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TRADITIO ET EXCELLENTIA

EDUCATIO ARTIS GYMNASTICAE

3/2023

STUDIA UNIVERSITATIS BABEŞ-BOLYAI EDUCATIO ARTIS GYMNASTICAE

3/2023
DOI:10.24193/subbeag.68(3)

ISSN (print): 1453-4223;
ISSN (online): 2065-9547; ISSN-L: 1453-4223

PUBLISHED BY BABEŞ-BOLYAI UNIVERSITY

EDITORIAL BOARD:

Address: 7th Pandurilor Street, Cluj-Napoca, Romania, Phone: +40 264 420709,
e-mail: studia.fefs@yahoo.com; http://www.studia.ubbcluj.ro/serii/educatio/index_en.html

YEAR **Volume 68 (LXVIII) 2023**
MONTH **SEPTEMBER**
ISSUE **3**

PUBLISHED ONLINE: 2023-09-30
PUBLISHED PRINT: 2023-11-30
ISSUE DOI: 10.24193/subbeag.68(3)

S T U D I A

UNIVERSITATIS BABEŞ-BOLYAI EDUCATIO ARTIS GYMNASTICAE

3/2023

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(RECOMMENDED CITATION)
DOI:10.24193/subbeag.68(3).19

COMPARATIVE ANALYSIS OF PHYSICAL FITNESS OF PHYSICAL EDUCATION MAJOR ROMANIAN AND UKRAINIAN STUDENTS

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Received 2023 September 14; Revised 2023 September 28; Accepted 2023 October 2nd; Available online 2023 September 30; Available print 2023 November 30.

ABSTRACT. Introduction: The aim of the present study was to compare the level of physical fitness of physical education majors from two universities based in Romania and Ukraine respectively. **Materials and methods:** A total of 201 university students participated in this study. 161 subjects were Romanian students enrolled at the Faculty of Physical Education and Sport, Babeș-Bolyai University (107 males and 54 females), and 40 subjects were Ukrainian students enrolled at the National University of Ukraine on Physical Education and Sport (23 males and 17 females). Anthropometric measurements were performed on all participants. In order to evaluate physical fitness indicators, seven physical tests were applied. **Results:** The main finding of the study was the fact that the physical fitness level of male students was statistically higher ($p<0.05$) than the physical fitness level of female students in both Ukrainian and Romanian subjects. There were no statistically significant differences ($p>0.05$) between representatives of the same gender groups of

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Romanian and Ukrainian students. In the case of Modified Sit-and-reach test and Plate tapping test, female subjects of both groups performed better than male subjects. Statistically significant differences ($p<0.05$) were observed between indicators of physical fitness of Ukrainian and Romanian students in the same gender groups for the Three Minute Step Test, Modified Sit-and-reach test, Plate tapping test and Standing long jump test. Moreover, excluding the Plate taping test, the results obtained by the Romanian students were statistically significantly higher than those obtained by their Ukrainian counterparts. Simultaneously, there was no statistically significant difference between female groups ($p>0.05$), except the results in the Plate tapping test, where Ukrainian students had statistically significantly higher results ($p<0.05$) than their Romanian counterparts. **Conclusions:** According to the findings of this study, the Romanian subjects had statistically significantly higher results than the Ukrainian subjects. For future research, it would be interesting to analyze the differences between the Romanian and Ukrainian curriculum specific to physical education majors.

Keywords: *university students, physical development, physical fitness, comparative analysis.*

REZUMAT. ***Analiză comparativă a condiției fizice a studenților români și ucraineni de la facultăți cu profil de educație fizică.*** **Introducere:** Scopul acestui studiu a fost acela de a compara nivelul de condiție fizică a studenților de la două facultăți de educație fizică din România, respectiv din Ucraina. **Materiale și metode:** La acest studiu au participat 201 studenți. 161 dintre aceștia au fost înscriși la Facultatea de Educație Fizică și Sport, Universitatea Babeș-Bolyai din Cluj-Napoca (107 bărbați și 54 femei), iar 40 de studenți au fost studenți ucraineni înscriși la Universitatea Națională de Educație Fizică și Sport din Ucraina (23 bărbați și 17 femei). S-au efectuat măsurători antropometrice cu toți subiecții. Pentru evaluarea nivelului condiției fizice s-au folosit șapte teste. **Rezultate:** Nivelul de condiție fizică a bărbaților a fost semnificativ mai mare decât nivelul de condiție fizică a femeilor ($p<0.05$) și în cazul studenților români, și în cazul studenților ucraineni. Nu s-au înregistrat diferențe semnificative statistic între valorile indicilor condiției fizice corespunzătoare grupurilor de studenți bărbați, respectiv femei, din cele două țări ($p>0.05$). S-au observat diferențe semnificative statistic ($p<0.05$) atunci când au fost comparate valorile indicilor condiției fizice corespunzătoare studenților români și ucraineni bărbați, respectiv studentelor din România și Ucraina, măsurate cu următoarele teste: 3 minute de urcare și coborâre, flexia longitudinală a trunchiului, lovește plăcile și săritura în lungime de pe loc. Excluzând rezultatele obținute la testul lovește plăcile, studenții români au obținut rezultate semnificativ statistic mai bune decât studenții ucraineni la toate testele efectuate. **Concluzii:** Conform rezultatelor obținute, studenții români la

educație fizică au o mai bună condiție fizică decât studenții ucraineni din același domeniu. O direcţie de cercetară utilă ar putea fi analiza comparativă a planurilor de învăţământ de la facultăţile de educaţie fizică din cele două ţări.

Cuvinte cheie: *studenți, dezvoltare fizică, condiţie fizică, analiză comparativă.*

INTRODUCTION

The modern lifestyle, with its particular challenges, requires a high level of physical fitness from students (Antipova et al., 2020; Nesen & Klymenchenko, 2020). Thus, monitoring the development of students' physical fitness was, and continues to be, a topic of high interest for researchers (Bonilla et al., 2023; Boros-Balint et al., 2015; Deak et al., 2014; Pribis et al., 2010; Sang & Wang, 2022; Sarpong, 2022; Sun et al., 2023).

According to Andrieieva et al. (2020), a decline in the fitness level of Ukrainian students was observed after winter and summer holidays. Moreover, a decrease in motor activity levels was reported in students enrolled in higher education institutions (Gres & Ostroglyad, 2020; Korobeinikova et al., 2021). There is a general tendency for the prevalence of male and female students with below average and low levels of health status (Orikhovska et al., 2020). In recent times, according to different estimates, 49.3 to 75.1 % of higher education students had reduced levels of physical fitness (Gres & Ostroglyad, 2020; Petritsa, 2018).

During the COVID-19 pandemic, the students' physical activity level decreased, and this process wasn't gender based (Kemeryte-Ivanauskiene et al., 2022). One more reason to be accounted for the decline in physical activity levels was the transition of society to information and digital, with students devoting more and more time to studying, communication and entertainment, using information and communication technologies, which sharply limited their physical activity (Siemova, 2018). Unfortunately, this situation has also affected students of physical education majors.

An increased incidence in functional musculoskeletal disorders was reported in Ukrainian students, due to the low social and economic standard of living, poor educational activities, online-studying, and high psychological stress (Hakman et al., 2020). Concerned scientists about the decline in physical fitness levels of university students had regularly highlighted the necessity to take immediate action (Nesen et al., 2020; Pelech & Grygus, 2016; Sydorova & Horina, 2020).

Experts focus on the development of innovative physical education programs for students, offer methods of involving them in an active lifestyle, and increasing their responsible attitude to their own health. In this context, the investigation of the pedagogical experience of European countries is an urgent issue today. Comparison of physical development indicators of European and Ukrainian students will allow us to determine which motor abilities are developing at an accelerated pace and, by analyzing the educational program, to determine which methods and approaches are used to achieve this. This would make possible to take advantage of the positive European Union countries experience by introducing certain means in the process of physical education into the practice of training a Ukrainian student.

The purpose of the present study was to compare the level of physical fitness of physical education majors from two universities based in Romania and Ukraine respectively.

MATERIALS AND METHODS

Participants

A total of 201 university students participated in this study. 161 subjects were Romanian students enrolled at the Faculty of Physical Education and Sport, Babeș-Bolyai University (107 males and 54 females), and 40 subjects were Ukrainian students enrolled at the National University of Ukraine on Physical Education and Sport (23 males and 17 females).

At the beginning of the study, participants were briefed on the evaluation process. The timing of the tests and the testing procedure were the same for all study participants. Written informed consent to participate in this study was obtained from all subjects.

Procedures

This study was conducted between April and June of 2022. Anthropometric measurements and physical fitness evaluation tests (Three Minute Step Test, ml/kg/min; Modified Sit-and-reach test, cm; Wall squat test (right and left legs) sec; Plate taping, sec; Sit up test, max reps 30 sec; Pushups, max reps; Standing long jump test, cm) were performed by all subjects. The assessment of physical development was carried out based on the calculation of the Ketle–Gould–Kaup weight-growth index (BMI, kg-m-2) (Hrynkiv et al., 2015; Majevska et al., 2014).

Statistical analysis

Shapiro-Wilk's W-consistency test (Ghorbanzaden et al., 2011) was used to check the compliance of the data with the normal distribution law. Since not all the indicators corresponded to the normal distribution law, structural averages were used - the median of Me and 25 and 75 percentiles - Me (25; 75) to represent these indicators.

