PROJECT OF ASSISTED PROGRAM IMPLEMENTATION AT PHYSICAL EDUCATION DISCIPLINE TO THE BUCHAREST UNIVERSITY OF ECONOMIC STUDIES

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Abstract

I have followed student's health problems (3 different university years) and additional medical issues (1 year of study) as main objectives. I have started the research from the premise that students with any health sensibilities can be assisted during a half a year period in order to achieve 2 credit-points at the physical education discipline. The study is sustained by 4 research methods: (observation, mathematical, interview inquiry and study case) and 4 types of primary documents (observation protocols, SIMUR lists, documents of attendance together with anamnesis files, original medical exemptions).

I have presumed that the cardiac frequency graphics of students with some medical sensibilities could be different from the healthy ones. After the data analysis - when the technique device works properly - I have noticed that the heart rate media of targeted subjects was superior comparative with their healthy partners.

In the final conclusions, I propose one special assisted program dedicated to those students who feel/suffer different physiological dysfunctions, for their own benefits. This special program could be sustained by interdisciplinary teams under the university guidance.

Keywords: *heart rate dynamics, physiological dysfunctions, medical exemptions typology*

JEL classification: *I250; I120*

Introduction

Related toThe Bucharest University of Economic Studies (A.S.E.) Bachelor's programs[2], all candidates should attach before admission into submission files "one medical receipt issued by scholar or territorial medical offices that prove the person is fit/able for the running profile"[3].Annually, the statistics reveal that some A.S.E.'s bachelors are launched into the labour market without the credits of physical education discipline. For different reasons they were medical exempted. This study is focussing on medical exemptions typology, and tries to lunch a platform/program dedicated to those students who declare some physical dysfunctions/sensitivities, and help them to be physically prepared for

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[2] http://mefc.ase.ro/Media/Default/baza%20legislativa/2017/Anexa3L.pdf [Accessed 17 march 2017]

[3] http://mefc.ase.ro/Media/Default/baza%20legislativa/2017/Licenta4.pdf, Capitol II, Art. 17, align C, [Accessed 17 march2017]

work and job duties at the end of their university studies.

1. Objectives:

- Data centralization related to medical problems for some of my students;
- Additional monitoring process focused on those students who declared in the beginning of 2016-2017 year of study that they hadsome medical issues; with emphasis on any cardiovascular particularities of students above mentioned, during physical education (P.E.) classes, using licensed measuring devices.

2. Assumption:

For subjects with declared medical issues, it was presumed that cardiovascular dynamics is different from the healthy one, for the same effort level performed during the P.E. lessons, under similar condition of data acquisition.

3. The purpose:

The main goal of this study is to launch a special assisted program that can be included into the A.S.E.'s offer, dedicated to those potential bachelor graduates who may be interested in their health condition during their university studies. My trust is that some of students are interested not only in achieving 2 credit-points/each half-year periods/physical education disciplines, but also in their fitness status, their cardiovascular adaptation to physical effort, etc.

4. The period of study:

This study was carried out on three different university years as following: 2011-2012, 2012-2013 and 2016-2017. For the second objective (paragraph 2. b), the study was carried out on the first semester of 2016-2017 university year.

5. Technical support:

For assumption analysis I have used 4 approved devices as following: Geonaute chronometer/ France licence; Polar Team System – hart rate monitor system/ Finland licence; Sanitas Pulsoximeter / Germany licence; desktop/ Microsoft - U.S.A. licence;

6. Research methods:

During this study I have used four research methods: observation, mathematical, interview inquiry and study case;

7. First rank documents:

The foundation of the research is supported by 4 different documents: observation protocols, S.I.M.U.R.[4] lists, documents of attendance together with anamnesis files, original medical exemptions;

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[4] http://www.project-simur.ase.ro/ [Accessed 21 March 2017]

8. Research methodology:

8.1. Step 1: total number of students for entire period: In the beginning of the study, based on S.I.M.U.R. lists and attendance documents, I have centralized the total number of students that I worked with. The statistics is presented in table 1. For the first objective of the study I have targeted 737 subjects: 305 subjects were targeted for the second objective; 432 were attending P.E. classes for both semesters in their first year of study.

