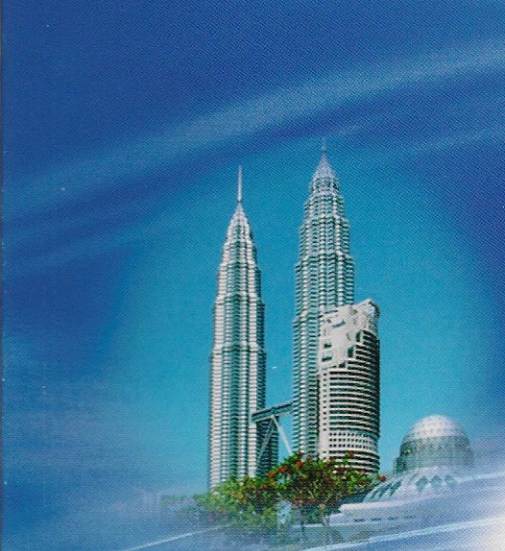
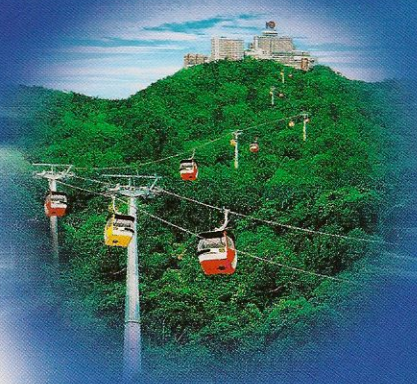
PROCEEDINGS

12th World Sport for All Congress 2008
Sport for All - for Life
Genting Highlands Resort, Malaysia
November 3-6, 2008





12TH WORLD CONGRESS
SPORT FOR ALL

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Genting Highlands Resort
Malaysia

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AGFIS
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Information technology and its role in promoting physical activity and sport for all

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INTRODUCTION

There is growing concern about the worldwide extent of physical inactivity (WHO, 2002). Technological changes, also in the field of information technology, are named as some of the driving forces behind this development. However, these changes are not only potentially detrimental for physical activity behaviour, but there is also great potential for promoting physical activity and sport for all.

Table 1. Established use and new fields for information technology in physical activity and sport for all. In addition to the general use of IT in scientific research, established areas in physical activity and sport as well as fields with specific potential for development can be identified.

Established use of IT in physical activity and sport for all	**New fields for IT in promoting physical activity**
• development of sport equipment • technical training • membership management for clubs • promotion of events • access to results	• Support for sport and physical activity providers and professionals • Facilitated access to offers and facilities • Individual motivation and support for becoming and remaining physically active • Exercise-generating video games

According to the Compact Oxford English Dictionary, Information Technology (abbreviated as IT) is "the study or use of systems such as computers and telecommunications for storing, retrieving, and sending information". It is penetrating today's life and has many implications for scientific research in general, such as data retrieval and data analysis (Sato et al, 2009). In sports and physical activity, the use of information technology has been well established for a number of dimensions (table 1).

In the development of sport equipment, mechanical and bio-mechanical research (both heavily depending on information technology) have become an important success factor for sports such as competition sailing and yachting, paragliding or cross-country skiing. However, not only sports with an obvious technological component, but also the development of widely used equipment such as running shoes depends on information technology (Rosandich, 2000). Video technology has been used for some time to register and optimise motion sequences as well as tactical processes in team sports, more and more it is now coupled with analytical tools to support the coaches' interpretation of the data (Barris et al, 2008). Address lists for Email and SMS or text messaging can substantially facilitate interaction with sport club members, either in an isolated way or combined with databases, websites and content management systems.

