on Australian teens (Dwyer, Sallis, Blizzard, Lazarus, & Dean, 2001) found that there was a definite correlation between fitness, exercise, and improved academic performance. They hypothesized that perhaps the endorphins emitted as a result of exercise calmed the students and made them more attentive to their studies.

The two research studies that we did find on using technology in a context that might some day be applied to physical education would probably be beyond our reach financially and the nature of the technology as well. The Titrac Motion sensor is a device that uses accelerometers to measure student motion and activity and store the data over a 14 day period. While the device proved too fragile and clumsy in a study of adolescents (Crocker, Holowachuk, and Kowalski, 2001), in the future independent study programs might be able to measure student actual activity, as measured by the device, rather than just collect their logs (assuming they don't pass the device on to their more active friends). We viewed another study, since misplaced, which dealt with the energy exertion required to do some video arcade virtual reality games and suggested that might be an acceptable exercise for adolescents. While we discounted that as too costly and remote, we then found an article (Globus, 1997) that spoke of learning sports skills through virtual reality.

On a more practical level, we did find, as mentioned earlier, a number of articles on using technology in physical education. While not studies of technology's efficacy,

but suggestions for educators on how to use technology, we feel these articles offer a number of ideas for us to implement in our independent study activities. One of the broad based articles offering a number of suggestions was an ERIC Digest (McLean, 1996) review of the use of computer-based technology, which included utilizing computer-based instruction, WWW sites dealing with health and human physiology, and tracking software for teachers. In 1998, Dorman wrote about using handheld devices for the monitoring students in the field, a goal-setting CD-Rom program, and FitnessGram, a software package that has been adopted since by the state of California for assessing students, and relevant WWW sites. Bonnie Mohnsen of the Orange County, CA Office of Education has authored a number of articles on technology and physical education. One that was particularly helpful was "Stretching Bodies and Minds Through Technology" (1997), which presents classroom scenarios including using heart and blood pressure monitoring devices, video for activity analysis, physical movement analysis software which uses digitized video, and personal portfolio software.

Video and still photography offer obvious benefits in physical education; in independent study physical education, video and still photography provide the opportunity for students to demonstrate what they have done outside of the classroom. Lemaster, Barnes-Wallace, and Creedon's describe a cross-curricular unit in elementary school that had students writing poems to accompany still pictures in a Hypercard stack of gymnastic routines they had learned, with poetry written to accompany the pictures. McKenzie and Croon (1994) outline a number of uses for video in physical education, including videos of students for teacher familiarization, teacher-created teaching videos, documentation for grant/funding requests, showcasing

program accomplishments, individualized feedback, video research, “commercials” on health/fitness topics, and orientation to school sports.

While the lack of research on independent study and physical education was a bit disheartening, the articles that we did locate should provide a sound basis for a study that would establish a program that integrates standards, assessment, and the use of technology in a high school independent study program.

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