Table 1. Student groups per each year

University Year				University Year				University Year	
2012 - 2013				2011 – 2012				2016 - 2017	
SEM 1		SEM 2		SEM 1		SEM 2		SEM 1	
group	Number	group	number	group	number	group	number	group	number
113	19	113	122	113	137	113	137	923	23
114	21	114		114		114		924	29
115	20	115		115		115		925	25
116	21	116		116		116		926	29
117	22	117		117		117		1027	
118	23	118		118		118		1028	
1019	26	1018	20	916	24	916	23	1029	199
1018	20	1019	48	917	54	917	54	1030	
1017	25	1017		918		918		1031	
144	20	144	20	215		214		1032	
	217		210					1033	
								1034	
									305

Table 2. Medical exemptions typology

		2012-2013 SEM 1+2	2011-2012 SEM 1+2	2016-2017 SEM 1
1	locomotors system malfunctions Scheuermann malady; different degree of ketosis' & scoliosis; condroplastyas, dysplasia; flat feet; joint laxity	3	3	12
2	urinary system malfunctions kidney stones; kidney malformation ± post operatory status	1	0	2
3	cardio-vascular system malfunctions extra systole, tachycardia etc	0	4	2
4	traumatology ± sequelae	5	4	4

	dislocations, twists, fractures, tendon fractures; discopathy, various pains			
5	respiratory system malfunctions	2	2	4
	asthma, bronchial cyst			
6	genital malfunctions	0	1	2
	ovary cysts ± cyst removals			
7	ocular malfunction	1	1	0
	glaucoma; strong myopia with astigmatism			
8	infectious& internal disease	2	2	1
	hyperthyroid secretion; thalassemia under treatment&chronically sinusitis			

8.2. Step 2: total number of medical exemptions for entire period: Related to original medical exemptions issued by A.S.E.'s medical unit, I have proceeded to centralise the data; I have used a classification based on main functions, organs and systems[5] of human body. The casuistic was various, so I have summarised 8 categories of malfunctions in table 2.

8.3. Step 3: selection of working group (second objective 305 students): In the beginning of 2016-2017 university year, whilst presenting to my students their rights and obligations - beside safety rules in gym fields/spaces and any other related requests – I have asked them about any health and medical particularities. This was the first phase of the selection process for my study. 11 subjects drew my attention due of their special particularities. Second phase comes by observing the reaction of my students to physical effort – in this case 1 student was included into the group. The third and final phase of selection process is again the observation path: using a pulsoximeter, I noted down the values of heart rate (H.R.) and oxygen saturation (SpO2) - sitting position - of some students, in the beginning of the lessons. I presumed that 100 b/min is a value that emphasizes a potential research subject. – Another 4 students were included in the group. At the end of the selection stages/phases I have selected data for initial working group comprised of 16 potential subjects.

8.4. Step 4: the pair disposal, final group organisation: At that stage, two conditions were necessary for a student to become member of research group:
8.4.1. Voluntary participation in the study: The student gets involved by free-will decision; the motivation was related to their curiosity focused on H.R. reactivity during P. E. classes; as I found out, none of them had previously been assisted from that point of view.
8.4.2. The pair disposal: at the same position/lesson, I have tried to pair one student with any physiological dysfunction, with another healthy one with similar

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[5]http://medical-dictionary.thefreedictionary.com/ [Accessed 12 April 2017]

anthropometric characteristics (age, height, weight, sex). An inquiry based on interview was necessary at that moment[i].

From initial number of 16 potential subjects identified in the early selection stages, only 8 of them accepted to be a part of the study together with their healthy/helpful partners. (table 3).

