

Why do students absent?
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Abstract

We investigated students absence reasons to find out are the numbers of absence connected with meteorological changes, quality of sleep and students obligations. Influenza, colds and inflammatory processes of the respiratory or digestive system respond to damp and warm closed areas.. The pressure and the relative humidity of the air values cause fatigue, dizziness, lower concentration, headache, poorer mood and change in blood pressure values as well. Such symptoms, just as well as stress, and reduced sleep quality reduce the activity of the immune system so the organism becomes more sensitive.

We assumed that a greater number of absences will be recorded in:

- 1.) periods of warming (conditions favorable to the reproduction of microorganisms),
- 2.) months with a larger number of days with a decrease in air pressure (5 hPa) and relative humidity (5%) values,
- 3.) months with the highest reported number of flu cases

We processed, compared, and analyzed collected data using Microsoft Excel and then displayed graphically.

Just hypothesis about the relation to the relative humidity values failed.

Key words: absence numbers and reasons, meteorological changes, sleeping quality, obligations

1. Research questions

1. Can the number of absences respond to changes in the air temperature value of $\pm 3^{\circ}\text{C}$?
2. Is there a congruence in the reported numbers of students absentee and cases of flu which is a multiple-day disease??
3. Can we connect the number of absences with meteorological elements?
4. Is the number of absences larger at the time of announced testing?
5. Is there a connection between sleeping disorder and absence?

2. Hypothesis

1. The number of absences will be in months with more frequent warming.(3°C).
2. The largest number of absences will be in the months with the highest reported number of flu cases.
3. The greater number of absences will be in the months when more days have the drop in air pressure (5 hPa)
4. The greater number of absences will be in the months with the relative humidity increase (5%).
- 5.The greater number of absences will be in months with an increased number of written checks.
6. Students reporting more frequent sleep interruptions will have a greater number of absenteeism.

3. Research methods

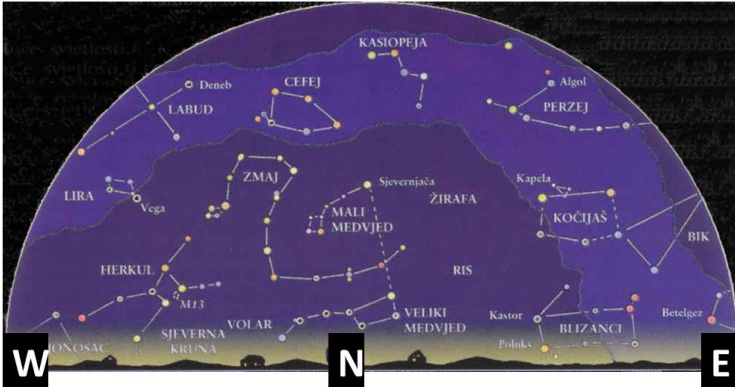
According GLOBE at night project's calendar visibility of the stars (magnitude od 0-7) sky was observed by 70 students from classes 1.A, B and C in following cycles during school year 2016./2017.:

- Perseus (20.-30.11.2016.; 20.-30.12.2016.)
- Orion (19.-28.1.2017., 18.-27.2.2017.).

The brightness of the night sky is defined as shine of the stars whose light, divided by the surface of the celestial sphere of one square arc-second (3600-you part 1 degree), gives the correct brightness of the sky. At this scale, the natural brightness of the night sky is in the most favorable case (dark, clear night during solar minimum) about 21.9 mag / arcsec² (magnitude of the arc per second squared).(First all students were introduced to relevant protocole, methods, working tools/ materials as well as in Greek mythology during geography, physiscs, biology and Latin lessons and GLOBE activities in general.) We created a working sheet for those observers. (picture 1)

Perseus 20.-30.12.2016.

Perseus constellation in winter is visible at E! Observing period 20,00 -22,00!!!!



date	hh:mm	Magnitude	Cloud cover	Hours of sleeping	Nr of sleeping disruptions
20.12.					
21.12.					
22.12.					
23.12.					
24.12.					
25.12.					
26.12.					
27.12.					
28.12.					
29.12.					
30.12.					

