

THE VERIFICATION OF THE USABILITY OF THE ONLINE INDARES.COM SYSTEM IN COLLECTING DATA ON PHYSICAL ACTIVITY - PILOT STUDY

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In order to reduce the increase of obesity and an inactive healthy lifestyle in the population, we are seeking means which would enhance a change in physical activity behavior worldwide. Information technologies, especially the internet, are among these means. Research has shown internet intervention to be effective in enhancing health in the population. The aim of the pilot study is to verify the usability of the online Indares.com system in collecting data on physical activity (PA) and at the same time to analyze a possible use of the system for intervention programs. The verification of the Indares.com system was carried out in the spring term (from January to May 2008) in a sample of 114 students at Valdosta State University who recorded their PA regularly into the system. The study analyzed the data from the first 12 weeks of the semester. The results show that the Indares.com system is an effective tool for the online collection of data on PA in its users and that the recorded data can be used for research purposes. Furthermore, the obtained information suggests that the Indares.com system can be used in internet intervention programs.

Keywords: Internet research, tailored feedback, intervention, monitoring of physical activity.

INTRODUCTION

The results of a study carried out on a sample of the population aged 15–69 years show that only 39.7% of the inhabitants of the Czech Republic meet the requirements of “healthy people 2010” concerning the amount of performed physical activity (PA) (Frömel et al., 2006). In order to reduce the increase of obesity and an inactive healthy lifestyle in the population, we are seeking means which would enhance a change in physical activity behavior worldwide and motivate people to a healthy and physically active lifestyle. In developed countries, there is a growing trend of the use of modern information technologies, especially the internet, in applying intervention aimed at behavioral changes. The annual increase of internet users provides reasons for using it for intervention purposes. This also applies to the Czech Republic where the number of households with internet access has risen from 14.8% in 2003 to 32% in 2007 (Český statistický úřad, 2007). Present experience tends to confirm the efficiency of internet intervention. Among the advantages is the possibility of addressing a large number of people while keeping costs low (Lewis et al., in press; Spittaels, De Bourdeaudhuij, & Vandelanotte, 2007). Using internet applications, we can deliver information tailored to users (Fotheringham, Owies, Leslie, & Owen, 2000) and provide them with privacy and anonymity. Moreover, users can access the

applications at times and places that suit them best (Moyer & Finney, 2004/2005). The studies discussing internet based intervention that have been published so far concerned public health with a focus on PA (Marshall, Leslie, Bauman, Marcus, & Owen, 2003) (see also below), healthy nutrition (Irvine, Ary, Grove, & Gilfillan-Morton, 2004), weight adjustment (Wing, Tate, Gorin, Raynor, & Fava, 2006), diabetes (Glasgow, Boles, McKay, Feil, & Barrera, 2003), reduction of substance abuse – tobacco (Strecher, Shiffman, & West, 2005) and alcohol (Bewick et al., 2008), and safe sexual behavior (Kiene & Barta, 2006), etc. Successful intervention has been so far confirmed in cases of intervention aimed at the improvement of nutrition, reduction of substance abuse and increase in safe sexual behavior (Portnoy, Scott-Sheldon, Johnson, & Carey, 2008). In cases of internet based intervention aimed at PA, the control of diabetes and weight adjustment, according to Portnoy et al. (2008) higher efficiency has not been found. To the contrary, other authors have confirmed the efficiency of internet based intervention focused on PA (Hurling et al., 2007; Napolitano et al., 2003; Rovniak, Hovell, Wojcik, Winett, & Martinez-Donate, 2005; Spittaels et al., 2007; van den Berg, Schoones, & Vlieland, 2007; Wantland, Portillo, Holzemer, Slaughter, & McGhee, 2004). In order for intervention aimed at increasing PA to be the most effective, it is important to consider how its users assess the given webpage or the applications

used within the intervention program. It seems that users assess very positively such internet webpages as enable them to keep individual records on their PA, set their own goals and to receive individual feedback on their PA (Lewis et al., in press).

The system Indares.com which is being verified provides all these possibilities and is based on immediate individual feedback in graphic form. The web application is available at www.indares.com. After free registration when the user creates his/her personal account, the person can freely use the system. At present, the Indares.com system is accessible in four languages – Czech, English, Polish, and Slovakian. At the moment, it is not known to what extent the Indares.com system can be applied in wider PA monitoring and intervention programs. Therefore, it is important to test its use and acceptability by its users in natural settings, preferably in all language areas.

The main aim of the study was to verify the practical use of the Indares.com system for data collection on PA and at the same time to analyze the usability of the system for intervention programs.