Table3. Working group

INITIALS	AGE (year)	HEIGHT (m)	WEIGHT (Kg)	BIOLOGICAL STATUS	LESSON TIPOLOGY	RESTING VALUES F.C. – beats per minute SpO2 - percent	DATA AQUISITION
G.A.I.	20	1,6	48	tachycardia	basketball	F.C.99 / 98% SpO2	08.11.2016
D.A.I.	20	1,63	48	healthy	basketball	F.C.87 / 99% SpO2	08.11.2016
T.A.M.	19	1,68	51	epilepsy	fitness	F.C.112 / 99% SpO2*	08.11.2016
P.E.G.	20	1,67	51	healthy	fitness	F.C.96 / 99% SpO2*	08.11.2016
I.M.C.	20	1,73	57	healthy	basketball	Missing to the test	
B.G.	20	1,7	56	asthma	basketball	absent data	28.10.2016
B.D.I.	20	1,54	50	brain surgery	basketball	F.C. 104 / 98% SpO2*	18.11.2016
B.A.A.	20	1,63	46	healthy	basketball	F.C. 107 / 99% SpO2*	18.11.2016
D.M.	21	1,58	53	high H.R.	aerobic	F.C.120 / 99% SpO2	01.11.2016
A.M.E.	21	1,61	56	healthy	aerobic	F.C.92 / 98% SpO2	01.11.2016
C.V.I.	19	1,98	114	high H.R.	basketball	F.C.107 / 98% SpO2	18.11.2016
R.M.A.	20	1,75	84	healthy	basketball	F.C.89 / 99% SpO2	18.11.2016
C.D.	20	1,77	68	high H.R.	fitness	F.C.103 / 99% SpO2*	18.11.2016 + 09.12.2016
B.A.	20	1,79	74	healthy	fitness	F.C.73 / 99% SpO2*	09.12.2016
P.D.I.	20	1,71	73	healthy	combat	F.C.73 / 99% SpO2	01.11.2016 + 06.12.2016
C.A.S.	20	1,7	54	high H.R.	combat	F.C. 136 / 95% SpO2	01.11.2016 + 06.12.2016
S.M.	20	1,83	79	healthy	combat	F.C.94 / 99% SpO2	01.11.2016

NOTE:
* standing position

8.5. Step 5: synchronising and resetting the equipment: Previous any H.R. data acquisition, I have proceed for synchronising the Geonaute chronometer, with desktop unit and also with Polar Team System –monitoring devices. These measures were taken in October 2016 into ± 10 seconds gap. Before each data acquisition/lessons I have set the chest units in accordance with the subject's anthropometric details, and also with East European time and date.

8.6. Step 6: collecting primarily H.R. data from each pair of subjects: for a data collection with good accuracy, a few conditions were needed to be simultaneously met.

- Adequate practice space: a type of overcrowded space was improper for monitoring the subjects' activity; from that point of view the best time was during the day when I could be only with my research group in the sport field/gym;

- Each pair of subjects had to be perfectly synchronized during the data collection: in order to achieve this, I made sure that the effort volume and intensity was similar for both of them: e.g. the same number of moves, repetitions, actions etc.; the only exception was the comparative analysis during the bilateral basketball game phases when each subject gets into the action in a individually manner.

- The devices used for data measurements were needed to work properly; nevertheless, this was not possible every time because of various reasons: some actions, positions (e.g. hanged on rib stall) even the thin constitution of some subjects made possible the slide of chest units from the recommended position – and this sometimes caused data losses.

- Proper use/set of Polar Team System units: the devices/units functions were explained to the subjects, and the recommendation was to be set on/off at the same time;

- Observation protocols records: for an exactly identification of all moments during the class, I have recorded each session on the observation protocols: details such as time, duration, effort type, working formation, actions etc. Later on, the H.R. graphics were interpreted by minute intervals in accordance with observation protocols. At that time the Geonaute chronometer, the desktop unit and Polar Team System had been previously synchronised.

There were in total a number of 13 hours, 38 minutes and 5 seconds (818 minutes + 5 seconds) of actions in various typologies (table 3). Behind those, 26 minutes and 25 seconds could be considered as vitiated.

