

# Effects of social isolation caused by the COVID-19 pandemic on changes in daily activity: A case study of physical education students

Mirosław Zalech

Department of Humanities and Social Sciences, Faculty of Physical Education and Health, Józef Piłsudski University of Physical Education, Warsaw, Poland

## abstract

**Background:** The study sought to describe student time use and to analyse the effects of the COVID-19 pandemic (lockdown) on changes in the time use and their role within the context of health and social aspects.

**Material and methods:** The research was carried out every year from 2017 to 2020 in the same period of time. The study included 340 students of physical education. In their time budget diaries, the participants noted down the amount of time devoted to activities performed in a typical week.

**Results:** The study showed that during the lockdown, students devoted less time to sports training, social meetings or cultural activities as compared to previous years. During the COVID-19 pandemic, the amount of time devoted to the majority of activities was different on weekdays and at weekends. The results also showed that women devoted more time to personal hygiene and individual study, while men spent more time doing sports training.

**Conclusions:** The crisis sparked off by COVID-19 resulted in considerable changes in student time use. The findings show that the allocation of time to various activities depends on gender, days of the week, legal regulations and recipients.

**Key words:** activity diary, COVID 19 pandemic, lockdown, physical activity, social isolation, time use.

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**Corresponding author:** Mirosław Zalech, Józef Piłsudski University of Physical Education in Warsaw, Faculty of Physical Education and Health in Biała Podlaska, 21-500 Biała Podlaska, Akademicka 2, Poland, e-mail: miroslaw.zalech@wp.pl; Phone: +48 83 342 87 84; Fax: +48 83 342 88 00

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## INTRODUCTION

At the end of the 19th century, researchers began to develop interest in time use trends. Initially, studies focused on identifying and comparing standards of living, work efficiency and leisure time activities as well as assessing viewer/listener availability from the standpoint of broadcasting media [1, 2]. Currently, studies on time use have become an important part of research in many scientific areas.

Whatever we do, time is of essence. It constitutes a limited resource that is constant and whose quantity is the same for everyone. Contrary to other resources, it does not change. Time can be seen as something objective, i.e. when we calculate how many seconds, minutes or hours a particular activity takes. Also, there is a concept of subjective (perceived) time use. Both constructs are closely associated and affect almost every sphere of life [3, 4]. For instance, how we spend our time determines our level of happiness [5], health [6, 7], life satisfaction [8], financial decisions [9], learning outcomes [10] or lifestyle [11, 12].

Despite a growing interest of researchers in the time budget, student time use has not been fully investigated as yet. Previous studies have used average national representative data related to the main social groups and have aimed to determine the structure and the understanding of behavioural trends [13]. The revealed differences were described using such variables as gender, age, education, ethnic origin, income, country or employment status [14, 15]. This limits the validity of recommendations that refer to large parts of the population without considering their internal differences. For example, the statement that steps need to be taken in order to encourage young adults to improve their physical activity levels [16] is not adequate to PE students, who considerably exceed national physical activity norms [17, 18].

Furthermore, previous studies have focused on one or just a few activities. They have investigated, among others, correlations between computer or television use and sleep quality [19] or assessed physical activity levels in relation to obesity [20]. These studies have omitted the structure, types and relations between different activities performed during the day. There is no consideration of the fact that activities 'compete' against one another. For instance, students who devote more time to employment spend less time on academics [21].

The COVID-19 pandemic has led to the implementation of preventive measures in the society. One of the main strategies aimed at reducing the spread of the disease is to limit direct contact between people [22]. According to the regulations introduced by the Polish government, starting mid-March 2020, universities were partly closed and distance learning programmes were launched [23]. In addition, a number of other temporary restrictions were introduced regarding public events and gatherings, sports activities, entertainment, leisure and cultural activities, public transport, retail trade, restaurants, travelling, etc. (with the exception of commuting to work and dealing with important everyday matters) [24]. To date, no studies on the effects of such restrictions on the time use of PE students (future teachers) have been carried out.

