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Introduction into the Virtual Olympic Games Framework for online communities

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Abstract

Objective: This paper presents the design of the Virtual Olympic Games Framework (VOGF), a computer application designated for athletics, health care, general well-being, nutrition and fitness, which offers multiple benefits for its participants.

Background: A special interest in starting the design of the framework was in exploring how people can connect and participate together using existing computer technologies (i.e. gaming consoles, exercise equipment with computer interfaces, devices of measuring health, speed, force and distance and Web 2.0 applications).

Method: A stationary bike set-up offering information to users about their individual health and athletic performances has been considered as a starting model.

Conclusions: While this model is in the design stage, some preliminary findings are encouraging, suggesting the potential for various fields: sports, medicine, theories of learning, technologies and cybercultural studies. First, this framework would allow participants to perform a variety of sports and improve their health. Second, this would involve creating an online environment able to store health information and sport performances correlated with accessing multi-media data and research about performing sports. Third, participants could share experiences with other athletes, coaches and researchers. Fourth, this framework also provides support for the research community in their future investigations.

Introduction

The Virtual Olympic Games Framework (VOGF) project was designed by a group of graduate students from the Ontario Institute for Studies in Education of the University of Toronto.[1,2] In this project, the original purpose was to develop a mock-up system that will host a 'Virtual Olympics' platform for online sports communities and an extended audience. The focus was to find ways of sharing meaningful online sports experiences between different types of participants. Initial questions considered were:

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1 How can participants' health be improved by using a simulation device?
2 What parameters should be considered for this pursuit?
3 What sports and consoles are already available for it?

This project was designed by giving careful consideration to what types of sports were offered as a situated context, what constraints might be, and what technologies are best suited to be implemented in this process. The starting point was to focus on developing one sport (cycling) and to create a system that could work with minimal requirements. The first stage included only one console sport device, the Stationary Bike Set-up. This paper only presents the initial discussions, the main design and some future directions.

Background

Old versions of sport consoles, which were not connected to the Internet and virtual worlds, made people feel isolated. Without any support and feedback, participants could easily find their use boring and ineffective.[3] As a consequence, they were infrequently used. New console games such as WII, Sony Play Station and Xbox are more dynamic. Also, the Internet, especially the Web 2.0 technology, is considered to be more effective in offering people a social architecture.[4,5] These new standards give people greater opportunities to interact with each other. This is why Web 2.0 can make a strong difference in athletes' success. Specialists in education[6,7] and health care[4,8] highly praise the potential of Web 2.0 technology.

Also, discussions between people on topics related to health care, nutrition, diet, habits and fitness have greatly increased since the launch of Web 2.0. For instance, in the YouTube, the user hashemzene[9] warned teenagers of the dangers of eating junk food and not exercising. Celebrities such as Ron Coleman discuss issues about nutrition and practice.[10] The user KTCDallas introduced several videos about diet for athletics and fitness including sports such as: biking, running, swimming and triathlon.[11–14] Some projects such as *The Nutrition Game: A Day of Food Choices*[15] design a computer game predicting peoples' fitness based on their options when they select different types of nutrition.

Simulation is a method where users actively experiment and practise in a simplified framework with the purpose of gathering information and skills from the real system.[16,17] Based on their input, learners can perform activities to generate and test hypotheses that imitate the context of the real world. Using instructional simulation,[18,19] students are able to connect to reality with abstract knowledge through discovery learning, to improve motivation and enhance learning, by actively interacting in the simulation processes.[20] In particular for sports, there were several attempts to use simulation for biking in virtual worlds.[21–24]

There were already attempts to include athletics with virtual worlds; for instance, on YouTube,[25] presenting boxing using a WII console. Tennis was presented also.[26,27] The user lazzarello[28] presented a game about biking using the console WII. MegAnimation[29] presented a biking competition in the online environment called *Yellow Jacket Beach Online Tour*.[30] More specifically, there have been some virtual games and people using Web 2.0 technologies to show the design of the games and their personal involvement. For instance, the user Ironrav[31] described in a video from YouTube his passion for athletics and how he was involved in creating the SL Triathlon group connected with the Second Life[32] virtual community.

The design of educational goals-learning and practice outcomes

Adapting the framework for both formal and informal educational settings was considered an important priority. In order to demonstrate how much participants have learned, or just to share their experiences, the presentations were designed to be delivered either as classrooms activities or as informal discussions. Key aspects addressed by designers and educators were:

1 Establishing the main educational goals.
2 The community involved in this framework.
3 The design scenario considered for creating the framework.