9. Data interpretation:

9.1 First objective: After the centralisation of all medical exemptions for all three years of study, I conclude that bigger incidence is represented by locomotors system malfunctions (31%) followed by traumatology events (22%); some of these malfunctions could not be suddenly installed during study period. (figure 1) – It is difficult to prove if these sensibilities/malfunctions were initially stipulated into admission files at this stage of the study.
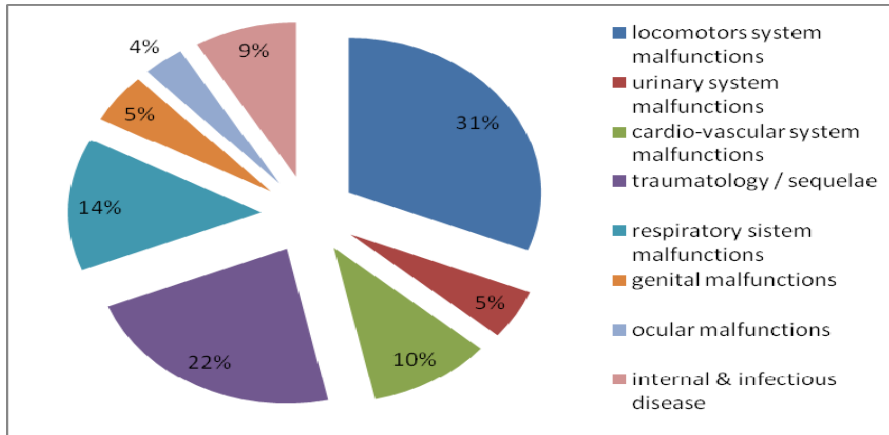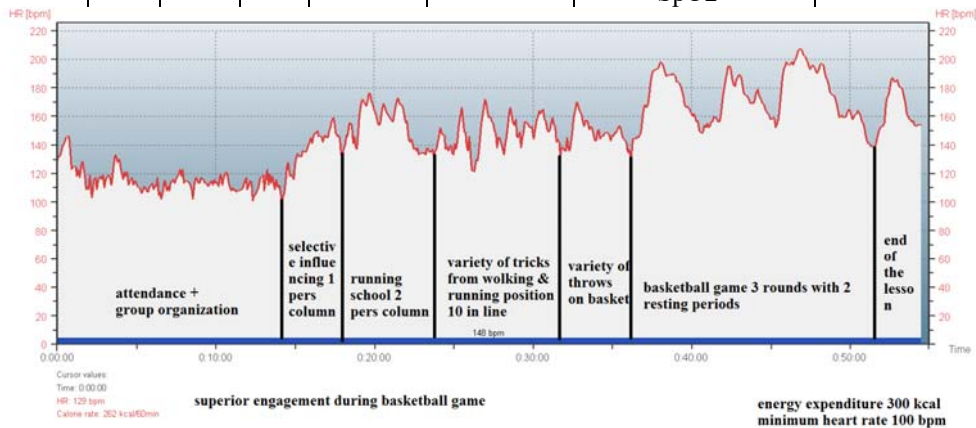
**Figure 1. Medical exemption typology 3 university years,
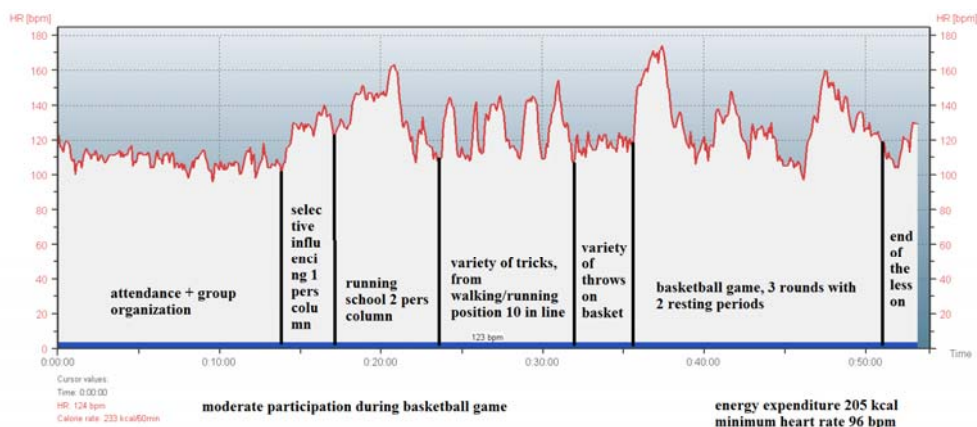737 students/58 issues (7,8 %):**