Name and surname: _____

Class: _____

ADRESS: _____

Picture 1. working sheet for observers (time, magnitude value, sleeping hours, number of sleep disrruptions, clouds

Air temperature, humidity and pressure were measured by DAVIS automatic station and compared with same data from National Hydrometeorological Institute. Sara and Tin collected them and uploaded it into GLOBE base.

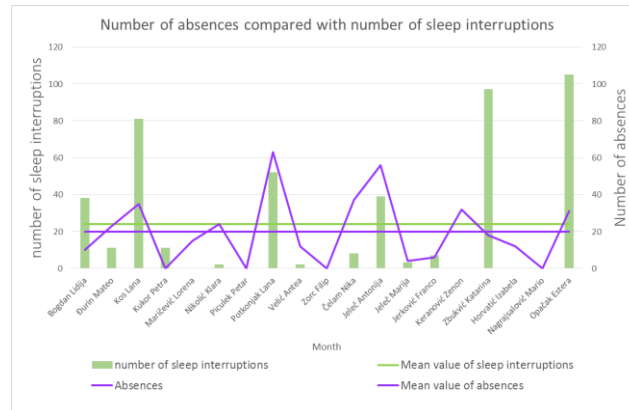
Data about number of absences were taken from e- class-books, processed by School's Team for quality members (our GLOBE mentors as well). Estera analyzed them for this project.

Data on the reported number of flu-like fluids have been taken over by the World Health Center for Influenza National Center. Those data were processed by Anita.

3. Data review

Collected data were statistically analyzed, shown in charts and tables. All stages and most interesting events are documented with photos, too.

For 19 students measuring the constellation visibility over all four cycles, we summed up all the sleep disturbances and the number of absences in the months of observation of the constellation visibility. We calculated the mean values of the number of absences of all 19 students and the mean number of sleep interruptions. The graph shows that pupils with a greater number of sleep disruptions often have a greater number of absenteeisms (Kos, Potkonjak, Jeleč A., Opačak) while students with a higher quality sleep are less absent (Kukor, Maričević, Piculek, Velić, Zorc, Jeleč M., Jerković, Nagrajsalović)(picture 2)



Picture 2. the mean values of the number of absences of all 19 students and the mean number of sleep interruptions

We observed the two most obvious exceptions; a student with a low number of breaks in sleep, and above the abnormal number of absenteeism – Nika Čelam, and a student – Katarina Zbukvić with an abnormal high number of sleep breaks and a below-average number of absenteeism.

Given that there are a lot of exceptions, we can conclude that lack of sleep may affect the absence of students, but it is not a key factor because besides the quality of sleep and other factors can affect the absence of students.

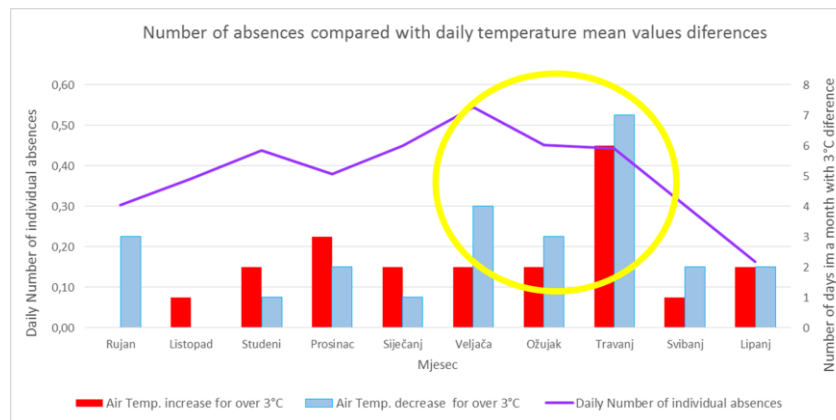
Table1: Air temperature data, eg for the 9th, 10th, 11th and 12th of March 2015.