In order to attempt to fill a gap in the literature, the present study sought to describe student time use in terms of everyday activities over a period of 4 years and to examine the effects of the COVID-19 pandemic on changes in time use. Another aim was to identify differences in the amount of time devoted to everyday activities with regard to gender and days of the week. The findings will enable a better understanding of how students make use of their time prior to and during the pandemic and to put forward adequate recommendations.

## MATERIAL AND METHODS

### PARTICIPANTS

Every year, the study included students of physical education (PE), a course that prepares students to become PE teachers. It was conducted at one of the top Polish sports universities. The data were checked in terms of their reliability and validity. The study involved analysing the time of all the activities that, on adding up, ought to correspond to the daily and weekly time budget. It verified whether the duration of activities performed by each person (e.g. duration of meals consumption) was provided. The authenticity of the time allocated to particular activities was confirmed. In the course of the study (4 years, 2017–2020), 18 individuals were excluded from analysis. In total, 340 participants completed the study: 2020 – 88 persons aged  $23.10 \pm 1.04$ ; 2019 – 86 persons aged  $23.13 \pm 0.86$ ; 2018 – 77 persons aged  $23.34 \pm 0.97$ ; 2017 – 89 persons aged  $23.31 \pm 1.05$ . Men constituted the majority of the study participants (68.24%). This stems from the fact that, in general, there are fewer women attending PE courses than men.

### PROCEDURE

The data used come from the research that was conducted every year between 2017 and 2020. The students noted down their activities in their time budget diaries broken down into the following 18 categories: (1) lectures; (2) sports classes; (3) theoretical classes; (4) meals – consumed regardless of the place; (5) personal hygiene; (6) sleep – at night or in the daytime; (7) active movement, e.g. walking, cycling, roller skating; (8) use of various means of transport, e.g. bus, car, motorbike or train; (9) studying individually, e.g. reading and revising, preparing projects and presentations, collecting data using the Internet, time spent in a library; (10) watching TV, surfing the Internet, playing computer and smartphone games, communicating through email and various messaging apps, visiting social networking sites; (11) social meetings, e.g. visiting and receiving guests, family meetings, celebrations; (12) cultural activities, e.g. going to the cinema, theatre, concerts, art exhibitions or sporting events, reading books, listening to the radio; (13) sports training; (14) recreational physical activity, e.g. exercising at home, outdoor activities (walking, trekking, jogging, cycling, etc.); (15) professional (paid) work; (16) voluntary work, e.g. helping others, unpaid work (e.g. being a member of student councils, organising charity events); (17) household chores, e.g. cleaning, washing up, washing, ironing, preparing meals, gardening, arranging household goods and materials; (18) other activities, e.g. idleness, shopping, personal and administrative services or religious practices.

The research tool was developed according to the Guidelines on the Harmonised European Time Use Surveys [25]. The analysis included primary activities in 15-minute time intervals, for 24 hours and seven days a week (Monday–Sunday). It focused on a typical week, i.e. with the exclusion of holidays and random events. If such situations occurred, the analysis was repeated. Data were gathered on the same months each year. The study was anonymous. This allowed reducing a tendency to over-report time spent performing socially desirable activities [26, 27].

In 2017–2019, the data were collected using paper questionnaires. In 2020, an electronic form was employed. Prior to completing the form, the respondents were provided with instructions. They were asked to take notes in their time budget diaries during or at the end of the day. As a result, the time of recall was shorter, and it also did not disturb their everyday activities. In general, findings related to time use may differ depending on the measurement technique applied [28]. Despite being more time-consuming, the use of time diaries seems to be more reliable and valid than asking direct questions [29]. Moreover, it allows recalling events and times easily. The passage of time seems to be the major factor affecting data reliability [30].