Mann-Whitney U-test was used for comparative analysis of gender differences between groups from different countries and their results in different tests (Byshevets et al., 2021; Chakhvadze & Nikitchenko, 2017). The main purpose of this method was to show the differences between male and female groups of studied indicators in general, and differences between the indicators of Romanian and Ukrainian students in the same gender groups (Chakhvadze & Nikitchenko, 2017). Z-statistic was additionally calculated, according to the fact that the volume of individual samples exceeded 60 observations. The data obtained during the research was subject to statistical processing, which was carried out using MS Excel and Statistica 10.0.

At all stages of the experimental data, statistical processing significance level was defined as $\alpha=0.05$ ($p<0.05$), while p was presented as $p<0.05$ in cases when its value did not exceed $1.0 \cdot 10\text{-}5$.

RESULTS

The average indicators of physical development and physical fitness of physical education majors were determined, depending on gender and the content of the educational program (Table 1).

Table 1. Indicators of the students' physical development and physical fitness, depending on their educational program (n=201)

№	Test results	Statistical indicators			
		Group 1* (n=107)	**Group 2** (n=54)**	**Group 3*** (n=23)**	**Group 4***** (n=17)**
	Weight and height indicators				
1	Height, cm	180 (175; 184)	165 (160; 171)	180 (177; 185)	166 (160; 170)
2	Body weight, kg	75 (68; 88)	57 (54; 63)	72 (68; 83)	56 (54; 62)

№	Test results	Statistical indicators			
		Group 1* (n=107)	Group 2** (n=54)	Group 3*** (n=23)	Group 4***** (n=17)
	Indicators of physical fitness				
1	Three Minute Step Test, ml/kg/min	56 (47; 61)	39 (36; 44)	41 (34; 54)	48 (34; 52)
2	Modified Sit-and-reach test, cm	33 (29; 38)	36 (28; 40)	16 (10; 21)	33 (21; 42)
3	Wall squat test right leg, sec	40 (27; 46)	34.5 (18; 56)	43 (36; 48)	35 (25; 39)
4	Wall squat test left leg, sec	37 (25; 44)	32.9 (16; 48)	41 (31; 45)	31 (28; 40)
5	Plate taping, sec	8.37 (7.91; 8.91)	9.41 (8.72; 10.35)	9.23 (8.35; 13.42)	13.45 (11.23; 14.80)
6	Sit up test, rep	25 (22; 27)	21 (19; 23)	31 (21; 37)	20 (19; 22)
7	Push up, max rep	36 (28; 46)	16 (10; 22)	35 (30; 50)	14 (8; 19)
8	Standing long jump test, cm	232 (220; 243)	170 (148; 184)	215 (201; 222)	167 (156; 175)

Note: Me (25; 75) is the median, 25th and 75th percentiles; Group 1* - group of Romanian male students; Group 2** - group of Romanian female students; Group 3*** - group of Ukrainian male students; Group 4***** - group of Ukrainian female students.

It was established that the BMI indicators of Ukrainian male students amounted to 23.04 (21.22;23.80) kg-m-2, and female students - 21.20 (19.96; 22.23) kg-m-2, and the differences between them were 8.66 %. Similarly, in the Romanian male group, the median values of BMI exceed female indicators by 12.32%: 23.66 (21.78; 25.68) kg-m-2 against 21.05 (19.47; 22.84) kg-m-2.

In both cases, the observed differences were statistically significant: for Romanian students, the results of statistical processing were U=1381; Z=5.3976; $p<0.05$, for Ukrainian – U=113; Z=2.2435; p=0.0249. These results do not allow us to group together students of different genders in the next research.

At the same time, no statistically significant differences were found between the same gender students, regardless of the educational program. So, for male students, the results of the comparative analysis were U=1007; Z=1.3605; p=0.1737, and for female students – U=452; Z=0.0876; p=0.9302.

There were some gender differences between the results of physical fitness characteristics among different gender groups proved the presence of individual differences depending on the educational program. For instance, the results of the Three Minute Step Test among Romanian male students prevailed over the results of Romanian female students by 43.59%. Quite the opposite, the results for Ukrainian male students were 14.58% lower than results of Ukrainian female group (Fig. 1).

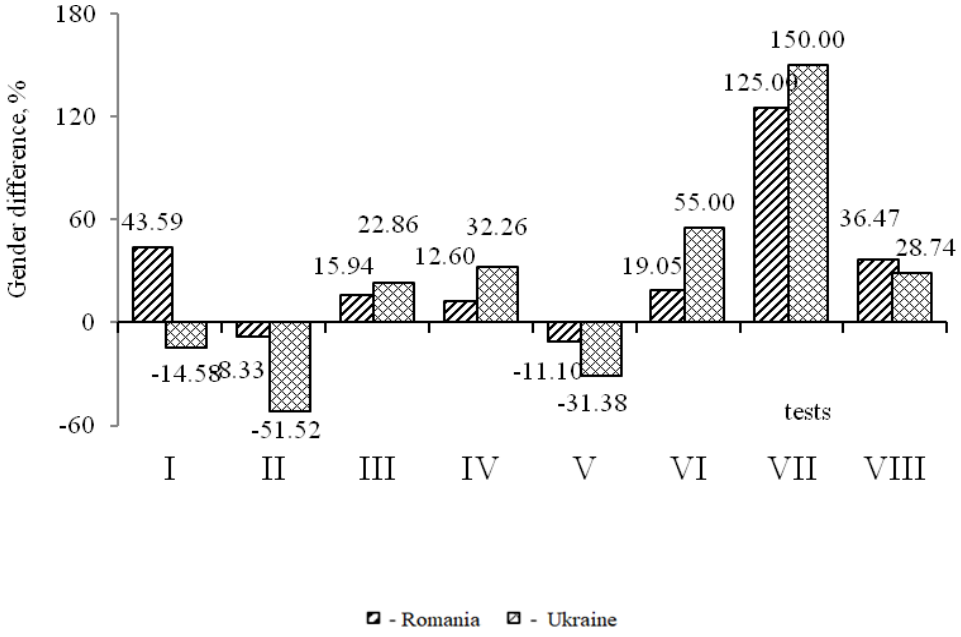

Fig. 1. Gender differences between the results of physical fitness tests among Romanian and Ukrainian group of students, % (n=201)

I – Three Minute Step Test, ml/kg/min; II – Modified Sit-and-reach test, cm; III – Wall squat test right leg, sec; IV – Wall squat test left leg, sec; V – Plate taping, sec; VI – Sit up test, rep; VII – Push up, max rep; VIII – Standing long jump test, cm

Regarding other physical fitness indicators, the direction of gender differences between Romanian and Ukrainian students coincides. However, there were significant differences in their absolute value. The maximum differences, which amounted up to 43.18%, were observed in the results of the Modified Sit-and-reach test: Ukrainian male students compared to Ukrainian

female students had average scores lower by 51.52%, and Romanian male students – lower by 8.33%, than Romanian female students. At the same time, the average values of the Sit up test were 55.0% higher among Ukrainian male students than among Ukrainian female students. For Romanian male students, these differences were 33.95% smaller and equal to 19.05%.

The maximum differences, up to 43.18%, were observed in the results of the Modified Sit-and-reach test: Ukrainian students' average scores were 51.52% lower than scores of Romanian students and 8.33% lower than the results for Ukrainian female students. Meanwhile, average results of Ukrainian male students in Sit up test scores were 55.0% higher than those for Ukrainian female students; these results were 33.95% lower for Romanian male students, compared with Romanian female students and equal to 19.05%. At the same time, statistically significant differences weren't observed for results of the Modified Sit-and-reach test, Wall squat test right leg and Wall squat test left leg in Romanian groups of students ($p>0.05$) (Table 2).

Table 2. Analysis of gender differences in physical fitness of students of the Faculty of Physical Education (n=201)

№	Tests results	Statistical indicators					
		Romanian students (n=161)			Ukrainian students (n=40)		
		U	Z	p	U	Z	p
1	Three Minute Step Test, ml/kg/min	708.5	7.8055	<0.05	185.0	-0.2736	0.7844
2	Modified Sit-and-reach test, cm	2474.5	-1.4823	0.1383	69,0	-3.4473	0.0006
3	Wall squat test right leg, sec	2671.5	0.7770	0.4372	96.5	2.6949	0.0070
4	Wall squat test left leg, sec	2547.5	1.2210	0.2221	114.0	2.2161	0.0267
5	Plate taping, sec	1290.5	-5.7216	<0.05	110.5	-2.3119	0.0208
6	Sit up test, rep	1376.5	5.4137	<0.05	88.0	2.9275	0.0034
7	Push up, max rep	622.0	8.1152	<0.05	35.5	4.3639	0.0000
8	Standing long jump test, cm	222.5	9.5456	<0.05	8.5	5.1026	<0.05

Note: U - Mann-Whitney test; Z - z-statistic; p - achieved significance level

We need to highlight that the results of the Plate tapping test for male representatives of Romanian and Ukrainian male students were significantly lower ($p<0.05$) when compared with results of female groups. For the Sit up

test, Push up and Standing long jump test, male groups had significantly better results ($p<0.05$) than groups of female participants.