date/March	9	difference	10	difference	11	difference	12	difference
1	25,0		13,5		9,2		12,3	
2	23,6	-1,4	14,5	1,0	6,8	-2,4	11,2	-1,1
3	21,9	-1,7	13,7	-0,8	8,5	1,7	6,1	-5,1
4	21,7	-0,2	16,5	2,8	10,5	2,0	5,0	-1,1
5	16,6	-5,1	16,1	-0,4	9,6	-0,9	3,9	-1,1
6	15,5	-1,1	15,8	-0,3	9,7	0,1	3,8	-0,1
7	14,7	-0,8	15,3	-0,5	11,6	1,9	3,2	-0,6
8	15,8	1,1	15,0	-0,3	14,8	3,2	2,4	-0,8
9	15,8	0,0	13,9	-1,1	15,4	0,6	3,6	1,2
10	14,5	-1,3	12,0	-1,9	13,8	-1,6	6,9	3,3
11	15,5	1,0	9,1	-2,9	15,5	1,7	3,4	-3,5
12	18,4	2,9	9,7	0,6	14,2	-1,3	2,0	-1,4
13	20,0	1,6	9,2	-0,5	11,6	-2,6	2,0	0,0
14	22,2	2,2	10,8	1,6	12,1	0,5	3,5	1,5
15	23,1	0,9	11,8	1,0	12,8	0,7	3,2	-0,3
16	23,8	0,7	12,2	0,4	15,6	2,8	4,0	0,8
17	25,8	2,0	11,3	-0,9	13,7	-1,9	2,3	-1,7
18	24,4	-1,4	11,8	0,5	14,0	0,3	1,4	-0,9
19	20,8	-3,6	9,5	-2,3	12,1	-1,9	2,4	1,0
20	18,6	-2,2	10,7	1,2	15,0	2,9	1,3	-1,1
21	15,8	-2,8	9,9	-0,8	5,4	-9,6	7,7	6,4
22	15,8	0,0	10,2	0,3	3,8	-1,6	11,1	3,4
23	18,6	2,8	8,9	-1,3	4,8	1,0		
24	14,3	-4,3	11,1	2,2	4,3	-0,5		
25	13,4	-0,9	9,1	-2,0	2,6	-1,7		
26	16,0	2,6	12,4	3,3	4,1	1,5		
27	15,2	-0,8	11,4	-1,0	4,7	0,6		
28	14,3	-0,9	11,3	-0,1	4,8	0,1		
29	14,4	0,1	12,0	0,7	5,6	0,8		
30	12,7	-1,7	11,7	-0,3	9,1	3,5		
31			10,9	-0,8				
Mj.sred.	18,3		12,0		9,9		4,8	
>3		0,0		1,0		2,0		3,0
<3		3		0		1		2

This is a table showing how we processed air temperature data, eg for the 9th, 10th, 11th and 12th of March 2015., in excell. We needed the number of times the air temperature increased or decreased for

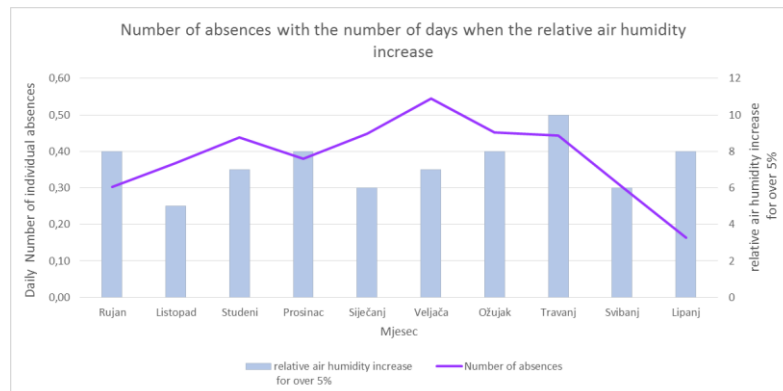
3°C so we took the values for two consecutive days and counted the days with the rise or fall of temperature for 3°C.

In next chart (picture 3), we compared the number of absences and differences between mean daily air temperature per month. At Axis x, we showed the months in the school year 2016/2017. On the left axis y we show the daily number of absences per student, and on the right axis y Number of days in the month with the difference noted greater than 3C. It is noticeable that a greater number of absences occurred in months when there were a number of cases with an air temperature drop of more than 3 °C, which is February, March and April.



Picture 3 Number of absences and differences in mean daily air temperature per month

Further, we have compared the number of absences with the number of days when the relative air humidity increase was recorded by 5%. The values for relative humidity increase were calculated in the same way as changes in temperature and air pressure.



Picture 4 Number of absences compared with the number of days when the relative air humidity increase was recorded for over 5%.

From the graph (picture 4) it is apparent that the relative humidity increase can not be related to the number of absenteeism of the students.