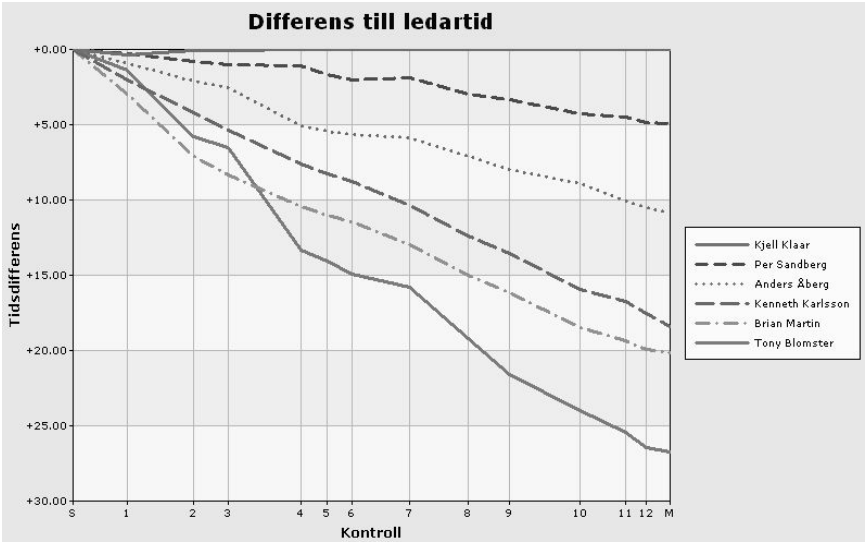

Figure 1. Graphical representation of runners' split times from the Swedish O-Ringen orienteering event website (www.oringen.org). Many sporting events nowadays provide competition results through the Internet. The sophisticated presentation of results allows for example the direct comparison of participants who had not been competing simultaneously.

Communication trough the Internet has become an important element in promoting sport events, often providing not only the essential information that could also be found in a flyer, but also links to related offers and the opportunity to register online or to book transport and accommodation. Often through the same websites, access to results is provided including several search options or additional information such as split times. Many such websites exist, the New York City Marathon (www.nycmarathon.org) is one of them. Some sports such as orienteering to a large extent take place away from spectators, for example in the forest. Here information technology has made it possible to reconstruct the details of competitions and even to make direct comparisons between participants that did not compete simultaneously. The website of the Swedish O-Ringen 5 Day orienteering event (www.oringen.org) gives such an example with most of the information available in English as well (figure 1).

The purpose of this publication is not to focus on these established uses of information technology, but to give an overview of some emerging areas that have a particular potential for the promotion of physical activity and sport for all (table 1). Where possible, scientific publications will be cited, but due to the rapid development of the field sometimes only references to ongoing projects and websites can be provided.

Support for sport and physical activity providers and professionals
Traditionally a great number of tools have existed to support sport for all instructors in their activities with training groups, for example coaches' manuals, visual aids and training programmes. Instead of providing these tools only in printed format, more and more they are available now also in electronic format. The Swiss programme Youth and Sport is such an example, with a website that includes openly available information as well as some password restricted areas open to registered coaches only (www.jeunesseetsport.ch, illustration 1).

Illustration 1. Screenshot of the website of the Swiss national programme Youth+Sports (www.jeunesseetsport.ch**).** The website provides general information to an interested public and specific information in a closed user group only to certified coaches.

A new development is the use of e-learning, where a part of the training of instructors is not done in class, but independently using electronic teaching tools. The Swiss physical activity counsellors' curriculum "Active upon advice" (www.ratzurtat.ch, illustration 2) is such an example. In this project, the IT based teaching elements were developed based on a formative evaluation focussing on the preferences and acceptance in the intended target audience. In order to develop and verify the necessary inter-personal skills, the curriculum also includes traditional teaching and testing elements (Padlina, Jimmy et al, in press).

Illustration 2. Physical activity professionals during formative evaluation of the Swiss physical activity counsellors' curriculum (www.ratzurtat.ch**).** The curriculum contains both e-learning elements and traditional teaching and testing elements.

Websites such as the ones mentioned above often link up to related offers and information. In addition, specific exchange platforms for professionals in the promotion of sport for all and physical activity are becoming more and more important (table 2). The World Health Organisation WHO has a number of resources on physical activity and health, both at the global level and at the level of its regional offices. With Agita Mundo and the Global Alliance on Physical Activity GAPA two global organisations exist that are specifically dedicated to this field, the new International Society on Physical Activity and Health ISPAH is likely to become an important player in the near future.