The next stage of the research involved the establishment and assessment of deviations between the indicators of representatives of the same gender groups depending on their educational program. According to Figure 2, the peculiarities of the educational programs led to significant differences between their physical fitness, such as results of the Three Minute Step Test: the score of Ukrainian students was lower by 26.79%, compared to Romanian students, but the same results of Ukrainian female students were 23.08% higher than the results of Romanian female students. The maximum differences between students' indicators for male groups, which were 51.52% in favor of Romanian students, were determined by the Modified Sit-and-reach test. At the same time, in contrast to Romanian students, Ukrainians showed a 24.0% better result on the Sit-up test. For female students, Ukrainian women outperformed Romanians by 42.86% in the Plate tapping test, but the Romanian female group performed better in the Push up test by 12.50% (Fig. 2).

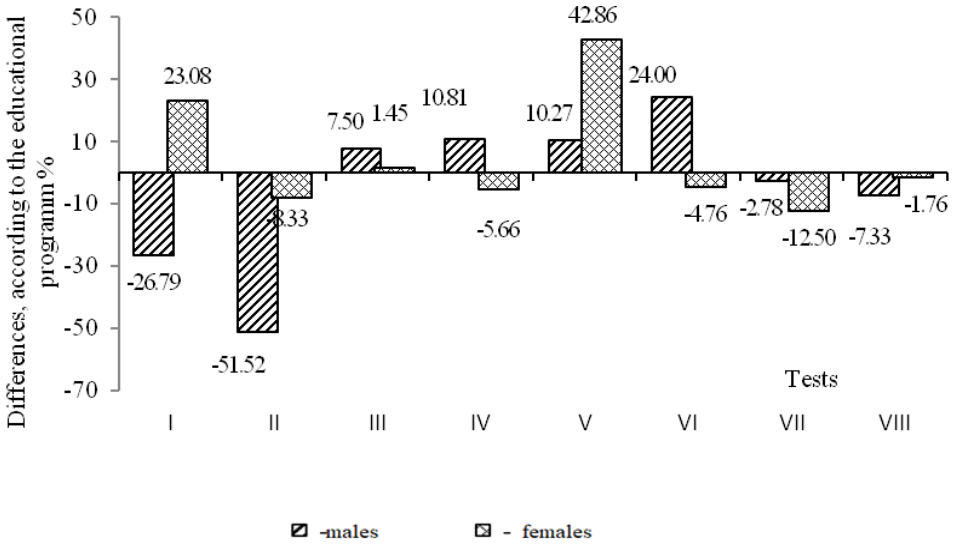

Fig. 2. Differences in physical fitness tests between Romanian and Ukrainian students, % (n=201)

I – Three Minute Step Test, ml/kg/min; II – Modified Sit-and-reach test, cm; III – Wall squat test right leg, sec; IV – Wall squat test left leg, sec; V – Plate taping, sec; VI – Sit up test, rep; VII – Push up, max rep; VIII – Standing long jump test, cm

When the indicators of physical fitness of Ukrainian and Romanian students (male groups) were compared, statistically significant differences ($p<0.05$) were found in the following indicators: Three Minute Step Test, Modified Sit-and-reach test, Plate taping and Standing long jump test. Moreover, with the exception of Plate taping, the results of Romanian students prevailed over the results of Ukrainian students (Table 3).

For both groups of Ukrainian and Romanian female students, the differences between the results of almost all control tests were statistically insignificant ($p>0.05$). The exception was only the Plate tapping test, where Ukrainian female students showed a statistically significant ($p<0.05$) better result than their Romanian colleagues.

The obtained results showed that, using the European experience in organizing the process of physical education majors, special attention should be paid to the physical training of students. It would be useful to investigate, due to which factors, Romanian students performed better in the Three Minute Step Test, Modified Sit-and-reach test, and Standing long jump test, compared with their Ukrainian colleagues, and to make efforts to implement this experience in the practice of physical education of Ukrainian students.

Table 3. Analysis of differences between physical fitness indicators of the students depending on the educational program (n=201)

№	Test results	Statistical indicators					
		Male students (n=130)			Female students (n=71)		
		U	Z	p	U	Z	p
1	Three Minute Step Test, ml/kg/min	691.0	3.2884	0.0010	334.5	-1.6708	0.0948
2	Modified Sit-and-reach test, cm	304.5	5.6465	<0.05	407.0	0.6939	0.4877
3	Wall squat test right leg, sec	923.0	-1.8730	0.0611	459.0	-0.0067	0.9946
4	Wall squat test left leg, sec	1041.0	-1.1531	0.2489	446.5	-0.1617	0.8716
5	Plate taping, sec	790.5	-2.6814	0.0073	124.0	-4.5071	<0.05
6	Sit up test, rep	909.5	-1.9554	0.0505	405.5	0.7141	0.4751
7	Push up, max rep	1109.0	-0.7382	0.4604	433.0	0.3436	0.7312
8	Standing long jump test, cm	578.0	3.9778	0.0001	426.0	0.4379	0.6615

Note: U - Mann-Whitney test; Z - z-statistic; p - achieved significance level

DISCUSSION

Current scientific data shows a decrease in the general level of physical fitness of university students. Special attention was given to the physical development and physical fitness assessment of physical education majors (Asauliuk & Kashuba, 2021; Kashuba et al., 2019; Kashuba et al., 2020). In addition, it was observed that the level of physical fitness of physical education majors is on a decreasing trend. Therefore, active research is currently underway to overcome this negative trend.

The results of previous research highlight the fact that the level of physical fitness of physical education majors needs special attention as the basis of professional competence (Kyrychenko et al., 2023). Finding ways to improve the physical fitness of students of higher education institutions was widely discussed in the scientific and methodological literature (Olenev & Kanishevskyi, 2019; Pelech & Grygus, 2016; Petritsa, 2018). However, in the context of the digitization of society and the limitation of students' motor activity, these issues continue to be relevant.

Our study was aimed at making a comparative analysis of indicators of physical development and physical fitness between Romanian and Ukrainian physical education majors in order to evaluate the effectiveness of two different educational programs.

The physical development of both Romanian and Ukrainian male groups of students was statistically significantly higher ($p<0.05$) than the physical development of female groups of students. At the same time, the difference between the Body Mass Index (BMI) in Romanian students of different genders was 12.32%, and in Ukrainian students of different genders was - 8.66%. However, in both cases, the statistical significance ($p<0.05$) of the identified differences was proven. No statistically significant differences ($p>0.05$) were found between Romanian and Ukrainian students of the same gender. This seems to imply that the physical development of students occurs in a similar way, which indicates similar living conditions, lifestyle and nutrition.

Results of individual tests of both Romanian and Ukrainian students differed statistically significantly ($p<0.05$) depending on the gender. The exceptions for Romanian students were the Modified Sit-and-reach test, Wall squat test right leg and Wall squat test left leg, and for Ukrainian students, the Three Minute Step Test, where statistically significant differences ($p>0.05$) between male and female students weren't found. Moreover, not all indicators of

physical fitness of male students prevailed over female students. In particular, both Romanian and Ukrainian female students, compared to male students, showed better results on the Modified Sit-and-reach test and Plate taping tests.

Statistically significant differences ($p<0.05$) were established between the indicators of physical fitness of Ukrainian and Romanian students according to indicators such as Three Minute Step Test, Modified Sit-and-reach test, Plate taping and Standing long jump test. And, with the exception of Plate taping, the results of Romanian students outweighed the results of Ukrainian students. However, no statistically significant differences ($p>0.05$) were found between the indicators of Ukrainian and Romanian female students, except for the results of the Plate tapping test, where Ukrainian female students showed a statistically significant better result ($p<0.05$).

From our perspective, the absence of differences between indicators of physical development of Ukrainian and Romanian students of higher education institutions indirectly indicates similar lifestyles and nutrition habits of Romanian and Ukrainian students. At the same time, unlike groups of female students, who did not show statistically significant differences in the performance of physical tests, with the exception of the Plate tapping test, where Ukrainian female students performed significantly better, Romanian male students performed significantly better in the Three Minute Step Test, Modified Sit-and-reach test and Standing long jump test. Therefore, there is a need to establish by which factors their results exceed the indicators of Ukrainian students in order to generalize, systematize and introduce positive experience into the practice of physical education of Ukrainian students.

CONCLUSION

In the context of full-scale accelerated digitalization of society, the lifestyle of modern higher education students is changing, and their motor activity is constantly decreasing. Therefore, the issue of improving the physical fitness of students is very urgent and requires an immediate solution. Research aimed at determining the differences between the development of physical abilities of the students from sports institutions depending on the educational program will allow researchers to investigate and systematize advanced pedagogical experiences and use it in further implementation into the practice of physical education of both Romanian and Ukrainian students.

Conflict of interests. The authors declare that there is no conflict of interest in this research.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXVIII, 3, 2023, pp. 21-29
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.68(3).20

THE TOURISTIC POTENTIAL OF RELIEF BY ANALYZING THE DIVERSITY OF PHYSICAL ACTIVITIES. CASE STUDY: TURDA GORGE

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Received 2023 October 8; Revised 2023 October 18; Accepted 2023 October 19;
Available online 2023 September 30; Available print 2023 November 30.

ABSTRACT. The research's aim is to identify the way relief can influence tourism and the physical activities which can be done in Turda Gorge. To conduct this study, we have analyzed the geodeclivity of relief expressed by sexagesimal degree of Earth's tilt surface in relation with the horizontal. This research presents the areas with great favorability to perform physical activities, but also areas with limitation for physical activities. Thus, the relief becomes a true oasis full of energy for more complex activities like climbing, alpinism or Via Ferrata. Our research is not based only on geodeclivity and therefore, is in conjunction with the sociological research which has been done in the studied area to identify the physical activities. Therefore, we have applied a questionnaire for 250 tourists, structured in two different sections: the first one indicates the relation of people with Turda Gorge, while the second one shows the relation of people with physical activities. The results of geodeclivity and sociological research express the type of physical activities done by tourists and also, proposals to develop more possibilities to practice activities.