METHODS

The research sample consisted of 114 students (44 males, 70 females) aged 20.5 ± 1.7 from Valdosta State

University (Valdosta, GA, USA) enrolled on physical fitness class. The data of 73 students (19 males, 54 females) who recorded their PA regularly into the online database and had more than one registered PA during the monitoring period were used in this study.

PA monitoring was carried out during spring semester (from January to May 2008). The data from the first 12 weeks of monitoring were analyzed in this study (1/28/2008–4/20/2008). There was one week of spring break (3/10/2008–3/14/2008) during the monitored period. The data from the last two weeks of the semester were not included in the analysis due to the low number of students recording their data into the system.

To record the data on PA in students, we used the online system Indares.com (International Database for Research and Education Support), which is freely accessible. Upon registration, it allows its users to record data on their PA and to compare them with health recommendations, their own goals, the average results of a group, etc.

The students entered information on their PA into the system by themselves and no checking of this data's objectiveness has been performed; the level of objectivity of such information therefore equals any regular questionnaire survey.

Using Indares.com system requires only Internet Explorer. PA data recording into the system follows this procedure – the user logs in, goes to the page on

Fig. 1

Form for data entry used on Indares.com to record information on performed physical activities

Physical activities

Data entry | Charts | Statistics | Settings | Goals | Info

Year 2009

January

Week 3

Sun 11

Mon 12

Tue 13

Wed 14

Thu 15

Fri 16

Sat 17

Week 3

My activities

Activity has been added successfully.

Rank	Activity	Time	Intensity	kcal	
1	Running	40	Moderate	205	UPD DEL
Sum				205	

Add new activity

Type: Bicycling [Other activities](#)

Duration: 30 minutes

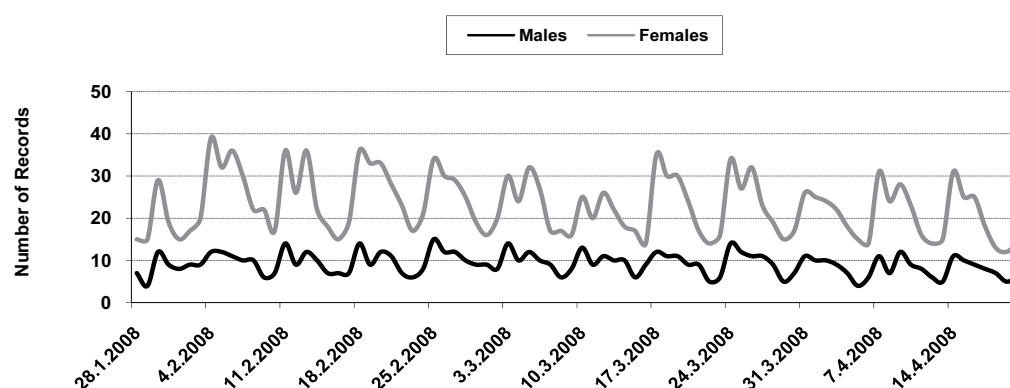
Intensity: Vigorous

Note:

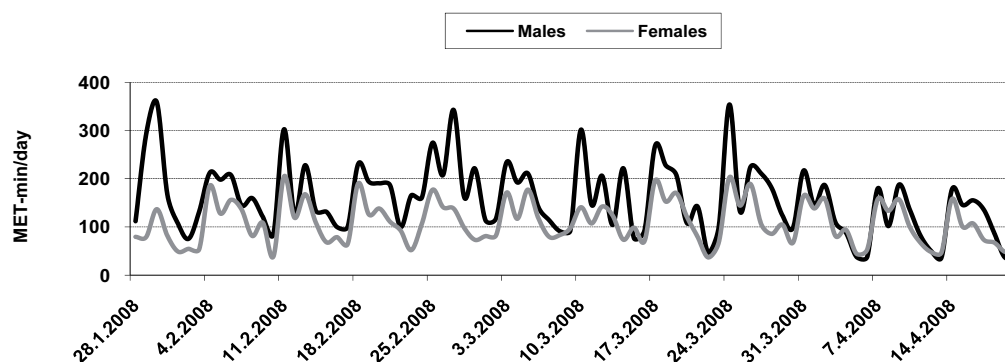
kcal: 308

Fig. 2

Number of daily records of PA into the Indares.com system during the observed period of 12 weeks

**Fig. 3**

Average daily PA of students during the observed period of 12 weeks



PA recording, and chooses the date for which he/she wants to record the PA data, he/she chooses the type of PA performed, records its duration in minutes, chooses the intensity of the PA performed, and saves the entire record.