Illustration 3. Examples for IT and in-person elements of HEPA Europe, the European network for the promotion of health-enhancing physical activity. International document inventory database, electronic version of WHO publication and HEPA Europe newsletter, all from the www.euro.who.int/hepa website, and discussion during the 2006 annual network meeting in Tampere, Finland

Currently, there are three organisations covering continents or world regions on physical activity and health, namely the Red de Actividad Fisica de las Americas – Physical Activity Network of the the Americas RAFA-PANA, HEPA Europe, the European network for the promotion of health-enhancing physical activity, and the Asia Pacific Physical Activity Network. In addition to a website, these organisations usually have newsletters that can be subscribed to, publications that can be downloaded or ordered and other tools such as inventories. However, with respect to the fact that information technology can enhance but not replace direct human interaction, most of them also have opportunities to meet in person with the other members at regular meetings or workshops (illustration 3).

Table 2. Important international exchange platforms for physical activity and health professionals. In addition to WHO, there are currently three global institutions dealing specifically with the issue and so far three networks covering continents or world regions.

World Health Organisation WHO	**www.who.int**
Agita Mundo	**www.agitamundo.org**
Global Alliance on Physical Activity GAPA	**www.globalpa.org.uk**
International Society on Physical Activity and Health ISPAH	**www.ispah.org**
Physical Activity Network of the Americas	**www.rafapana.org**
HEPA Europe	**www.euro.who.int/hepa**
Asia Pacific Physical Activity Network	**www.ap-pan.org**

No comprehensive picture, but only examples can be given of the situation within countries (Dössegger, Studer et al, in press). Structures similar to the international networks exist at the national or local level, such as the Network HEPA Switzerland (www.hepa.ch) or Agita São Paolo (www.agitasp.org.br). In addition there are platforms for specific issues such as best practice (www.cbpp-pcpe.phac-aspc.gc.ca), community interventions (www.thecommunityguide.org/pa) or interventions in children (www.children-on-the-move.ch).

Facilitating access to offers and facilities

Knowing about specific possibilities to exercise and to do sports is an essential issue both for individuals wanting to become more active and for counselling professionals. Using information technology to provide this knowledge is an intriguing idea. Conceptually it relies on the existence of centralised knowledge about offers, on the possibility to make queries and to receive replies. In a very localised context, this information is often available from individuals or groups in institutions and they can be approached directly. In the context of larger communities or even at a national level, the information becomes so complex that it is kept and managed in a database and queries can be made by telephone for example. If the database is an electronic one, communication can also happen through information technology, for example through text messaging or SMS, through email or through websites.

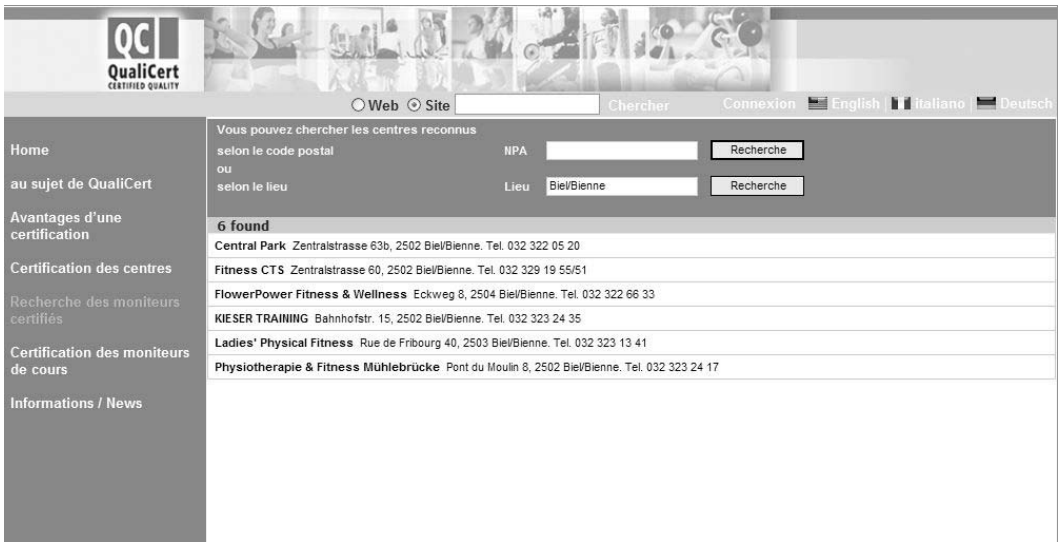

Illustration 4. Screenshot of the Qualitop website (www.qualitop.org**) as an example for a physical activity offer search engine by name or postal code of the town**. As the certified fitness centres listed in the database qualify for membership fee subsidies through many health insurance companies, this is an incentive to keep the information complete and up to date.