Keywords*: Turda Gorge, mountain tourism, geodeclivity, sociological research, physical activities.*

REZUMAT. ***Potențialul turistic al reliefului prin diversitatea de activități fizice. Studiu de caz: Cheile Turzii.*** Studiul își propune identificarea modului prin care relieful influențează și modelează turismul și activitățile fizice care se pot

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desfăşura în Cheile Turzii. La realizarea cercetării se află analiza geodeclivităţii reliefului, printr-o exprimare în grade sexagesimale a înclinării suprafeţei terestre cu orizontala. Această analiză conturează arealele de favorabilitate pentru desfăşurarea activităţilor fizice de tip drumeţie, trasee montane, prezentând şi arealele cu limitări în realizarea activităţilor fizice de agrement. Astfel, acestea, pe de altă parte, devin adevărate oaze de energie pentru activităţile mai complexe, precum: escaladă, alpinism, căţărare sau Via Ferrata. Cercetarea noastră nu se rezumă doar la analiza geodeclivităţii, astfel că aceasta se află într-o strânsă conexiune cu cercetarea sociologică efectuată în arealul de studiu, pentru a identifica activităţile fizice ce pot fi efectuate. Aşadar, am aplicat chestionarul unui număr de 250 de turişti, care a fost structurat pe două mari direcţii: prima vizează relaţia oamenilor cu Cheile Turzii în general, în timp ce a doua deplasează accentul asupra activităţilor fizice pe care le realizează oamenii în arealul de studiu.

Cuvinte cheie: *Cheile Turzii, turism montan, geodeclivitate, cercetare sociologică, activităţi fizice.*

INTRODUCTION

Since ancient times of human existence, relief has represented an essential factor which influences tourism and also physical activities. Relief is crucial for tourism because it shapes the landscape and provides diverse attractions for travelers (Hall & Page, 1999). Mountains, coastlines, valleys, and unique geological formations offer scenic beauty and recreational opportunities.

Tourism, which is expressed by the bilateral relation with the anthropic component of the geospheres, it is defined as "activity with sporty character, consisting of walking on picturesque or interesting scientific regions" (Frazzei, 2004). We need to mention that the human as part of the anthroposphere through tourism shows the role of physical activity, which consists in different ways of body movements with energy expenditure. In this context, the physical activities of the human body should be analyzed and interpretate as a recreational way of movements and as a leisure activity, remarked by multiple benefits for our health.

Turda Gorge is located 6 km west from Turda, in the Trascău Mountains of Apuseni. It represents a protected area, part of the Category IV by International Union for Conservation of Nature (IUCN) known as habitat management area, which "aim is to protect particular species or habitats and management reflects this priority" (Dudley, 2008). Represented by Jurassic limestones old by 150 million years ago, Turda Gorge is dubbed "the grandest

landform of Petreşti Ridge" (Cocean, 1988) due to the rare beauty of landscapes, which exemplify a mosaic diversity of physical activities, starting from different levels of hiking until climbing and alpinism.

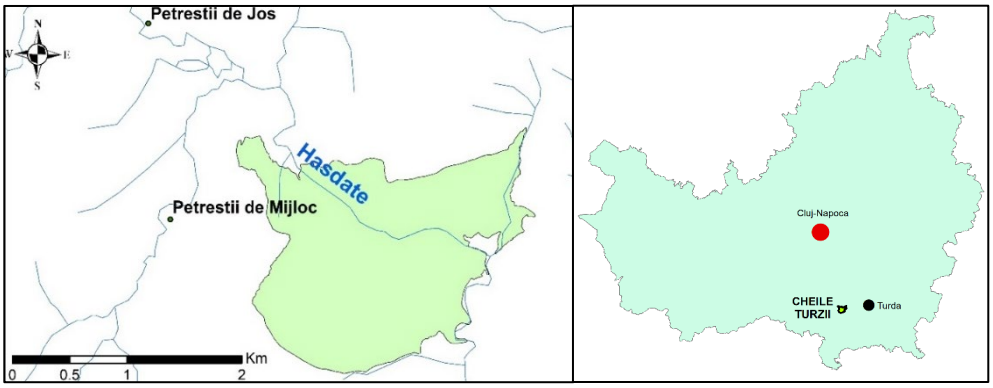

Figure 1. The localization of Turda Gorge

Because of the proximity with 2 important cities in the county and also at regional level (Cluj-Napoca and Turda), it can be truly mentioned the favorable position of Turda Gorge for an analysis and comprehensive study, taking in consideration the geodeclivity of relief and also the sports which can be done.

Through our research we want to create an interdisciplinary analysis between geography and physical education, expressing the way the relief can create different areas to practice specific sports and activities, but also the way the relief can become a restriction factor for some activities.

METHODS

The research is expressed by two different parts: the theoretical analyzed by the geodeclivity and on the other hand the practical part, by applying a questionnaire to the tourists of Turda Gorge.

Firstly, this study reflects the analyses and interpretation of geodeclivity of Turda Gorge by taking into account the physical activities which can be done. Thus, we took part at geomorphological observations on site, and we also used the database for the Digital Elevation Model of Romania. All the data obtained has been analyzed by using the ArcMap 10.08.

Secondly, to identify the physical activities which can be done in Turda Gorge, we have enforced sociological research by applying a questionnaire to 250 people, including 12 questions. They had the opportunity to fill in on site when we went there and also online, for those who have been asked to fill it in, but couldn't do it because of the lack of time.

The responses provided by the participants have been entered into the Statistical Package for the Social Sciences (SPSS) software. In SPSS, the data has been subjected to a comprehensive analysis that involved various criteria. These criteria encompassed factors such as gender, age, and place of residence. The utilization of SPSS has allowed for a systematic examination of the data, providing the ability to generate summary statistics and produce graphical representations. By analyzing the data through these multiple lenses, the research team was able to gain a more nuanced understanding of the respondents' perspectives and discern any significant correlations or differences based on the specified criteria.

RESULTS

Tourism is considered an essential activity in the big family of human activities which has to be analyzed in relation to the relief, because it represents the most important element in developing the touristic activities. The relief presents a series of advantages and also disadvantages while talking about tourism. If the same area can be described with steep slopes which shows a restriction factor for people, the same area can become an advantage to practice different sports which are less known by the majority. These aspects can be identified in our space research, and we can mention that Turda Gorge act as a complex area.

Geodeclivity

The geodeclivity map shows the tilt of Earth's surface in relation to the horizontal and it is expressed by sexagesimal degree. The aim of geodeclivity is to identify the areas with great favorability for physical activities in conjunction with the conditions to perform it. Following the data processing the geodeclivity of Turda Gorge has values between 7° and 55°. We classified the results based on 6 classes, which are shown on the map with gradual colors starting from dark green for those less than 8° and dark red for those higher than 45°. To continue, "the slope is not a natural geomorphological component, it meets the function of geometric part" (Grigore, 1979). Hence, the slope represents just a geometric expression of the relief.

In our research area in the center part there is a visible growing of slopes on a West-East arrangement, which identify the area with maximum geodeclivity. Therefore, along the Hășdate River there is a steep relief, which leads to identify a specific area for mountain sports and are used utilitarian-applicative motor skills. In this category we can mention climbing, alpinism or Via Ferrata. On the other hand, in Turda Gorge there are slopes with less than 25°, therefore ideal conditions for hiking. In this context, the predominant activity for tourists is hiking and below it will be explained in the questionnaire.

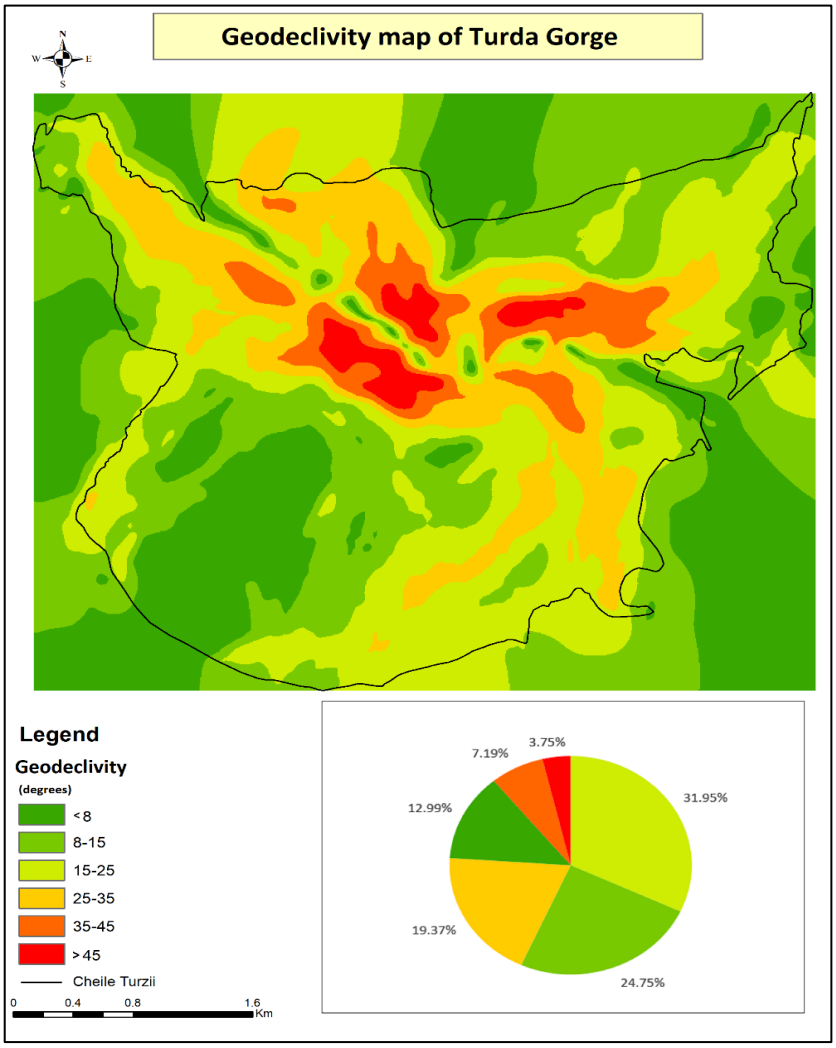

Figure 2. Geodeclivity map.