The procedure can be easily understood from a screenshot of the page serving for data entry (Fig. 1). The system currently contains 75 different types of PAs that can be chosen. For each activity, there are preset appropriate levels of intensity that can be selected. The system uses three levels of intensity (low, moderate, and vigorous) and depending on the type of activity chosen, it displays, with a short description, what a particular intensity represents. This way the user is enabled to enter the most suitable level of intensity for the PA performed.

The system itself calculates additional information (e.g. energy expenditure [kcal] and the amount of PA considering its intensity and time of duration [MET-min]). The Indares.com system provides its users with detailed feedback on the PA performed in graphic form.

The data from the Indares.com system were transferred into the Statistica 6.0 program. It was not possible to differentiate days on which students did not really perform any PA and days on which they did not record the data to the system. Yet, the system enables the users to record data even backwards (to an earlier date) and the students could fill in the missing data; all of which were then interpreted as if no PA had been performed. In statistical analysis, basic descriptive statistics were used; the Wilcoxon match pair test and ANOVA for repeated measures. The level of statistical significance was set at $p < 0.05$. The effective size for the results of the Wilcoxon match pair test was assessed based on the d coefficient. Its levels are stated as being $d = 0.2$, low effect, $d = 0.5$, medium effect, and $d = 0.8$ high effect (Cortina & Nouri, 2000). We consider as logically significant the difference in PA performed at the rate of 280 MET-min/week, which is 40 MET-min/week higher than stated by Frömel et al. (2006). After calculating 280 MET-min for an average day in a week, we will obtain the equivalent of 10 min/day of a moderate PA (40 MET-min/day).

RESULTS

Students recorded PA into the Indares.com system regularly. The number of records for the individual days was rather stable during the monitored period. The highest number of PA records appeared on those days when students participated in organized PA – physical fitness classes – from Monday to Thursday; the least PA was recorded at weekends (Fig. 2).

Regarding the intensity and duration of PA, students performed the least PA at weekends and, on the other hand, the most PA on those days when they participated in organized PA (Fig. 3) during the monitored period.

The comparison of average week and average weekend days has shown that female students ($Z = 5.70$; $p < 0.001$; $d = 1.55$) and male students ($Z = 3.38$;

$p < 0.001$; $d = 1.55$) were significantly more physically active on weekdays than on weekend days (Fig. 4). These differences were significant both statistically and logically. On average, both men and women performed the highest amount of PA on Mondays and Wednesdays, further on Tuesdays and Thursdays, during the monitored period. These were the days when physical fitness classes took place. In men, the level of PA on Fridays was similar to PA on Tuesdays, Thursdays and Sundays (no statistically significant differences were found). Men were the least active on Saturdays, when the level of PA was comparable with Sunday values. In women, PA on Fridays was identical to PA on Saturdays and Sundays (no statistically significant differences were found), and women performed the least PA on these three days of the week (Fig. 5).

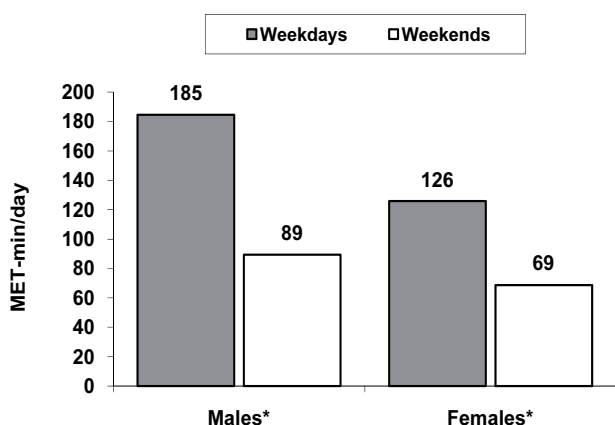
The amount of PA performed on average on weekdays was rather stable in both men and women during the monitored period of 12 weeks. Men were more physically active on weekdays in the fifth and ninth weeks of monitoring but only in comparison to the tenth, eleventh and twelfth weeks. Women performed the least PA on weekdays during the first week of monitoring (Fig. 6). Spring break, which took place in the seventh week of monitoring, did not have any apparent effect on the PA in students.

The level of PA performed in men at weekends was the lowest in the last 3 weeks of monitoring. In women, an increase in PA at weekends during the first six weeks of monitoring was recorded, however, the increase was neither statistically nor logically significant (Fig. 7).