Such a system can be used to establish contacts between individuals who look for others to exercise with, as in the Swiss Meet2Move project (www.meet2move.com). Several schemes have already existed also for institutionalised or group offers, but few have been able to keep the database up to date and complete. Technically this issue can be solved, for example by giving institutions the possibility to edit the database concerning their own offers. However, motivating them to actually do so is the far greater challenge. It seems that financing an institution for doing this at the local level is a solution, such as the regional agency of the Ligues vaudoises de la santé in the context of a primary care physical activity promotion scheme (Bize et al, 2008), and that providing financial incentives in form of subsidies to sports

organisations (Padlina, Dössegger et al, in press) is another one. Direct financial interests can also be instrumental for keeping databases up to date, such as subsidies for membership fees through health insurance companies only in certified and registered fitness centres (www.qualitop.org, illustration 4) or the perspective of participation fees for qualified organisers of walking courses in the former Allez Hop project (Dössegger, Nützi et al, in press). Another possibility is to focus only on existing infrastructure such as gymnasiums or sport grounds, as it has been done in the Active Scotland initiative (www.activescotland.org.uk) which started in 2008 (Jackson et al, 2008). Such an approach can achieve a good geographical coverage and faces less danger of being outdated. However, it leaves it to the individuals to find out about the actual offers and there might be a danger to miss offers that are geographically independent such as walking courses.

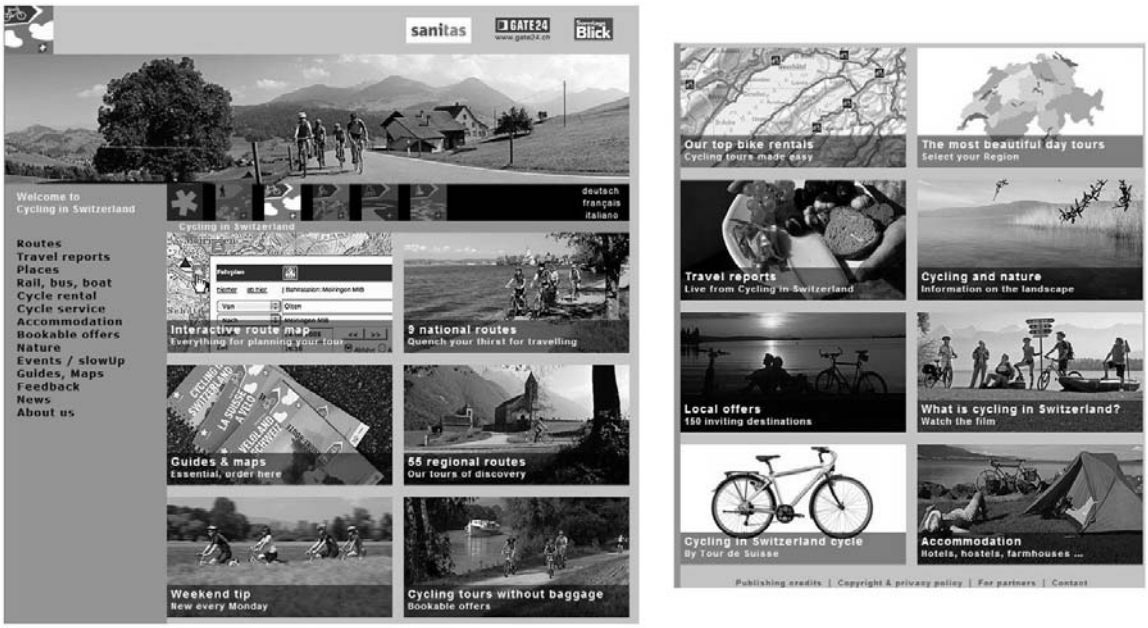

Illustration 5. Screenshots of the cycling module of the Switzerland Mobility website (www.switzerlandmobility.ch**).** The development and maintenance of integrated information systems for physical activity offers is very demanding, but can be realised in collaborative efforts.

Ideally, integrated information systems cover geographical information, infrastructure, rental possibilities for equipment, transport and accommodation. For the health and the sport sector in most countries, such an endeavour would probably be beyond its possibilities. However, through collaboration with the public administration, sports associations, sponsors and commercial partners, the tourist experts from SwitzerlandMobility (www.switzerlandmobility.ch, illustration 5) have created such a platform covering national offers in hiking, cycling, mountainbiking, skating and canoeing (Martin-Diener et al, 2008).