SOCIOLOGICAL RESEARCH

While the analyses of geodeclivity gives the answers just from the theoretical part about the physical activities which can be done, the questionnaire treats the practical part by taking into consideration the opinions of people.

Thus, it has been established sociological research in Turda Gorge to find out how often the tourists go there, but also what activities they do. During 1st of October and 5th of November 2022 we applied the questionnaire to 250 tourists with ages over 15. It contained several categories of questions and in total there have been 12 questions. Our goal has been to collect quantitative data by asking questions with unique answers, but also qualitative data where tourists had the chance to come up with their own ideas or opinions. We have decided to apply it face to face for a better interpretation of the answers, especially for the opened questions. But during the time spent there we have met multiple cases where the tourists have been out of time. In this context, we have anticipated this problem by creating an online version of the questionnaire.

It has been followed the relevance representativeness of the answers given and therefore the research has been applied by taking into account different aspects: age, gender, residence, level of studies, occupation, which can be find in the tables below.

Table 1. Distribution based on gender.

Gender	Value
Male	147
Female	103

Table 2. Distribution based on age group.

Age group	Value
15-25	22
26-35	57
36-45	73
46-55	46
56-65	31
Over 65	21

Table 3. Distribution based on residence.

Residence	Value
Cluj-Napoca	109
Turda	31
Settlement in Cluj county, but less than 50 km far away	34
Settlement in Cluj county, but more than 50 km far away	15
Neighboring county	53
Not neighboring county	8

The fundamental part of the questionnaire has been divided into two different directions. So, the first one studies the relation of people with Turda Gorge, while the second one shows the relation of people with physical activities.

The first question consists in finding the tourists who are just for their first time there or if they have been before. In this context, 197 of them have responded they have been before there which means almost 80%. By analyzing group ages, we can find out that all the people over 45 years old have responded positively, while 60% of those between 15-25 are there for their first time.

The frequency analysis of Turda Gorge explains that the majority of people visit the place at least once per year (79%). The number tourists who visit monthly is similar to those who visit only one time per year. For the purpose of this question, to establish the frequency the respondents have been asked to disregard the cold periods of the year when snow and low temperature are restriction factors.

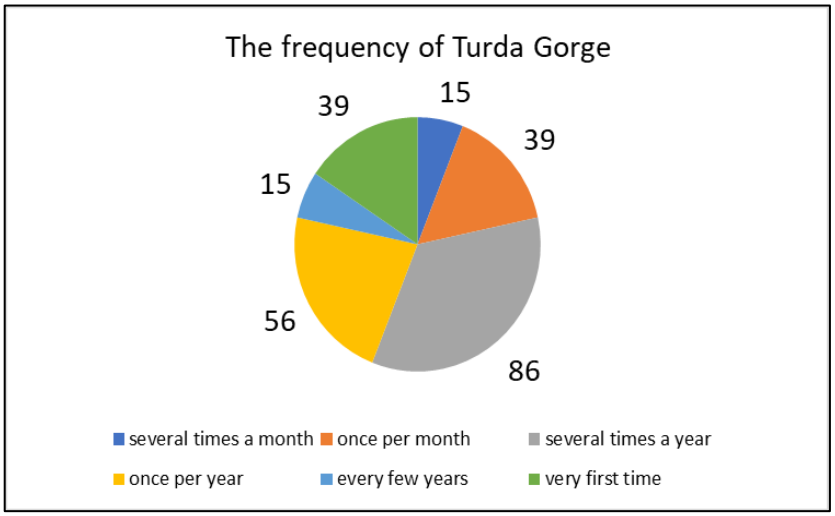

Figure 3. The frequency of Turda Gorge.

Moreover, they have answered they come with their family (58.5%), friends (31.5%), alone (5%) or with animals (5%) having different goals: walking, socialization, sports, etc.

The second part debuted with the choice of physical activities and sports which people know can be done in Turda Gorge. All of them have answered they know about hiking, but on the other hand, only a few of them have heard about paragliding or mountain biking. To avoid false answers when

the tourists say they know about it and actually they don't, we have decided to introduce 10 sports for these questions, even if some of them cannot be done in this area: kayaking, paint ball or rafting and, if selected a sport which cannot be done in the area, the tourist should have been asked to respond again, to ensure the validity of the answers.

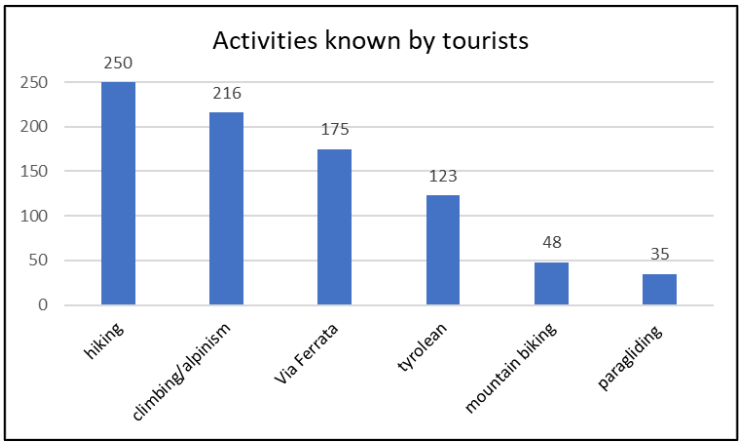

Figure 4. Activities known by tourists.

Moreover, the 250 tourists had the opportunity to answer what kind of activities they do in the area. We have thus established that most of them come for hiking (80%). In our current research, we need to mention that we have also met a group of people who have been there for Via Ferrata and therefore, we concluded that this activity covers 7%.

The last one was an open question which required respondents to come up with proposals regarding the type of physical activities and sports they thought could be done in the future around Turda Gorge. In this context, we can mention some of the ideas our respondents suggested, such as a sports ground at the entrance of Petreştii de Jos, next to the camping area, or a motor sports circuit in the area.

CONCLUSION

Our research presents aspects related to the ways geography and physical education can join together by analyzing the geodeclivity as an essential factor enhancing the potential of relief in promoting tourism and

various tourism-related activities. The database could have been developed only in connection with the sociological research which identifies the opinions of tourists regarding physical activities.

All these results intertwine, giving the background image of the physical activities which can be done in Turda Gorge. After thorough observations, we can state that the relief has become a true precursor of the evolution and development of mountain tourism. The relief characteristics have created different conditions for people to undertake activities for recreation or leisure in the areas with low geodeclivity, but also complex activities, such as mountain biking, climbing, Via Ferrata or even paragliding.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXVIII, 3, 2023, pp. 31-44
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.68(3).21

SELF-COMPASSION PREDICTS STUDENT ATHLETES' NEGATIVE AND POSITIVE AFFECT AFTER REMEMBERING EXERCISE-RELATED SETBACKS

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Received 2023 July 12; Revised 2023 August 28; Accepted 2023 September 1th; Available online 2023 September 30; Available print 2023 November 30.

ABSTRACT. Introduction. Previous findings show that self-compassion is an important resource for athletes, being associated with less fear of failure and better adaptation to obstacles. **Objective.** The study examines the role of self-compassion in predicting student athletes' negative and positive affect after recalling a negative, shameful experience of physical training. It examines the extent to which self-compassion can predict the different types of positive (soothing and activating) and negative affect in this context. **Method.** In a correlational design, self-compassion levels were measured in N = 62 student-athletes using the Self-Compassion Scale- Short Form. After remembering a training-related setback, levels of soothing and activating positive affect were measured using the Types of Positive Affect Scale, and levels of negative affect were assessed with the Emotional Distress Profile. **Results.** Results indicated that self-compassion is a significant positive predictor of both types of positive affect and a negative predictor of negative affect after recalling a negative shameful experience related to physical training. **Conclusion.** Confirming previous findings, self-compassion was a relevant construct in the sport context, predicting students' affect. These results suggest that interventions to improve self-compassion may be adaptive for athletes, and may improve their affect, probably leading to more optimal sport motivation, however, interventional studies are needed to investigate the effectiveness of self-compassion interventions in optimizing athletes' affect and motivation.