The following subsections will separately detail each question.

The main educational goals of the VOGF project

The main purpose of this project was to offer an informal way to provide instructional simulation for a variety of participants involved in sports. There were several theories that were included in the theoretical foundation of this project such as:

- situated learning theory;[33]
- knowledge building theory;[34,35]
- simulation theory;[16,17]
- virtual reality simulation;[36]
- manifold relational understanding.[37]

It was considered that simulation can be more effective if it is combined with previous experience and knowledge.[19] Also, it was considered that simulation would be more effective if combined with building on the existing knowledge base. This is why external knowledge, a data repository containing an extended body of research about athletic performances, health care, diet, fitness and

technologies, was included in the design, not only as a prerequisite for simulation but also as a body of dissemination in the virtual community. In this way, informal discussions between participants were considered to be of equal importance with research findings and mass-media artifacts.

Target audience

The online software environment was designed for people to practise, discuss and carry out research in their daily social contexts. Therefore, the design of the software and the user interface was approached from the perspective of the participants' needs, exploring their preferences, expectations and predispositions, as well as the individual and social practices in which they prefer to be involved. It was important to explore how much use of the technology they already make. It was also important to know the type of users and the perspectives and practices in which they are involved. The main types of users were: athlete, coach, researcher and observer. The current classification of types of users was based on common sense and the reflections of the designers.[1]

By experiencing all aspects of bicycle racing, athletes were not only getting a chance to participate individually, compete individually or in teams, but also, they had the inter-disciplinary opportunity to track their progress in athletics, training, nutrition, fitness and well-being (i.e. weight, heart rate, etc.). A performance portfolio was very important for VOGF as a way of assessing performers' involvement and their deepening understanding and practice of sports.

Participants involved in this project would be divided into two major groups: 'practitioners' and 'observers'. The practitioner group included: (i) athletes or students and (ii) coaches or instructors. The observer group included: (i) administrators, (ii) researchers and (iii) observers of the virtual community. For this initial phase of the project, the following factors were included for study:

- pace of exercises;
- exercise routine;
- motivational factors.

The project contains software support for tracking these measures. At the beginning, the following biometric indicators were considered:

- blood pressure;
- heart rate;
- distance covered;
- intake of calories.

The project also wanted to include other perspective factors such as:

- sleep;
- regime;
- dietary considerations (based on the Canada Food Guide and Aboriginal Food Guide).

Other factors (e.g. stress, social interactions) might be added in the future.

There are mainly five types of groups of participants:

- The group which forms a team, not competing against each other but as a whole athletic team.
- A group of competitive individuals, where the athletes compete against each other with participants agreeing a clear set of rules.
- A group comprising competitive teams, with the athletes competing as teams within the group. In addition, clear rules need to be agreed.
- Support groups, where individuals or teams do not compete against each other, but rather discuss topics of interest or experiences encountered.
- Research groups in which contributions take place according to scenarios developed by researchers.

Each group might accept coaches, researchers and observers. The Internet etiquette policies and fair play attitudes toward competitors are strongly emphasized. Regardless of the type of group, participants provide feedback and share their experiences.

Although VOGF was designed as a game for virtual communities, the VOGF scenario has many real consequences. There are different sports that could be simulated. As mentioned earlier, at this stage of its development, this project is focused on cycling. However, other sports could be developed in the future such as:

- other cycling types of activity (including road racing, velodrome racing, mountain bike racing);
- rowing;
- climbing;
- running and track and field sports such as: running (sprints, middle-distance, long-distance), throwing (javelin, shot put) or jumping (long jump, triple jump, high jump).

The project designed as a game

For a larger community, VOGF could provide opportunities for sharing details about fitness, health and well-being: diet, drinks, sleep and other habitual dispositions. It was essential that the design promoted a framework that would help individuals learn from their experience and feedback received from their social networking. It was also important to track how groups would progress or devolve. By providing the means to share and compare the results and methods, this project should support virtual communities in developing new understanding of the training methods that best support members' goals (whether these would be winning, feeling better, getting fit, etc.).

First, practitioners start to exercise. They can select whether they want to perform individually or in a group and can select which parameters will be tracked. Also, they can choose whether their performances are stored in the system or not and, in this case, they can make their data public or private. In addition, they have the right to be informed about what personal data will be requested and can choose whether they want this to be included in the research or not.