## DATA ANALYSIS

The analysis was carried out for mean daily time use on weekdays (Monday–Friday) and at the weekend (Saturday–Sunday). To compare mean time use in the years of 2017–2020, Kruskal-Wallis rank test (H) as well as multiple comparisons were performed. Wilcoxon signed-rank test (WR) was used to assess differences in mean daily time use in relation to the days of the week during the pandemic. In the course of the study, differences in physical activity levels between women and men were determined using U Mann-Whitney test (Z). Decisions to carry out analyses taking into account days of the week and gender were made based on the literature review in which authors imply that these are important variables that differentiate time use [15]. Statistica 13.3 was employed in the study. Significance of differences was set at  $p < .05$ .

## RESULTS

### DIFFERENCES IN TIME USE ON WEEKDAYS

Table 1 shows the mean time that students devoted to various activities on weekdays. The comparison between the years prior to the COVID-19 pandemic and the period of social isolation revealed that during the latter one, students spent significantly more time sleeping ( $H=27.49$   $p=.000$ ), studying individually ( $H=65.27$   $p=.000$ ), watching TV, surfing the Internet, using a computer or a smartphone ( $H=81.20$   $p=.000$ ), performing recreational physical activity ( $H=37.84$   $p=.000$ ), and doing household chores ( $H=54.06$   $p=.000$ ). During the pandemic, students devoted considerably more time to personal hygiene ( $H=10.20$   $p=.017$ ); however, multiple comparisons revealed that significant differences only occurred between 2020 and 2018 ( $p=.019$ ).

Table 1. Mean daily time use (minutes) on weekdays (by activity) in 2017–2020

Activity	2020**	2019*	2018*	2017*
	Mean ± SD	Mean ± SD	Mean ± SD	Mean ± SD
1	0	52 ± 25	69 ± 41	55 ± 25
2	0	66 ± 24	72 ± 50	59 ± 31
3	0	108 ± 38	111 ± 31	111 ± 28
4	68 ± 25	68 ± 38	70 ± 24	70 ± 28
5	62 ± 23	59 ± 25	54 ± 25	55 ± 23
6	490 ± 63	446 ± 48	457 ± 50	460 ± 64
7	67 ± 68	56 ± 31	53 ± 28	64 ± 43
8	17 ± 23	24 ± 26	25 ± 26	30 ± 34
9	114 ± 88	45 ± 36	44 ± 34	60 ± 35
10	242 ± 115	132 ± 65	128 ± 62	110 ± 57
11	34 ± 51	76 ± 40	93 ± 55	86 ± 60
12	10 ± 27	16 ± 19	25 ± 24	18 ± 25
13	51 ± 47	58 ± 37	68 ± 34	65 ± 38
14	67 ± 48	31 ± 23	34 ± 25	34 ± 29
15	67 ± 148	37 ± 76	27 ± 64	46 ± 85
16	6 ± 22	8 ± 22	6 ± 12	9 ± 23
17	91 ± 50	47 ± 28	57 ± 49	63 ± 26
18	54 ± 113	111 ± 114	47 ± 68	45 ± 72

Note: \*face-to-face learning \*\* research carried out during the lockdown caused by COVID-19

In the course of the research conducted in 2020, university classes as well as other extra-curricular activities did not take place due to the introduced legal restrictions. Distance learning programmes were launched at universities. In the previous years (2017-2019), students devoted an average of 225 minutes (2017) to 252 minutes (2018) to educational activities. Social isolation caused students to devote significantly less time to social meetings ( $H=72.52$   $p=.000$ ), cultural activities ( $H=33.16$   $p=.000$ ) as well as using various means of transport ( $H=10.62$ ,  $p=.014$ ) and training ( $H=9.26$   $p=.026$ ). When it comes to other activities, in the period of four years (2017-2020), significant differences in time use were noted ( $H=36.02$   $p=.000$ ).