Keywords: *self-compassion, athletes, affect, exercise.*

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REZUMAT. ***Auto-compasiunea prezice afectele negative şi pozitive ale studenţilor sportivi în urma reamintirii eşecurilor legate de exerciţii fizice.*** **Introducere.** Rezultatele anterioare arată că auto-compasiunea este o resursă importantă pentru sportivi, fiind asociată cu o frică mai mică de eşec şi o mai bună adaptare la obstacole. **Obiectiv.** Studiul examinează rolul auto-compasiunii în prezicerea afectelor negative şi pozitive ale studenţilor sportivi după reamintirea unei experienţe negative şi stânjenitoare de la antrenamentul fizic. Studiul examinează măsura în care auto-compasiunea poate prezice diferitele tipuri de afecte pozitive (liniştitoare şi activatoare) şi negative în acest context. **Metode.** Într-un design corelaţional, nivelurile de auto-compasiune au fost măsurate la N = 62 de studenţi-atleţi folosind Scala de Auto-Compasiune - Forma Scurtă. După ce şi-au amintit de un eşec legat de antrenamente fizice, nivelurile de afecte pozitive liniştitoare şi activatoare au fost măsurate cu ajutorul Scalei Tipurilor de Afecte Pozitive, iar nivelurile de afecte negative au fost evaluate cu ajutorul Profilului Distresului Emoţional. **Rezultate.** Rezultatele au indicat că auto-compasiunea este un predictor pozitiv semnificativ al ambelor tipuri de afecte pozitive şi un predictor negativ al afectelor negative după rememorarea unei experienţe ruşinoase legate de antrenamentul fizic. **Concluzii.** Confirmând constatările anterioare, auto-compătimirea a fost un construct relevant în contextul sportiv, prezicând afectele studenţilor. Aceste rezultate sugerează că intervenţiile de îmbunătăţire a auto-compasiunii pot fi eficiente pentru sportivi şi pot îmbunătăţi afectele acestora, ducând probabil la o motivaţie sportivă mai optimă, însă sunt necesare studii intervenţionale pentru a investiga eficienţa intervenţiilor de auto-compasiune în optimizarea afectului şi motivaţiei sportivilor.

Cuvinte cheie: *auto-compasiune, sportivi, afect, exerciţiu fizic.*

INTRODUCTION

The context of sports and training can present many challenges, which can easily lead to perfectionism-related distress. Expectations related to performance, appearance, and interpersonal expectations can appear in large numbers, leading to diverse cognitive, emotional, and behavioral responses, which can give rise to additional demands (Magnus et al., 2010; Mosewich, 2020). Self-compassion is one approach that has great potential in helping athletes to adapt effectively to these challenges, supporting them to reach their performance potential while maintaining and promoting high levels of well-being (Mosewich, 2020).

Self-compassion is a recently introduced concept in the science of psychology, based on Buddhist tradition, as an antidote to maladaptive perfectionism (Neff 2003a, 2003b). It is a healthy way to relate to one's pain

and suffering, which are inevitable parts of human life. Instead of self-criticism, it involves a gentle, supportive attitude toward oneself (Germer, 2009; Neff, 2003a). According to Gilbert's (2009a, 2009b, 2014) definition of compassion, self-compassion means sensitivity to own suffering, accompanied by the intention to reduce or prevent it. Self-compassion has three main components: *mindfulness* rather than *over-identification*, *common humanity* rather than *isolation*, and *self-kindness* rather than *self-judgment* (Neff 2003a, 2003b). Meta-analyses have found a strong relationship between self-compassion and psychological distress in adults (MacBeth & Gumlay, 2012) and adolescents (Marsh et al., 2017). Self-compassion is related not only to psychopathology, but also to indicators of well-being, including positive affect (Zessin et al., 2015), correlates with physical health, with health behaviors in general (Phillips & Hine, 2021; Sirois et al., 2015; Terry & Leary, 2011), and also with physical activity (Wong et al., 2021). Self-compassion can be learned especially during face-to-face group interventions, and the acquisition of self-compassion has a range of benefits (Ferrari et al., 2019; Póka et al., 2023).

Self-compassion is also relevant in the context of physical training and can influence participation in physical activity, motivation to exercise, and even the level of emotional distress experienced when facing challenges. Self-compassion has been associated with a lower fear of failure and better adaptation to obstacles (Magnus et al., 2010; Mosewich, 2020; Mosewich et al., 2011; Mosewich et al., 2013; Phillips & Hine, 2021; Semenchuk et al., 2018). Athletes with high self-compassion are more likely to recall self-determined training goals and are more likely to recommit to their goals, have less rumination, and have fewer negative emotions following a sports injury (Semenchuk et al., 2018). There is also evidence that interventions aiming to improve self-compassion can be effective in young female athletes, with sustained reductions in self-criticism, rumination, and worrying about setbacks after just one week (Mosewich et al., 2013). For a current review of studies examining the role of self-compassion in sports settings, see Cormier and colleagues' (2023) study.

Sirois et al. (2015) found that self-compassion affects health behaviors by decreasing negative affect and increasing positive affect (negative and positive affect mediated the relationship between self-compassion and health behaviors), suggesting that different types of affect may be particularly important in the context of health behaviors, including physical exercise. We know that physical activity (both cardio and strength training) generally makes people feel better. Evidence suggests that during physical activity and physical training, positive affective states may be associated with short- and long-term positive benefits (Hall et al., 2005; Mutrie & Faulkner, 2012; Ekkekakis, 2003).

Positive affect is not just a simple response to physical activity but can also play a significant role in motivating behavior (Crocker et al., 2004). Our choices are not always based on logical analyses or rational cost-benefit analyses, but we also use emotions when deciding whether or not to engage in a particular behavior (Kiviniemi et al., 2007). For example, results show that increases in positive emotions predict subsequent participation in physical activity for up to six to twelve months. Repeated experiences of positive affect during and after physical exercise may support long-term participation in such activities (Guérin & Fotier, 2012; Kiviniemi et al., 2007). Therefore, the affect associated with exercise is very important, and it is also essential to investigate factors that may influence the affective impact of the training experience, even in the face of adversity, such as self-compassion (Semenchuk et al., 2018).

Although the PANAS (Positive and Negative Affect Scale; Watson & Clark, 1988) is the most commonly used instrument to measure affect, it only distinguishes between positive and negative affect, and only captures the valence of the affect. However, is also very important to take into consideration the arousal level (the activation dimension) too (Ekkekakis, 2003; Russell, 2003). Gilbert's (2009a, 2009b, 2014) neuroscience-based theory (Depue & Morrone-Strupinsky, 2005) describes the existence of three emotion-regulation systems: the threat–defense system, responsible for threat detection, the drive system, responsible for motivation and resource-seeking, and the soothing system, responsible for reassurance and comforting. According to the theory, there are two types of positive affect in line with these systems: activating positive affect and soothing positive affect (Gilbert et al., 2008).

Another important distinction, based on Gilberts' theory (2009a, 2009b, 2014), is between self-coldness and self-warmth. Self-warmth refers to the average of the positive dimensions of self-compassion (mindfulness, common humanity, and self-kindness), while self-coldness refers to the average of the negative dimensions of self-compassion (over-identification, isolation, and self-judgment). The theory assumes that self-coldness is related to the threat system and self-warmth is related to the soothing system, so it is important to make this distinction and not just consider the role of global self-compassion. The evidence from the meta-analyses (Chio et al, 2022; Muris & Petrocchi, 2016) also points out the importance of this distinction, because indicators of distress (e.g., negative affect, stress, depression, etc.) have a stronger relationship with self-coldness, but indicators of well-being in general have a stronger relationship with self-warmth.

To the best of the authors' knowledge, only one study has examined the relationships between self-compassion and different types of positive and negative affect in a training context (Póka et al., 2022). It investigated the

predictive power of self-compassion (and separately self-warmth and self-coldness) for different types of positive and negative affect on changes in workout schedules during Covid-19. However, no study has investigated these relationships in student athletes' by considering their state affect after recalling a negative, shameful training experience.

GOALS AND HYPOTHESES

Based on the theories and results presented, this study aimed to investigate the predictive power of self-compassion on student athletes' negative and positive affect after recalling a negative, shameful training experience. It was hypothesized that self-compassion would be a negative predictor of athletes' negative affect, a positive predictor of their positive affect in general, and separately for both types of positive affect (soothing and activating). We also aimed to explore the difference in the predictive power of self-compassion for these two different types of positive affect (activating and soothing positive affect).

We further aimed to investigate separately the predictive power of self-warmth and self-coldness in predicting affect. We hypothesized that self-coldness would have a stronger predictive power than self-warmth for the negative affect of student athletes after recall and that self-warmth would be a stronger predictor of positive affect than self-coldness. We also tested the explanatory power of this model separately for the two types of positive affect.

METHOD

Participants

The participants of our study were 62 first-year undergraduate students of the Faculty of Physical Education and Sport of the Babeș-Bolyai University (n = 28 males, 54.8%; and n = 28 females, 45.2%), aged between 18-22 years (M = 19.37, SD =.79). The G-power results indicated that a minimum of 55 participants would have been required for the study to have adequate statistical power (ß = 0.80) at a significance level of p = 0.05 for the anticipated mean effect size (f^2=.15).