9.2. Second objective: From a total number of 305 subjects targeted for the second objective, 16 were part of the study group. Related to their interest/choice, 8 of them agreed to proceed further into the research process; for each of those 8, one volunteer/partner had similar anthropometric characteristics. Once all data had been processed, I faced the following situations:

9.2.1. For 5 pairs the devices worked properly for both partners: (figure 2)

B.D.I.	20	1,54	50	brain surgery	basketball	F.C. 104 / 98% SpO2*	18.11.2016
B.A.A.	20	1,63	46	healthy	basketball	F.C. 107 / 99% SpO2*	18.11.2016

Figure 2. Example of valid data for both member of study pair (5 pairs x 2 subjects)

9.2.2. For 1 pair the devices worked properly for one partner and partially correctly for the other one: (figure 3)

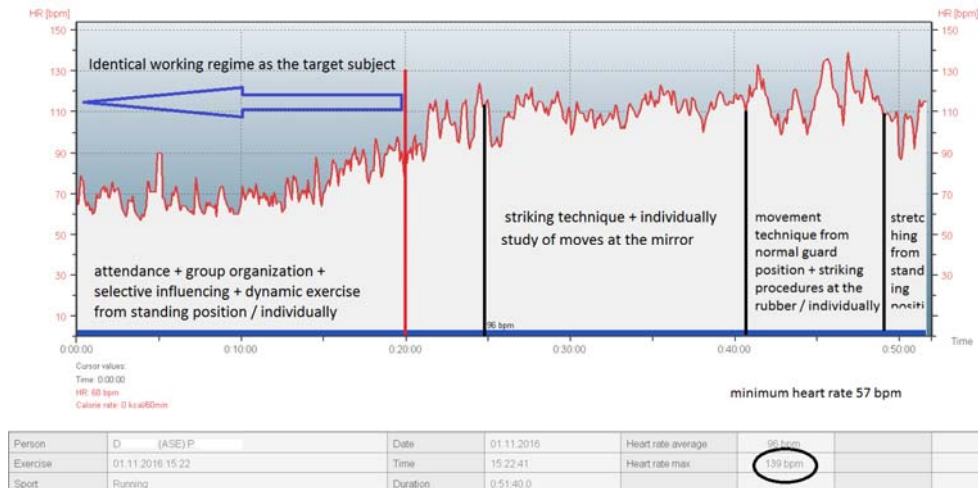| P.D.I.	20	1,71	73	healthy	combat	F.C.73 / 99% SpO2	01.11.2016 + 06.12.2016
C.A.S.	20	1,7	54	high H.R.	combat	F.C. 136 / 95% SpO2	01.11.2016 + 06.12.2016
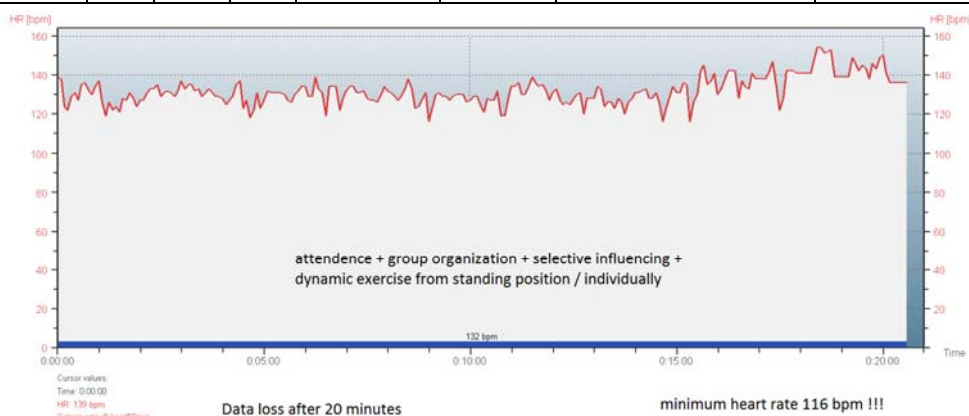
Figure 3. Example of valid data for one member of study and partially/incomplete for the second one