Second, in the initial phase of the project, all participants can start looking for information and improve their theoretical knowledge. The approach is inter-disciplinary and contains data available from different areas. For instance, the technological part contains sports' consoles for different areas and the exercises that are available for it. Next, a digital literature with fitness, athletics and sports is available for participants. Consequently, participants can look for different types of information relating to nutrition, general well-being and habits. The VOGF will provide strong support for informing participants at any time. This information can contain scientific research or only mass-media information.

Third, the researchers participate in disseminating the athletic experiences and performances. They apply first for ethical clearance. After they have received permission, they can contact athletes and eventually collect personal data, have participatory discussions and opt for creating their own group. These approaches are not intended to remain isolated. Data generated from the performances of athletes, from groups' conversations, the digital information library and from ongoing research are stored and processed by a software management system. Putting all this information together provides this project with specificity and strength. Only the extended practices and tests of the infrastructure created by the VOGF project in experimental and natural settings can shed light on opportunities that this software would offer.

Technological aspects of the project

Simulations have been widely implemented in many fields, such as medical science, health care, fitness, meteorology, space programmes, aviation, manufacturing industry, the military and nuclear industry.[19,38] It facilitates learning of specific professional skills, communication skills and human interpersonal relationships.[16] Bradley showed evidence of the support of instructional simulation in professional practice and professional development and also its use as a formative and summative assessment tool.[38]

The initial target was to provide an opportunity for participants to acquire a deep understanding of their own athletic practices. As an environment for interaction, it was considered that Web 2.0 can store data containing athletic performances and, also, provide facilities where participants can interact in different capacities (athlete, coach, researcher, etc.) in discussion groups. These groups were designed to be used as non-competitive participants, competitors, team competitions and moderated chat spaces.

Technological devices

This project could use both a real bike or a biking device connected to a modified game controller adapted to capture the basic inputs and create a game-like environment. Optionally, these devices can be connected with a game console (W11, Sony Playstation, XBox, etc.). They are all easy to connect. The display device visualizes the most important parameters, such as heart beat, the number of calories, time and distance (Fig. 1).

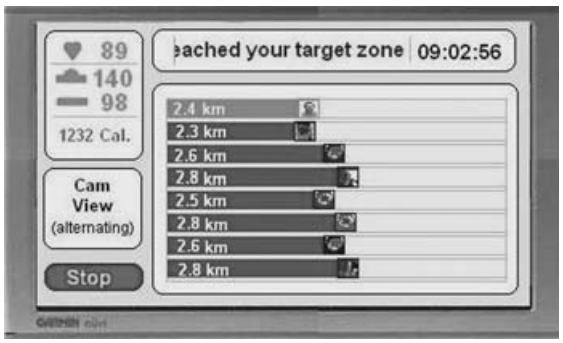

Figure 1 The console display

Technical requirements

The following types of technologies were selected to support the theoretical framework:

- stationary bike set-up;
- bike trainer configuration, with some basic data inputs, rotational speed and resistance;
- monitoring display;
- broadband Internet access [digital subscriber line (dsl)/cable/wireless];
- software tools:
  - knowledge object repository;
  - wikis;
  - asynchronous computer-mediated communication;
  - evaluation/assessment tools.

A special Learning Management System designed for VOGF was designed to host and gradually integrate all activities already mentioned. In Fig. 2, the overall system is presented when the device such as the Stationary Bike Set-up is selected. As can be seen, the console is connected with the monitor. This device sends these measures through the Internet to the Learning Management System.

Requirements, constraints and limitations

In this section, some considerations about requirements, constraints and limitations of the VOGF design will be discussed. A number of limitations restraining the population and the accessibility of this framework are presented. First, the critical aspect was the cost involved in this project. In order to implement the designed solution it should be cost-effective for remote communities. Although basic equipment and networks were intended to be used, people have varied technological experience and some have limited access to the technology required for VOGF. Currently, a small percentage of people are:

- able to purchase;
- willing to use these technical devices;
- have Internet access;
- possess the required technical experience to use them.