Instruments

Self-Compassion

Self-compassion, self-warmth, and self-coldness were measured with the Self-Compassion Scale – Short Form (SCS-SF; Raes et al., 2011), which is a 12-item version of the original Self-Compassion Scale (SCS; Neff, 2003). The SCS-SF measures each component of self-compassion, the three negative- (self-judgment, isolation, and over-identification), and the three positive components (self-kindness, common humanity, and mindfulness) with two items. For example, „When I fail at something important to me, I tend to feel alone in my failure" is an item to measure isolation. Answers are to be given on a five-point scale ranging from 1 (almost never) to 5 (almost always). The self-warmth sub-scale scores were calculated by averaging the responses to items that measure the positive components of self-compassion (self-kindness, common humanity, and mindfulness), the compassionate responses; and self-coldness was calculated by averaging the responses to items that measure the negative components of self-compassion (self-judgment, isolation, and over-identification), the uncompassionate responses towards the self. The global score was calculated by averaging the responses to all items after that negative item which measures uncompassionate responses (i.e., self-judgment, isolation, and over-identification) were reverse-coded. Higher self-compassion, self-coldness, and self-warmth scores indicated higher levels of trait self-compassion, self-coldness, and self-warmth respectively.

The scale has good psychometric characteristics. In this study, the internal consistency for self-compassion as a complex indicator ($\alpha = .737$) and for self-coldness was acceptable ($\alpha = .754$), but for self-warmth was poor-questionable ($\alpha = .582$).

Positive Affect

The Types of Positive Affect Scale (Gilbert et al., 2008) was used to measure the levels of positive affect. The scale consists of three subscales, it measures three types of positive affect (*activating-, relaxing-, and soothing positive affect*). The activating positive affect is measured with eight items (e.g., "Active", "Dynamic", "Excited", etc.), the soothing positive affect is measured with four items (e.g., "Secure", "Safe", etc.), and the relaxing positive affect with six items (e.g., "Relaxed"). Answers are to be given on a five-point scale ranging from 1 to 5, indicating to which the given affect was characteristic of their current experience (positive affect was measured as a state). The global scores were determined by summing up all responses to items. The scores of the two specific subscales of interest (soothing and activating positive affect) were

calculated by summing up the responses to specific items. Higher scores indicate higher levels of positive affect. For this sample, the internal consistency of the global positive affect (α = .936) and activating positive affect sub-scale were excellent (α = .927), and the soothing positive affect sub-scale was acceptable (α = .692). Gilbert et al. (2008) found similar internal consistencies for soothing positive affect (α = 0.73), however, we found greater internal consistency for activating positive affect compared with their results (α = 0.83).

Negative Affect

To measure negative affect, we used the abbreviated version of the Emotional Distress Profile (Profilul Distresului Emoţional - PDE; Opris & Macavei, 2005). The scale was developed and validated in Romania. It has good psychometric properties and excellent internal consistency as a complex indicator of emotional distress (α = 0.94). The original scale consists of 26 items that describe different negative affect such as „depressed", „anxious" or „sad". In our study, we used 12 items evaluated on a five-point Likert scale to determine the extent to which the given affect was characteristic of their current state (negative affect was measured as state). Higher scores indicate higher levels of negative affect. For this sample, the internal consistency for the abbreviated version of the scale was also excellent (α = .921).

Procedure and design

The research was carried out with students of the Faculty of Sport at the Babeș-Bolyai University, during the seminar of the Educational Psychology course within the pedagogical module. After voluntarily agreeing to participate and providing online consent, participants completed an online structured survey using Google Forms. First, they had to provide demographic information and fill out the scale measuring self-compassion. After completing the scale, participants were asked to recall and describe in as much detail as possible a training setback, an unpleasant, shameful training experience, for that they criticized themselves. After describing the event, they had to complete the scales measuring the negative and positive affect they were currently experiencing (state affect).

Analytical procedure

For statistical analyses, we used the SPSS 20 software. The internal consistency of scales was tested using Cronbach Alpha. Following George & Mallery's (2003) recommendations we interpret the Cronbach Alpha values

as follows: α > 0.9 are indicative of excellent, α > 0.8 of good, α > 0.7 of acceptable, α > 0.6 of questionable, α > 0.5 of poor, and α < 0.5 of unacceptable indices of internal consistency. Pearson's correlation analysis was used to assess the relationship between measured variables, and for hypotheses testing, linear regression analyses were conducted, and F statistics with their significance level, $R^{2,}$ and β were reported.

RESULTS

Descriptive statistics and preliminary analyses

First, we analyzed the descriptive statistics of the measured variables. Results are presented in Table 1.

Table 1. Descriptive statistics of the main quantitative variables (N = 62)

Variable	Min.	Max.	M	SD	Skewness		Kurtosis	
					Statistic	SE	Statistic	SE
Self-compassion	1.67	4.5	3.13	0.60	-.090	.304	-.159	.599
Self-coldness	1.17	4.67	2.96	.84	-.159	.304	-.514	.599
Self-warmth	1.83	4.33	3.23	.64	-.218	.304	-1.024	.599
Positive Affect	35	90	66.72	13.60	-.131	.304	-.859	.599
Soothing Positive Affect	8	20	14.37	3.26	-.246	.304	-.665	.599
Activating Positive Affect	14	40	30.24	6.94	-.367	.304	-.687	.599
Negative Affect	12	46	22.62	8.91	.821	.304	-.060	.599

The correlations between the measured variables are presented in Table 2.

Table 2. Correlations between measured variables (N = 62)

	1.	2.	3.	4.	5.	6.	7.
1. Self-compassion	-						
2. Self-coldness	-.866**	-					
3. Self-warmth	.752**	-.321*	-				
4. Positive affect	.464**	-.383**	.373**	-			
5. Soothing positive affect	.414**	-.332**	.345**	.801**	-		
6. Activating positive affect	.388**	-.287*	.357**	.937**	634**	-	
7. Negative affect	-.460**	.508**	-.201	-.515**	-.457**	-.404**	-

Notes: ** Correlation is significant at the .01 level (2-tailed)

To provide the prerequisites for a simple linear regression, we examined whether the relationships between different types of affect and self-compassion were linear, and we also examined the normal distribution of residuals and homoscedasticity. Our data met all three preconditions.

Hypotheses testing

To test the first hypothesis, we examined the predictive power of self-compassion on negative affect by simple linear regression. The model showed a significant fit, $F(1, 60) = 16.07$, $p < .001$, $R^2 = 0.211$, that is, self-compassion explains the variability of negative affect in 21.1%, thus it was a significant negative predictor ($\beta = -.46$, $p < .01$). Next, we examined the predictive power of self-compassion on positive affect. In this case, too, the model showed a significant fit, $F(1, 60) = 16.45$, $p < .001$, $R^2 = 0.215$, that is, self-compassion explains the variability of positive affect in 21.5%, it was a significant positive predictor ($\beta = .46$, $p < .01$).

Testing the predictive power of self-compassion on the two types of positive affect separately, for both types of affect, we found significant results. Self-compassion explains the variability of soothing positive affect in 17.1%, $F(1, 60) = 12.38$, $p = .001$, $R^2 = 0.171$), it was a significant positive predictor ($\beta = .41$, $p < .01$). For activating positive affect, the model also fitted the data, $F(1, 60) = 10.65$, $p = .002$, $R^2 = 0.151$, self-compassion explained the variability of activating positive affect in somewhat less extent than the variability of soothing positive affect (15,1%), but it was a significant predictor for activating positive affect too ($\beta = .38$, $p < .01$). The results of regression analyses are presented in Table 3. Based on these results, our first hypothesis was confirmed.

Table 3. Results of regression analyses (N = 62)

	β	p	F	p	R^2
Negative affect					
Self-compassion	-.46	<.01	16.07	< .001	.211
Self-warmth	-.04	.71	10.32	< .001	.259
Self-coldness	49	<.01			
Positive affect					
Self-compassion	.46	<.01	16.45	< .001	.215
Self-warmth	.27	.025	8.15	.001	.217
Self-coldness	-.29	.019			
Soothing positive affect					
Self-compassion	.41	<.01	12.38	.001	.171
Self-warmth	.26	.038	6.20	.004	.174
Self-coldness	-.24	.053			
Activating positive affect					
Self-compassion	.38	<.01	10.65	.002	.151
Self-warmth	.29	.022	5.64	.006	.161
Self-coldness	-.19	.13			

Self-compassion predicted both student-athletes' negative and positive affect after remembering a negative, shameful physical training experience, regarding they were self-critical.

To test the second hypothesis, we examined separately the predictive power of self-coldness and self-warmth on negative affect and positive affect. For the model predicting negative affect our data fit the model significantly, $F(2, 59) = 10.32$, $p < .001$, $R^2 = 0.259$, that is, it explains the variability of negative affect in 25.9%. Self-coldness was a significant positive predictor ($\beta = .49$, $p < .001$), however self-warmth ($\beta = -.04$, $p = .71$) was not. In the case of positive affect in general our data also fit the model significantly, $F(2, 59) = 8.15$, $p = .001$, $R^2 = 0.217$, that is, it explains the variability of positive affect in 21.7%. For positive affect in general, both self-coldness ($\beta = -.294$, $p = .019$) and self-warmth ($\beta = .279$, $p = .025$) were significant predictors.

In our study, we also explored the role of self-warmth and self-coldness in predicting the two major types of positive affect. In both cases, our data fitted the model significantly. The model explained the variability of soothing positive affect in 17.4%, $F(2, 59) = 6.20$, $p = .004$, $R^2 = 0.174$. For soothing positive affect, self-warmth was a significant positive predictor ($\beta = .26$, $p = .038$), however, self-coldness ($\beta = -.24$, $p = .053$) was not. This model also explained the variability of activating positive affect 16.1%, $F(2, 59) = 5.64$, $p = .006$, $R^2 = 0.161$. Again, self-warmth was a significant positive predictor ($\beta = .29$, $p = .022$), however, self-coldness ($\beta = -.19$, $p = .13$) was not. Therefore, our second hypothesis was also confirmed, showing that self-coldness is more important in predicting negative affect after recalling a negative training experience and that self-warmth is more relevant in predicting both types of positive affect.