9.2.3. Third case was represented by 1 pair with valid data collected for one of them and totally incorrect for the second one.

9.2.4. Finally, data collection for only one subject; in 1 case the target subject did not came at all (table: 3); however, for 1 subject I have proceeded for H.R. registration without any partner.

10. Conclusions:

10.1. Regarding P.E. lessons with basketball themes, the H.R. dynamics ware strictly related to game phases (recovery under panel, sprints, demarcation etc.). For the target subjects, the H.R. values were comprised between 190-207 bpm. There is a probability, for at least one subject that the recorded value to be too high for a normal/classic activity during P.E. class. I presume that a good monitoring process of H.R. dynamics during any kind of physical activity cannot be realised without special devices – the best case is when one can obtain spot feed-back (proper licensed and advanced devices);

10.2. In the case of fitness classes, some subjects have developed H.R. values between 194 - 201 bpm during treadmill running; any medical advice/assistance could be very useful, considering that 1 subject has epileptic history;

10.3. Related to those 5 pairs of students who had valid data acquired - without any exception - the target subjects have developed H.R. media bigger than suitable mark partners. (table: 4); in their case, those superior H.R. values might be a future impulse for a careful monitoring of their life style, diet, sport activity and so on.

Table 4. Difference of medium H.R. values 5 pairs of subjects – valid aquisition

Initials	Biological status	Maximum H.R.	Medium H.R. (bpm)	Difference	Lesson typology
D.M.	high H.R.	162 bpm	139	**(+ 28)**	aerobics
A.M.E.	healthy	132 bpm	111		
C.V.I.	high H.R.	205 bpm	151	(+ 7)	basketball
R.M.A.	healthy	191 bpm	144		
T.A.M.	epilepsy	194 bpm	146	(+10)	fitness
P.E.G.	healthy	184 bpm	136		
B.D.I.	brain surgery	207 bpm	148	(+ 16)	basketball
B.A.A.	healthy	174 bpm	132		
G.A.I.	tachycardia	169 bpm	128	(+11)	basketball
D.A.I.	healthy	190 bpm	117		

10.4. As an Advanced Education and Research Unit[6], The Bucharest University of Economic Studies has the opportunity to invest in human resources for the labour market. One well prepared economist it is first of all in good health, able to sustain a focused/intense effort and fit. In order to increase the quality of learning/preparing process during university studies, I propose a special programme implementation for those students with some physiological dysfunctions/sensitivities. This programme might be assisted by multidisciplinary teams (researchers, medical examiners, biochemists, physical therapists, etc.), beside P.E. teachers, under university scrutiny.

REFERENCES

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http://medical-dictionary.thefreedictionary.com [Accessed 12 April 2017]

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[i] In order to increase the scientific value of this activity, I have offered my support to receive any kind of documents that prove student's medical histories/background. Later on, nobody couldn't prove by documents what they have declared; that is why the credibility of this study is mainly supported by my own observations rather than student's declaration.

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[6] http://www.hotnews.ro/stiri-esential-17016842-clasificarea-universitatilor-fost-declarata-legala-inalta-curte-casatie-justitie-ministerul-educatiei-castigat-procesul-universitatea-stefan-cel-mare-din-suceava.htm [Accessed 6 April 2017]