#### DIFFERENCES IN TIME USE AT WEEKENDS

The characteristics of mean daily time use at weekends can be found in Table 2. During the pandemic, students devoted significantly more time to sleeping ( $H=25.96$   $p=.000$ ), studying individually ( $H=27.28$   $p=.000$ ), surfing the Internet, using a computer or a smartphone ( $H=74.55$   $p=.000$ ), performing recreational physical activity ( $H=19.44$   $p=.000$ ) and doing household chores ( $H=25.60$   $p=.000$ ), compared to years 2017-2019.

Table 2. Mean daily time use (minutes) at weekends (by activity) in 2017-2020

Activity	2020** Mean ± SD	2019* Mean ± SD	2018* Mean ± SD	2017* Mean ± SD
1	0	0	1 ± 8	0
2	0	12 ± 34	7 ± 21	4 ± 16
3	0	1 ± 7	3 ± 16	13 ± 62
4	74 ± 26	78 ± 40	74 ± 25	82 ± 44
5	65 ± 24	65 ± 35	58 ± 28	64 ± 30
6	525 ± 68	467 ± 53	493 ± 99	491 ± 86
7	63 ± 59	71 ± 48	66 ± 56	83 ± 59
8	18 ± 30	42 ± 48	56 ± 54	70 ± 68
9	78 ± 71	28 ± 33	40 ± 34	51 ± 54
10	249 ± 114	153 ± 82	138 ± 93	121 ± 89
11	59 ± 83	113 ± 66	132 ± 83	131 ± 80
12	9 ± 24	42 ± 44	48 ± 51	42 ± 52
13	37 ± 37	37 ± 39	37 ± 35	37 ± 39
14	82 ± 67	46 ± 54	45 ± 37	57 ± 64
15	30 ± 79	102 ± 175	92 ± 146	62 ± 133
16	9 ± 39	9 ± 32	9 ± 27	18 ± 64
17	85 ± 51	52 ± 40	64 ± 51	62 ± 43
18	57 ± 118	122 ± 146	77 ± 107	52 ± 99

Note: \*face-to-face learning \*\* research carried out during the lockdown caused by COVID-19

National restrictions introduced in 2020 resulted in cancelling all face-to-face educational classes as well as courses and workshops that mainly took place on Saturdays and Sundays. In previous years, these weekend activities took students 11 to 17 minutes on average, with considerable differences between particular study participants. It means that very few of them took part in such activities.

Due to social isolation, a significant reduction was noted in the time devoted to using various means of transport ( $H=38.61$   $p=.000$ ), social meetings ( $H=51.10$   $p=.000$ ) and cultural activities ( $H=47.48$   $p=.000$ ).

The Kruskal-Wallis rank test showed significant differences in time students devoted to active movement ( $H=8.29$   $p=.040$ ). However, multiple comparisons between particular tests did not reveal any significant differences. On average, the time devoted to active movement differed from 3 minutes between 2020 and 2018 to 20 minutes between 2020 and 2017.

Between 2017 and 2019, there was an increase in the amount of time students spent doing professional work, followed by a sharp decrease in 2020. These changes were significant ( $H=13.57$   $p=.004$ ). The same tendency was observed for the so-called other activities ( $H=26.55$   $p=.000$ ).

#### **DIFFERENCES IN TIME USE DURING THE COVID-19 PANDEMIC DEPENDING ON GENDER**

Male students significantly differed from their female peers in the time devoted to personal hygiene on weekdays ( $Z=2.76$   $p=.006$ ) and at weekends ( $Z=2.54$   $p=.011$ ). On weekdays, personal hygiene took female and male students an average of 71 and 56 minutes, respectively, while at weekends it took them 74 and 59 minutes, respectively. Female students also spent significantly more time studying individually ( $Z=2.19$   $p=.029$ ), i.e. 147 minutes on average, which was 53 minutes more than male students. In turn, men devoted significantly more time to sports training on weekdays ( $Z=2.44$   $p=.015$ ). It took them 59 minutes on average, i.e. 20 minutes more than in the case of their female peers.