Individual motivation and support for becoming and remaining physically active

Traditionally, motivation and support for becoming and remaining physically active have been delivered through individuals and groups of people, be it family, friends, sport instructors and other athletes or counselling professionals. Nowadays, they can also be provided through information technology based counselling systems with different degrees of complexity and automation, often including tools to follow one's behavioural changes when revisiting the system. Such interventions are often Internet-based and have the potential to reach large numbers of individuals at relatively low cost. Other advantages are interactivity, immediate display of individual, personally-relevant feedback and information based on behaviour, attitudes and motivation of the user, as well as time- and place-independent availability. Such an example is the Swiss programme Active-online.ch (www.active-online.ch) that is available free of charge in German, French and Italian (Martin-Diener et al, 2004).

Two reviews have investigated the effectiveness of website delivered physical activity interventions. Vandelanotte and colleagues summarized that a little more than half of the controlled trials included in their review reported positive behavioural outcomes (2007). Studies with shorter follow-up periods and a higher number of contacts were more likely to find positive outcomes. There was limited evidence of maintenance of physical activity when follow-up was longer than three months. Van den Berg and colleagues found evidence in their review that interventions were more effective than a waiting-list control

strategy (2007). However they were not able to establish key components of interventions that may increase effectiveness.

Feedback on physical activity behaviour can support behaviour change. A simple information technology based tool often used in this context is the pedometer or step-counter. A recent Canadian study has found indications of its effectiveness at the population level (Craig et al, 2007).

Illustration 6. Screenshot of the Internet counselling system Active-online.ch (www.active.online.ch**).** The expert system provides tailored feedback and advice in German, French and Italian and is available free of charge.

Training diaries are a traditional tool of sport training, they are now also available in electronic format. Commercial offers for personal coaching integrate these tools and provide individual feedback from experts, for example from the Swiss world class marathon runner Victor Röthlin (www.vicsystem.ch). While a vast range of such offers exist, it is left to the user to judge their quality and appropriateness of fees.

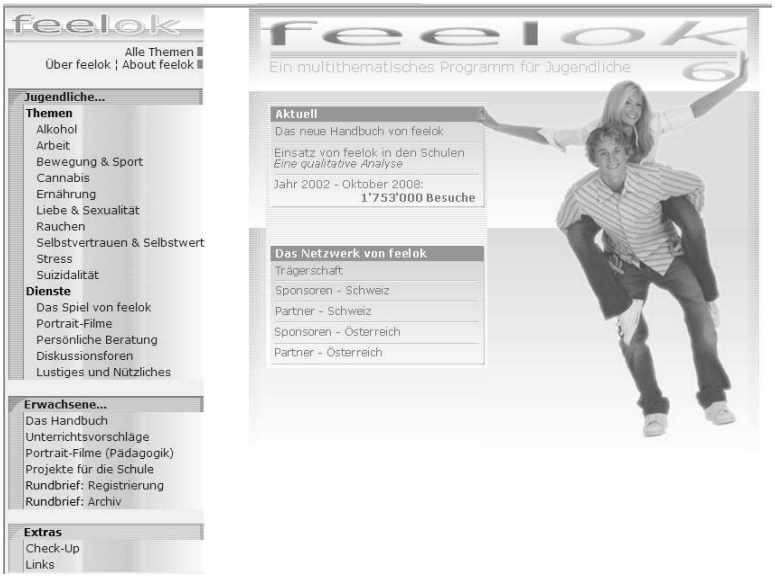

Illustration 7. Screenshot of the Feelok.ch youth prevention programme (www.feelok.ch**).** Physical activity and sport is only one out of a range of topics covered on the website. Adolescents can access information und motivational tools, but also details about specific sports and opportunities for training.

Ideally information technology based motivation and support systems provide not only general information and advice, but also links to specific offers in sport for all and physical activity. One such example is the Feelok.ch website, a Swiss prevention programme for adolescents (illustration 7). It covers a whole range of topics including physical activity and sport (Padlina, Dössegger et al, in press). The website not only

provides feedback on adolescents' physical activity behaviour, tips for changing or maintaining it and tools to identify individually appropriate activities, but it also contains a module presenting different sport disciplines in text and video sequences. In a further step, the programme allows to search for local and regional clubs offering this specific sport in the context of the national Youth+Sport programme and it provides the respective place, time and contact details.