Regarding the type of PA, men performed weight lifting, walking and running most frequently. Women performed walking, conditioning exercises and aerobics most frequently. The list of the top ten PAs performed by men and women most frequently during the twelfth weeks of monitoring is below (TABLE 1).

Fig. 4

Comparison of average PA on weekdays and at weekends



Legend:

* $p < 0.001$

Fig. 5

Amount of PA realized during the average week (calculated from the 12 observed weeks)

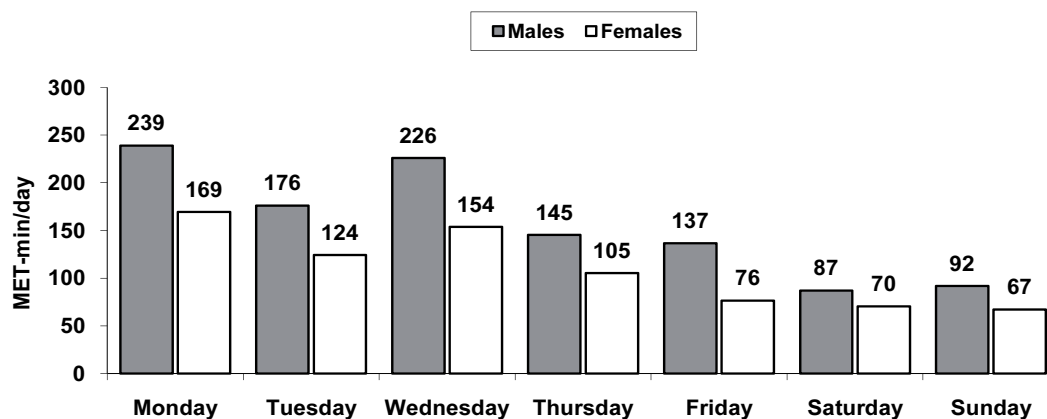
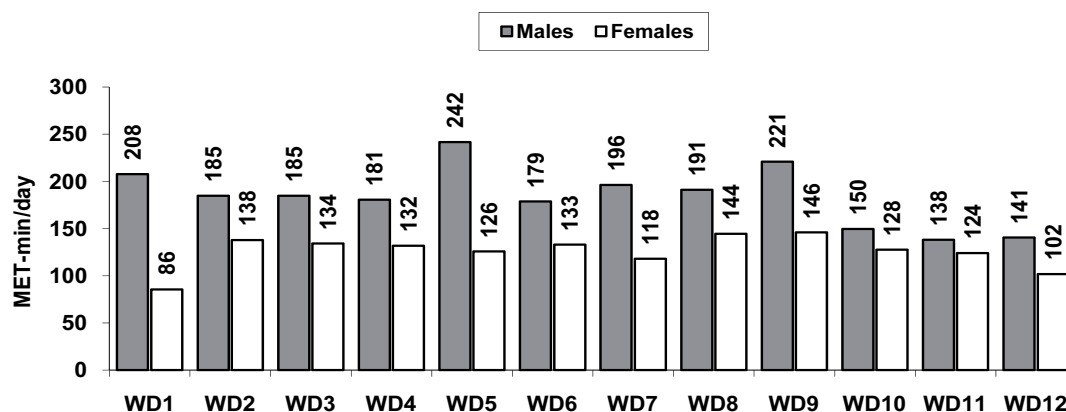


Fig. 6

Average weekday PA of students during the observed period of 12 weeks

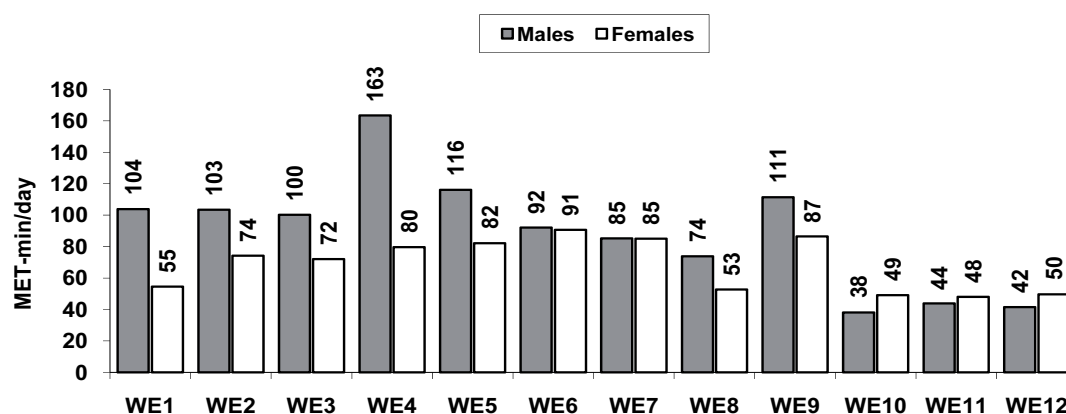


Legend:

WD = weekday

Fig. 7

Average weekend day PA of students during the observed period of 12 weeks



Legend:

WE = weekend

TABLE 1

The most frequently performed PAs during the observed period of 12 weeks

Order	Males	Females
1	Weightlifting	Walking
2	Walking	Conditioning exercise
3	Running	Aerobics
4	Basketball	Dance
5	Bicycling	Running
6	Conditioning exercise	Volleyball
7	Dance	Basketball
8	Aerobics	Bicycling
9	Bowling	Games
10	Football	Swimming

DISCUSSION

The information recorded into the Indares.com system during the experiment shows the frequency, intensity, duration and type of PA performed by the users of the system. These types of PA characteristics are sufficient in order to provide feedback to the users and to compare their PA to PA recommendations. The information could be, moreover, used in research. Since we did not encounter any difficulties in using the Indares.com system on the part of users nor with the amount of information which we gathered in the pilot study, we believe that the Indares.com is a suitable tool for use in online data collection on PA.

The design of this study did not allow us to fully test the use of the Indares.com system for intervention purposes. The main reasons were the absence of a control group and missing information on PA in students before they used the system. The comparison of the Indares.com system and its functions to the internet applications described in published intervention studies (Lewis et al., in press; Portnoy et al., 2008; Spittaels et al., 2007) suggests that the system could be used in intervention programs. This assumption can be partially supported by the observed increase of PA in female students at weekends, although it was not statistically significant, during the first six weeks of the experiment.

The students understood the use of the Indares.com system as a part of their homework assignments in physical fitness classes. This fact is proved by the high number of students using the system (64% of the registered students), further by the decreasing number of PA records in the last two weeks of the semester. After the semester finished, the students completely finished recording PA data into the system.

The Indares.com system was more used by women than men in this study. This finding coincides with the results published in intervention studies aimed at PA (Lewis et al., in press; Napolitano et al., 2003). We can, therefore, assume that when the Indares.com system will be applied in intervention programs, women will use this tool more willingly and frequently than men. Further studies need to show how users assess the system. Despite the fact that the Indares.com system includes the recommended features (Lewis et al., in press), it is necessary to verify whether the form and the properties of the system are efficient for the users. It is not possible to generalize the information obtained and it needs to be verified in other studies. It is essential to analyze the reasons which make the users of the Indares.com system use the system on a long term basis or, on the other hand, what will make them stop using the system. This information will be significant in case the Indares.com system will be used in intervention studies and it can be reflected in its efficiency.

CONCLUSIONS

Based on the results of the pilot study, the Indares.com system is a suitable tool for online data collection on PA in its users. User interface and the way the system is used did not cause any difficulties to the users.

The obtained information suggests that the Indares.com system can be used in internet intervention programs. However, this presumption needs to be confirmed by other experiments.

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OVĚŘENÍ VYUŽITELNOSTI ONLINE SYSTÉMU INDARES.COM PRO SBĚR DAT O POHYBOVÉ AKTIVITĚ – PILOTNÍ STUDIE

(Souhrn anglického textu)

Ve snaze zmírnit trend nárůstu obezity a inaktivního způsobu života populace jsou celosvětově hledány prostředky, které by přispěly k žádoucí změně pohybového chování lidí. Mezi tyto prostředky patří moderní informační technologie, zejména internet. Dosavadní výzkumy spíše potvrzují efektivnost internetových intervencí zacílených na zdraví populace. Cílem této pilotní

studie bylo ověřit praktickou využitelnost internetové aplikace Indares.com ke sběru dat o pohybové aktivitě (PA) a současně analyzovat možnosti využití systému pro intervenční programy. Ověřování systému Indares.com bylo uskutečněno během jarního semestru (leden až květen 2008) na 114 studentech Valdosta State University, kteří svou PA pravidelně zapisovali do systému. V této studii byla vyhodnocena data z prvních 12 týdnů semestru. Z výsledků vyplývá, že systém Indares.com je vhodným nástrojem pro online sběr dat o PA uživatelů a zaznamenaná data jsou využitelná pro výzkumné účely. Získané informace dále naznačují, že systém Indares.com bude využitelný v internetových intervenčních programech.

Klíčová slova: internetový výzkum, osobní zpětná vazba, intervence, monitoring pohybové aktivity.

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