#### **DIFFERENCES IN DAILY TIME USE DURING THE COVID-19 PANDEMIC DEPENDING ON DAYS OF THE WEEK**

The comparison between weekends and weekdays revealed that at weekends male students devoted significantly more time to eating meals ( $WR=2.97$   $p=.003$ ) - an increase from 68 to 73 minutes, sleeping ( $WR=4.52$   $p=.000$ ) - an increase from 484 to 523 minutes, social meetings ( $WR=3.33$   $p=.001$ ) an increase from 41 to 69 minutes, and recreational physical activity ( $WR=2.08$   $p=.038$ ) - an increase from 61 to 78 minutes. On the other hand, they spent significantly less time studying individually ( $WR=2.39$   $p=.017$ ) - a decrease from 94 to 74 minutes, doing sports training ( $WR=3.86$   $p=.000$ ) - a decrease from 59 to 42 minutes, and working professionally ( $WR=2.74$   $p=.006$ ) - a decrease from 84 to 33 minutes.

The comparison between weekends and weekdays also showed that at weekends female students devoted significantly more time to eating meals ( $WR=2.56$   $p=.011$ ) - an increase from 69 to 77 minutes, sleeping ( $WR=3.82$   $p=.000$ ) - an increase from 498 to 528 minutes, and social meetings ( $WR=2.30$   $p=.021$ ) - an increase from 21 to 43 minutes. However, they spent significantly less time studying individually ( $WR=3.42$   $p=.001$ ) - a decrease from 147 to 84 minutes.

## **DISCUSSION**

The paper focuses on how the COVID-19 pandemic and the introduction of social restrictions and distance learning affected students' time use. The comparison between the period of social isolation and previous years revealed that students considerably differed in terms of the time devoted to particular activities. During the COVID-19 pandemic, the time devoted to the majority of activities was different on weekdays and at weekends. As for the participants' gender, time use did not substantially differ. The study showed that there occurred an increase in the time devoted to passive activities.

Compared to the same periods in previous years, in 2020 students spent approx. twice as much time watching TV, surfing the Internet, using computers and smartphones as well as studying individually. It shows that the time devoted to theoretical classes at the university in the years prior to the pandemic was now spent studying individually and using information technologies for education purposes, e.g. using video conferencing services during classes.



An increase in the amount of time spent studying individually was also noted in the case of weekends. It shows that in the period of distance learning, students devoted more time to education than they would have if classes had been held at the university. An increase in the amount of the time devoted to studying individually may have stemmed from the lack of experience of both teachers (who assigned more homework) and students (who were incapable of making proper use of online education). When isolated, students do not often have favourable conditions for studying, they manifest low levels of motivation and they do not have adequate materials [31]. Ineffective control and the lack of support from teachers as well as limited interaction evoke a feeling of isolation, which reduces the level of satisfaction and impairs the effectiveness of distance learning [32].

Switching to distance learning revealed a reduction in using various means of transport. It seems to have been caused by the lack of need for moving between the place of living and university.

In 2020, there was an increase in the amount of time students spent watching TV, surfing the Internet or using computers and smartphones at weekends, compared to 2017–2019. The increase was significant, i.e. from 63 to 106 percentage points. The time devoted to such activities cannot be linked with changing the form of education only, since it is also used for professional, entertainment and communication-related purposes. It is usually connected with a sedentary lifestyle, which exerts a negative influence on one's health. There exists a negative correlation between watching TV and life satisfaction. People who spend a lot of time in front of TV consider their financial situation to be worse, have higher material aspirations, experience anxiety, are less trustful of others and believe they are not as involved in social activities as their peers. This distortion results from the fact that life shown on TV contains more violence, beauty and wealth than real life [33]. Frequent exposure to negative news on social media causes fear or anxiety and it may exert a negative influence on one's mental health [34]. However, the use of social networking sites may also contribute to the improvement in social support and mental wellbeing. What is important is the quality of interactions on social networking sites, not their frequency or duration [35].