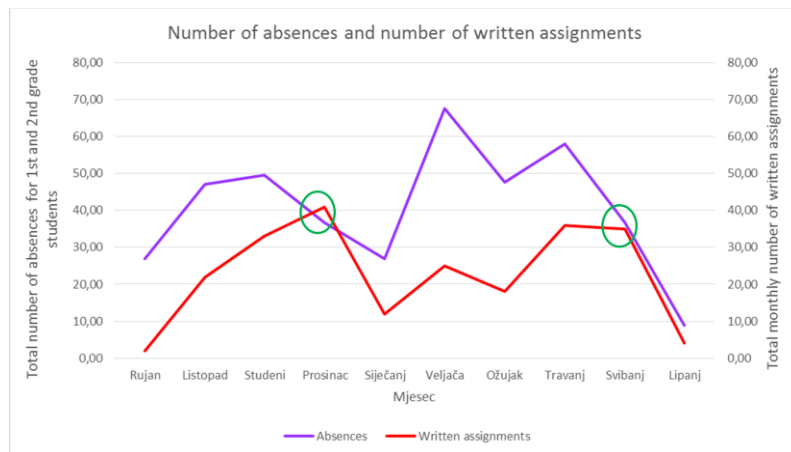
In table 2. We have downloaded a series of written assignments for the 1st and 2nd classes from e-class book, and for the part of the written assignments for 1.a. we processed data using excel.

Table2

E – Class Book – test schedule (1.a, 2015./2016.)

RASPORED PISANIH ZADAĆA, TEHNIČKIH I DRUGIH PROGRAMA I OSTALIH UČENIČKIH RADOVA										
Nastavni predmet	Rujan	Listopad	Studeni	Prosinac	Siječanj	Veljača	Ožujak	Travanj	Svibanj	Lipanj
Hrvatski jezik				Prva školska zadaća 10.12					Druga školska zadaća: Teme: S knjigom u ruci nisi sam, Hamletove dvojbe - tvoje dvojbe; Kako se osjećam u srednjoj školi 23.05	
Engleski jezik I			Pisana provjera znanja 11.11	Školska zadaća 08.12		Pisana provjera znanja 24.02		Školska zadaća 06.04	Pisana provjera znanja 11.05	
Latinski jezik			Gramatička kontrolna zadaća 25.11						2. KZ - deklinacija imenica i pridjeva, komparacija pridjeva i priloga, akt i pas. prez. imperf. glagola 1.-4. konj. i particip prez. akt. 04.05	
Matematika		1. pisana provjera znanja - RACIONALNI BROJEVI 29.10		2. pisana provjera znanja - algebarski izrazi 03.12			3. pisana provjera znanja - algebra i funkcije 17.03		4. pisana provjera znanja - oblik, prostor i mjerenje 25.05	
Biologija			Materijali i njihova svojstva 12.11			Pisani ispit 04.02		Pisani ispit - Životni procesi 01.04	Pisani ispit 30.05	
Fizika		Fizikalne veličine i mjerne jedinice - pisana provjera 16.10	Gibanja - pisana provjera 20.11	Gibanja - pisana provjera 21.12		pisana provjera 12.02	pisana provjera 11.03	pisana provjera 25.04	pisana provjera 23.05	
Povijest				Pisana provjera znanja - pp doba, Stari istok, Grčka 01.12	Pisana provjera znanja (od Rimske Republike do razvoja feudalizma) 19.01	Pisana povijest znanja - Hrvatska u ranom srednjem vijeku 23.02		Pisana provjera znanja - Hrvatska u razvijenoj i kasnom srednjem vijeku 27.04		
Geografija			Pisana provjera znanja - g. širina i dužina i računanje vremena 25.11	Pisana provjera znanja - Sunčev sustav, Gibanja Zemlje 02.12		Reljef - opća obilježja, građa Zemlje, endogeni procesi 10.02	Reljefni oblici 16.03	Egzogeni reljefni oblici 05.04		

In the school year 2015/2016. we counted the written assignments in the first and second grades. We compared the total monthly number of written assignments with the total number of absences per student of the first and second grade.



Picture 5 Number of absences increases with the number of written assignments

The graph (picture 5) shows that the number of absences increases with the number of written assignments. The exception is the month of December and May when we assume that students are more likely to attend classes, regardless of their health status, due to the end of the semester or the end of the school year.