Also, as people are geographically scattered, a large variety of participants are expected to interact. In addition, informal and formal school contexts are both presented in this framework, therefore interactions in VOGF could be challenging. As for teachers and coaches, they need not only to

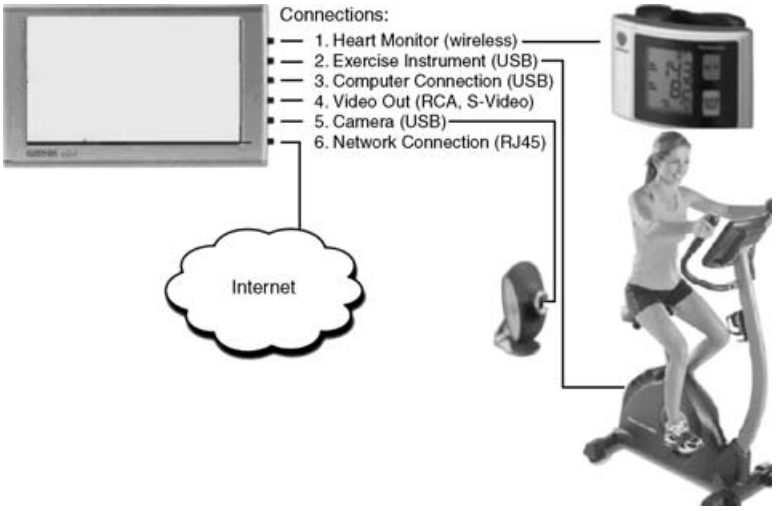

Figure 2 Devices' interactions schema for the Virtual Olympic Games Framework

be athletes but also able to offer technical support and research evidence for participants.

As for any project, a limited amount of time is dedicated for implementation. In this case, four months was allocated for designing the original prototype. Complexity is another aspect that was considered in implementing this project. For implementation purposes, the solution was intended to be as simple as possible. Only one sport and one console, the stationary bike set-up, was included in the first stage. Another challenge is the way in which groups are self managing. It is not known yet how many different perspectives there are and which ones are needed in order to create, develop and achieve an efficient self-organization. Because integrating virtual reality would increase the budget and the time allocated for the project, it was decided to postpone the virtual reality implementation and the consequent connections from the first stage.

The goal in the first stage was to keep the project's design approach limited to a theoretical framework. This framework would contain situated learning, knowledge building, simulation theory, virtual reality and manifold relational understanding, as required theories highlighting the content of this project.

An important point in VOGF design concerns implementing an inclusive policy framework. VOGF was designed for a democratic and diverse community of users. These are people interacting and socially networking but come from different backgrounds. Therefore, participants are required to respect cultural differences and, also, different levels of performance. From early childhood students to seniors, from outstanding athletes to people with disabilities, all participants are welcomed. This is why inclusion policies are in place and special attention is being dedicated to promote and sustain gender equity and ethnic diversity.

Final discussions

Critiques of situated learning would enable us to understand more about the reasons when and why knowledge and expertise does not transfer in an athletic framework community. This is important to gain opportunities and abilities to transfer skills as a specific learning goal.[39] Providing as much as possible in the way of experiencing aspects of practice and knowledge, in both explicit and implicit ways, allow students to call upon required aspects of their individual practice.

The VOGF project was intended to provide participants with 'richer and more varied experiences with the knowledge object'[37 p.13] of human physical fitness by incorporating three different stages of experiences: external knowledge, simulation experience and personal authentic experience. This was the main reason why the simulation was incorporated in the design of this VOGF project. Providing participants with authentic activities is the best way they can gain access to meaningful and purposeful learning activities.[40]

Future developments

As previously mentioned, this project is presently only in the design stage and no experiment with athletes could be reported at this stage. Integration with Second Life and other virtual worlds is intended in the future, as is research including human subjects. However, some preliminary findings are encouraging. Although technology has been accused of impeding people in practising physical exercises, in this case the social software might improve the success of participation. In addition, joining the community of researchers with the community of athletes will improve each others' experiences.

Key Messages

Implications for Policy

- This project will allow users from different backgrounds and various areas to work together in order to practise and discuss athletics issues.
- Although they use similar devices, there can be considerable variation in their goals and performances of practice of these sports.
- The harmonization between different research strategies and informal discussions could benefit by avoiding duplication of effort. Also, an interdisciplinary and practical use of evidence is provided gathering expertise from fitness, health care, athletics and nutrition.

- All participants can look for existing research in fitness, nutrition and heath care. They also can informally discuss issues, can participate in research, effectuate meta-analyses or develop new research.
- A working group for software development and research has been formed to redesign the existing model and implement it.

Implications for Practice

- Only through practising, will participants improve athletic performances.
- Sharing experiences from coaches or other athletes will improve experiences.
- In addition, practising in groups and sharing experiences will diminish the isolation of participants and improve the feedback required for enhancing their practices.

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