The COVID-19 pandemic has led to an increase in the amount of time students devoted to sleeping on weekdays. During this period, women and men did not significantly differ in terms of sleep time. In both groups, sleep took significantly more time at weekends than on weekdays. According to the literature, longer sleep at weekends in young adults makes up for the lack of enough sleep on weekdays [36]. However, taking the pandemic into consideration, this argument does not seem to be convincing. It appears that in students, an increase in the duration of sleep is associated with an unexpected change in lifestyle. It is a consequence of restrictions imposed by the government on universities, leisure and cultural centres, shopping malls, restaurants, etc. Their lifestyle change is noticeable through a reduction in the time they devoted to social meetings and cultural activities. Thus, social activity limitation may be linked with an increase in sleep time. This increase may stem from the fact that during the pandemic, students had more free time and they did not have any demanding work- or university-related schedule to stick to. Retired or unemployed individuals as well as those with reduced work time are more likely to sleep and watch TV more [36]. Long sleep duration may contribute to mood and performance deterioration; it may cause drowsiness, increase the risk of cognitive impairment, depression, anxiety, stroke, cardiovascular diseases, diabetes or obesity [37].

In order to reduce health implications of passive time use, it might be useful to take up physical activity. During social isolation, students did not participate in any sports activities at the university. Due to the restrictions implemented by the government, the activity of sports clubs was suspended, and movement in public space was limited [24]. As a consequence,

the average amount of time devoted to sports practice was reduced. Men spent more time training than women, and the amount of time they devoted to sports training was significantly higher on weekdays compared to weekends. A reduction in average training time indicates that only some of the study participants gave up training. Others trained at home or did not obey the rules introduced by the government. Previous studies report gender-related differences in the amount of time devoted to sports training or physical activity [38, 39]. Men are also more likely to take risks [40, 41]. Therefore, despite legal restrictions, some individuals carried on training. The lack of adequate and reliable information concerning rules and regulations as well as their social unacceptance might have contributed to it. The introduction of immediate bans prohibiting participation in sports practice produces physiological and performance-related consequences [42] and causes health concerns [43].

The findings revealed a twofold increase in the amount of time devoted to recreational physical activity during the COVID-19 pandemic. It was also noted that men spent more time doing physical activity at weekends than on weekdays. This difference may result from the compensation of training time. The amount of time in daily time budget that was devoted to recreational physical activity (an average of over 1 hour on weekdays and almost 1.5 hours at weekends) indicates students' relaxed approach to the restrictions. It shows the lack of acceptance of rules limiting access to public open space for recreational purposes.

Other researchers' findings indicate that physical activity plays a crucial role in maintaining and improving health status. It enables enhancing cognitive performance as well as increasing working memory efficiency, cognitive flexibility and speed of information processing. In the case of mental health, it relieves depression and anxiety and improves one's mood and wellbeing [44]. As for physical health, it reduces the risk of cardiovascular diseases, diabetes, cancer and obesity [45]. An increase in the morbidity rate depends not only on physical activity levels but also on sedentary lifestyle [46].

The COVID-19 pandemic outbreak contributed to an increase in the amount of time students spent doing household chores. What is characteristic is that there were no significant differences between genders. Even though the present study revealed a greater involvement of women in household chores, it could be noted that the differences were not significant. It is inconsistent with other researchers' findings. Their studies indicate that although the differences have decreased over the last few decades, they are still considerable [12, 47] and noticeable over the lifecycle [48]. The fact that students spent less time doing household chores prior to the pandemic may be associated with their current place of living. Throughout an academic year, the majority of students live in dormitories or rented flats. It implies that the range of chores is less diverse than back at home.