4. Conclusions

1. Comparing the absenteeism of the students with the change in the mean daily temperature, we concluded that the number of absenteeism increased in the months when there were a number of cases with a mean daily temperature drop of 3 ° C, not as we expected with temperature rise. The reason for this is more frequent student placement in indoor environments and weaker room ventilation, which is conducive to transmitting pathogens.
2. The number of absenteeism coincides with the number of cases of flu in the Republic of Croatia. This outcome is expected since flu is a disease lasting about a week, which significantly increases the number of absenteeism.
3. By comparing the number of absences with changes in the value of air pressure and relative humidity, we concluded that the air pressure drop (5 hPa) is associated with the number of absences, whereas the relative air humidity increase (5%) does not indicate a connection with the number of absences.
4. In the months in which students have tests, there are a number of shortcomings that can be related to the stress or uncertainty of the pupils, which is absences are preferable. The exception is the month of December in which a number of written checks were carried out, but the number of absences was smaller, and we concluded that students wanted to conclude the semester successfully
5. After observing the constellation within the Globe at Night project and recording sleep quality, we concluded that pupils with a smaller number of interruptions are often less absent. This may be due to the fact that quality sleep and rest positively affect the immune system of the pupils, which is why they are more resistant to disease and more regular in attending classes. Given that there are also students with good sleeping quality with a high number of absenteeism, we can conclude that besides the quality of sleep other factors can affect the absence of students.

5. Discussion

Students absence is a great problem in Croatia, and some other EU countries, like for instance Portugal, too. After presenting our project we wanted to rise up the awareness of that issue in a local community. Our Schols' Team for Quality used our project as a part of the international project „International Quest for EU Quality“. Project was written and carried out by our GLOBE mentors, as cooperation with a vocational school from Portugal, in connection with a selfevaluation process (larger EU project for vocational schools). As a result of this project our school was pronounced as the best vocational school in Croatia. We are highlighted as good practice example. Part of that project showing how successful we are was the combat with absenteeism. It was nice to find out that our work contributed.

6. Acknowledging

May 2017., Annual GLOBE review in Croatia, our project was rewarded as the best research project in this field

June 22nd 2016. – Good morning Croatia, TV show, an interview with our mentors and student

(We were asked to inform about our combat with absenteeism, among other things regarding our selfevaluation project.)

EQAVET Newsletter JUNE 2017 ISSUE 15

„An important part was a comparison of individual experiences in the implementation of the self-assessment process in VET schools; with notable experiences presented by participants from the Vrapce Nursing School, Požega Craft School and Rijeka Medical School....“

7. Data sources / literature

<http://www.darksky.org/>

<http://visibleearth.nasa.gov/view.php?id=55167>

<http://www.zagreb.hr/default.aspx?id=12917>

http://prognoza.hr/karte_postaja.php?id=glavne

http://prognoza.hr/karte_postaja.php?id=klimatoloske

http://gripa.hr/content/szo/tjedno_izvjesce.aspx

<https://bib.irb.hr/datoteka/219072.219072.pdf> - Psihoneuroimunologija, dr.sc. Katja Gotovac

GLOBE in course of time - projects review School for nurses Vrapče (2001.,2002.,2003.)

Light pollution and our sleep, GLOBE project 2015.

Volner, Z., 2014: Medicinska bakteriologija, virologija i parazitologija. Školska knjiga, Zagreb
e-class book

Team for Quality reports 2012. – 2017.

Badges description:

B.1 Collaboration

All our members are listed and their roles in collecting, analyzing and entering data, presenting them are defined. Together, students, teachers and scientists we worked as a professional team. We were recognized as such, and our results as relevant for another international project.

B. 2 Community impact

We described how the topic of our research is a big problem in our community and wider. It led us to this research which had an significant impact on another, bigger international project which then placed our school on a very high level of national and international importance. National Vocational Education Agency, their experts used our results, for their further research, helped us to improve our presentation skills, acting publicly and on national TV

B. 3 Connecting to a STEM Professional

We were in constant contact with:

- National Health Institute and improved our medical knowledge and skills, too.
- National Hydro Meteorologic Institute and its scientist, Dubravka Rasol, which helped us to interpret meteorological data