The potential of exercise-generating video games

Video games have been on the market for several years and since early on there have been concerns that they might contribute to the problem of physical inactivity. Advances in technology have made it possible to include feedback on bodily movements of the users, through cameras, pads reacting to body weight and pressure or other devices. Thus a whole range of exercise-generating video games is now available and promoted commercially (illustration 8).

Studies have shown that playing active games is using significantly more energy that playing sedentary video games, but not as much as real sports (Graves et al, 2007). Preliminary study results indicate that playing exercise-generating video games on a regular basis may positively influence children's overall physical activity levels (Ni Mhurchu et al, 2008). The development in this field is rapid and there are specific websites such as "GamerSize Science - Quest for the perfect ExerGame" (www.gamersizescience.org) informing about the latest news.

Illustration 8. Examples of commercially available exercise-generating video games. Technical devices such as cameras or sensor mats allow interaction between the activities of the player and the situation on the screen.

Physiologically there is sufficient evidence that exercise-generating video games can induce physical activity relevant for health, and in customised physical activity programmes for people with disabilities the potential of information technology is actively explored (Rimmer et al, 2008). There are some indications that forms of exercise gaming using group interaction and support can improve exercise adherence compared to solitary use (Chin A Paw et al, 2008). At the current point in time it seems likely that exercise-generating video games can make a contribution to physical activity promotion, maybe comparable to the one of exercise equipment such as hometrainers. However, whether they will have an impact at the population level will depend on their ability to reach large audiences and to induce long-time exercise adherence.

DISCUSSION

Information technology is already well established in research in general and in a number of specific implementations in physical activity and sport, such as development of equipment, technical training, membership management for clubs, promoting events and providing access to results. This review describes the potential of IT in four new fields:

- In the support for sport and physical activity providers and professionals, traditional tools can be partially or entirely replaced by faster and potentially cheaper IT elements.
- IT can be used in facilitating access to offers and facilities, but integrated solutions require considerable resources and keeping the information up to date is a huge challenge regardless of technical aspects.

- Individual motivation and support for becoming and remaining physically active can profit from using information technology, and feedback providing systems offer new perspectives.
- In exercise-generating video games the technological potential seems to be there, long-term participation or combination with other forms of activity will be the key issue.

In many of these developments, traditional tools are replaced by new ones that allow physical activity and sport professionals to do faster and more efficiently many of the things they already have been doing. In some fields such as automated counselling, feedback systems and exercise-generating video games, genuinely new developments are possible. However, as information technology cannot replace personal interaction, approaches usually include information technology elements as well as opportunities to meet in person.

There is a wealth of offers competing for visitors, especially on the internet, of varying quality regarding content, readability and usability. Furthermore, some commercial websites may be more interested in selling a product than in helping individuals to change behaviour. An evaluation of physical activity websites reported that only few websites used the advantages of the internet, such as interactivity, and most did not provide personal information and individually tailored feedback (Doshi et al, 2003). A study carried out on nutrition websites found large differences in quality of content between the different offers, with ".gov" and ".org" websites of generally better quality than ".com" ones. At the same time, better readability did not correspond with better quality of content (Sutherland et al, 2005). Also in physical activity websites, better appeal is no guarantee for better content, which can make judging and selecting offers very difficult. The best general recommendation currently to be given is to rely less on design and more on the trustworthiness of the institution behind the offer.

The use and availability of information technology varies widely between countries and population groups. It also changes over time, sometimes rapidly. In order for it to reach its full potential – and to justify the costs for development and implementation - the necessary infrastructure must be generally available and socially acceptable in the target group. While most of this review deals with Internet based technology, telephones, text messaging, smart phones, game consoles or other tools still to be developed might be more relevant in specific contexts.

Only for some of the interventions in this review, evidence on effectiveness in behavioural change is available. Therefore expectations have to be realistic, particular if an approach focuses only on the individual and not also on the social and physical environment. Long term maintenance of positive behaviour in physical activity and sport remains the main challenge. Information technology can support physical activity and sport for all promotion, but it cannot replace human interaction and personal experiences.

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