On weekdays during the pandemic, students devoted more time to personal hygiene. The results obtained were in line with previous findings and confirmed that women spent more time than men performing activities associated with personal hygiene [48]. For instance, women were found to wash their hands more frequently than men [49]. Hand hygiene is effective against infectious diseases as well as gastrointestinal and respiratory illnesses [50]. The fact that students spent more time performing personal hygiene activities may have been caused by numerous COVID-19 information campaigns run in the media. These campaigns aimed to inform the public about preventive measures (e.g. frequent handwashing was recommended).

## CONCLUSION

To sum up, the findings of the present study show that the COVID-19 pandemic outbreak and restrictions introduced by the government brought about considerable changes in time use patterns among students. The changes include prolonged sedentary time (watching TV,



surfing the Internet, sleeping, studying individually) and a reduction in physical activity time. Time-use components of these behavioural patterns are significant modifiers of morbidity and mortality risks [51]. Therefore, in the case of prolonged sitting, e.g. while studying individually or sitting in front of TV/computer, it is recommended that students should interrupt sitting time with frequent physical activity breaks. Such habits help to produce positive cardiometabolic outcomes [52].

In students, sports training time decreased, whereas the amount of time devoted to recreational physical activity increased. The change was rather unfavourable, but still physical activity time exceeded the norms recommended by the World Health Organization [53]. It shows that external factors (legal restrictions) did not discourage students from physical activity. Thus, it seems that when choosing the study course related to sports, students are driven by their beliefs and interests. These results bear out the assumption that intrinsic motivation strongly influences behaviours associated with carrying on with physical activity despite unfavourable conditions [54]. It implies that controversial rules introduced without adequate consultations and rational justification may result in the lack of acceptance, reduced confidence in the government and poorer compliance [55,56]. Therefore, when implementing crisis-related measures, the government should, first and foremost, provide detailed information and comprehensive explanations, which would enhance their social approval. Moreover, the government ought to point to alternative and safe forms of physical activity and inform how to take preventive measures. In addition, programmes should be developed that would strengthen people's motivation for exercising in different settings, e.g. at home. It is essential since proper physical activity levels exert a positive influence on physical and mental health, thus contributing to reducing adverse effects of isolation and social distancing [57-59].

The shift from traditional to emergency remote teaching brought problems that involved difficulties in conducting and participating in sports classes that required group interaction, suitable facilities and proper equipment. The crisis exposed the need to develop alternative curricula based on individual exercises which could be done in limited space with as little equipment as possible. This form would partly substitute traditional classes during a crisis, while other curriculum areas would be covered at a later time.

An increase in the amount of time that students devoted to personal hygiene is believed to have been caused by media information campaigns that aimed to prevent the spread of the virus that causes COVID-19. It was anxiety about possible health risks that might have resulted in such behaviour. However, hygiene cannot be associated just with COVID-19, as campaign effects can last only until the danger is over. It is suggested that more attention should be paid to how government announcements and social campaigns are prepared in terms of information content so as to produce and enhance far-reaching and long-term effects. Therefore, announcements should be narrative, delivered via audio and video and focused on individual behaviours [60]. Also, they should be delivered to groups of individuals (segments) by means of highly credible sources [61] and they can appeal to fear simultaneously assuring recipients that they are capable of adopting recommended solutions [62].

To sum up, the findings of the present study provided evidence of the influence of the lockdown and social distancing on changes in students' time use and made it possible to determine differences within particular activities. A small sample size is the major limitation of the study. Thus, it is hard to generalise the results to other populations. Still, the homogeneity of the group under investigation (the same university and study course) boosts the chances of more precise implementation of adequate interventions. In addition, this fact may enhance conclusions drawn from other studies, thus enabling their replication

in various spheres and in a wider context. Finally, to the best of author's knowledge, it is the most complex study on time use before and during the most severe government restrictions caused by the COVID-19 pandemic that has been carried out so far.

The conclusions and recommendations put forward in this study only partially fill the current literature gap. Therefore, integrated discussion is needed to address relations between the time use and emergency states in different areas. It would help to develop optimal strategies aimed at increasing the effectiveness of health and social interventions among students during crises.

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