DISCUSSION

This study aimed to investigate the predictive power of self-compassion, self-warmth, and self-coldness on student athletes' affect after recalling a negative physical training experience, regarding they were self-critical. Based on previous results and theories (Chio et al., 2021; Depue & Morrone-Strupinsky, 2005; Gilbert, 2009a, 2009b, 2014; Gilbert et al., 2008; Muris & Petrocchi, 2016; Neff 2003a, 2003b) we expected that self-compassion will be a positive predictor for positive affect (both types of positive affect: activating and soothing) and will be a negative predictor for negative affect.

The results of testing the first hypothesis confirmed our expectations, that is, self-compassion predicted both negative and positive affect to the same extent and in different directions after recall. This finding is in line with the literature showing that self-compassion is associated with emotional distress,

including negative affect, and with emotional well-being, including positive affect (MacBeth & Gumlay, 2012; Ferrari et al., 2020; Póka et al., 2023), in the context of physical exercise too (Magnus et al., 2010; Mosewich, 2020; Semenchuk et al., 2018).

The results of testing the second hypothesis also confirmed our expectations. Based on meta-analytical findings (Chio et al., 2021; Muris & Petrocchi, 2016) we expected that self-coldness will have greater predictive power for negative affect than self-warmth, and that self-warmth will have greater predictive power for positive affect than self-coldness. Accordingly, the results indicated that only self-coldness is a significant predictor of negative affect. For predicting positive affect in general, both components of self-compassion (i.e., self-coldness and self-warmth) are similarly important, but when their role was analyzed separately for different types of positive affect, the results showed that only self-warmth is a significant predictor of these, self-coldness is not. These results reinforce the assumptions of Gilbert's (2009a, 2009b, 2014) theory and sustain the importance of the distinction between self-coldness and self-warmth. The results also have relevance for sport-related self-compassion interventions, suggesting that to reduce negative affect it may be preferable to focus on reducing self-coldness, but to improve soothing- and activating positive affect it may be preferable to focus on cultivating athletes' self-warmth levels.

In parallel to the results, we also have to take into consideration the limitations of our research, which include the correlational nature. It can be hypothesized that self-compassion may prevent negative affective consequences of training setbacks, but longitudinal and experimental studies are needed to support this idea. It can also be hypothesized that the development of self-compassion may be effective in reducing the level of negative affect associated with training setbacks and may optimize training motivation, however, research using a randomized controlled intervention design is needed to reach this conclusion. Another limitation was that we had poor internal consistency for self-warmth, so the results should be taken into account accordingly.

CONCLUSION

In conclusion, our results supported the idea that self-compassion predicts student athletes' negative and positive affect (both types of positive affect: soothing and activating) after recalling an exercise setback, a negative, shameful physical training experience. Considering the two dimensions of self-compassion separately, that is, self-coldness (negative dimensions, uncompassionate attitudes

towards oneself) and self-warmth (positive dimensions, compassionate attitudes towards oneself), results showed that only self-coldness was a significant predictor of negative affect levels, and only self-warmth was a significant predictor of different types of positive affect.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXVIII, 3, 2023, pp. 45-51
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.68(3).22

ANATOMO-PHYLOGENETIC ARGUMENTS FOR THE PRODUCTION OF MUSCULAR SPORTS INJURIES

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Received 2023 July 19; Revised 2023 August 28; Accepted 2023 September 1th;
Available online 2023 September 30; Available print 2023 November 30.

ABSTRACT. The striated muscles that appeared later on the phylogenetic scale have more white, fast fibers in their composition, more sensitive to metabolic aggression. Based on the composition, phylogeny and anatomical-functional characteristics, we selected the following muscles: semitendinosus, iliac, subscapular, extensor pollicis brevis and flexor pollicis longus. The data from the specialized literature show that the respective muscles are exposed to sports injuries. In principle, one can try to prevent injuries by changing the proportions in types of muscle fibers, possibly through physical exercises, but there is the potential danger of changing joint biomechanics.

Key words: *striated muscles, phylogeny, fiber types, sports traumatology.*

REZUMAT. ***Argumente anatomo-filogenetice pentru producerea leziunilor sportive musculare.*** Mușchii striați apăruți mai târziu pe scara filogenetică au în compoziție mai multe fibre albe, rapide, mai sensibile la agresiuni metabolice. Pe baza compoziției, filogeniei și caracteristicilor anatomo-funcționale am selectat următorii mușchi: semitendinosul, iliacul, subscapularul, extensor pollicis brevis și flexor pollicis longus. Datele din literatura de specialitate arată că respectivii mușchi sunt expuși traumatismelor sportive. În principiu se poate încerca prevenirea accidentărilor prin schimbarea proporțiilor în tipuri de fibre musculare, eventual prin exerciții fizice, dar exista pericolul potențial al modificării biomecanicii articulare.

Cuvinte cheie*: mușchi striați, filogenie, tipuri de fibre, traumatologie sportivă.*

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INTRODUCTION

Muscles that appeared more recently on the phylogenetic scale have a higher proportion of white muscle fibers (Wittenberger, 1971). These fibers are more sensitive to cancer cachexia, sepsis, chronic heart failure, diabetes (Wang & Pessin, 2013), and muscle atrophy can be a risk factor for sports injuries (Bahr & Holme, 2003). Moreover, fast fibers are the first to degenerate with age (Callahan et al., 2014), and the high proportion of fast fibers can be a risk factor for sports injuries (Delos, Maak & Rodeo, 2013). As a result, the current work aims to discuss some muscles of the human body that have recently appeared phylogenetically and highlight the relationships with sports traumatology. To the selection criteria of the respective muscles, we added functional and anatomical-topographical arguments intended to support their more recent phylogenetic appearance.

SEMITENDINOSUS, SUBSCAPULARIS, ILIAC, EXTENSOR POLLICIS BREVIS AND FLEXOR POLLICIS LONGUS

For the muscles of the posterior compartment of the thigh, the structural differences given by the different loads occurring depending on the phylogenetic development of the muscle group are risk factors for the production of injuries (Shi et al., 2022). Among these muscles, the semitendinosus muscle seems to have appeared last in the phylogenetic evolution, the hypothesis being supported by:

- Its separation from the Sartorius muscle is present only in frog species more phylogenetically evaluated (Inger, 1966).
- His disposition in the most superficial level.
- The appearance of a physiological genu valgum in the 2-year-old child, which reaches a maximum at 3-4 years and resolves at 7 years (Patel & Nelson, 2023); the insertion of the semitendinosus muscle in the medial part of the body of the tibia, in the vicinity of the anterior ridge, shows its role in maintaining the bipedal posture, which appeared later in the phylogeny.
- In obesity, the prevalence for genu valgum is higher than for genu varum (Soheilipour et al., 2020), which also supports the role of the respective muscle in maintaining posture.
- Semitendinosus muscle can be affected in case of damage to the central motor neurons (Haberfehlner et al., 2016).
- In the case of proximal lesions of the biceps femoris, the common proximal tendon of the semitendinosus and biceps femoris thickens, but in the case of proximal lesions of the semimembranosus, the same tendon becomes thinner over time (Silder et al., 2008) – this finding, together with the analysis of

proximal and distal insertions, suggests a very interesting role of the semitendinosus, namely to supplement, through its later phylogenetic appearance, the functions of the other muscles in the posterior compartment of the thigh (biceps femoris and semimembranosus).

Fast fibers, appearing later phylogenetically, account for 65.8 ± 10.1% in men and 54.8 ± 8.3% in women of the composition of the semitendinosus (Fournier et al., 2022). These values for the fast fibers are superior to those in the biceps femoris (Evangelidis et al., 2017). So the semitendinosus, being more recent phylogenetically, is more specialized but also more sensitive to aggression. This means that the semitendinosus will be affected before the biceps femoris and probably also the semimembranosus in Cushing's syndrome, considering that in this disease the white fibers are destroyed first (Gupta & Gupta, 2013). So in the case of Cushing's syndrome or glucocorticoid treatments, physical therapy must focus on exercises for the lower limbs intended to stimulate the fast fibers, or on electromyostimulation for the fast fibers, to prevent postural disorders and those of the biomechanics of walking or running. The same considerations are valid for the prevention of sports injuries. It is also worth mentioning the effect of transforming fast muscle fibers into slow fibers in the case of supplementation with arginine (Chen et al., 2018).

Another muscle that appeared relatively recently phylogenetically is also the subscapularis, since the upper segment of the reptilian latissimus dorsi contributes to the formation of the mammalian subscapularis (Koizumi, 2022). Note also the fan shape of the subscapular muscle in humans, resulting from the complex rotational movements of the upper limb. In humans, the subscapularis has a higher proportion of fast-twitch fibers (62%) than other rotator cuff muscles (Lovering& Russ, 2008). This fact may explain the frequency of sports injuries produced in this muscle (Goldberg et al., 2022). Ruptures of the subscapular tendon are more common in diabetes or metabolic syndrome (Park, Gwark & Na, 2022). Given the fact that specific subscapular toning exercises are used (Altintas et al., 2019), an effective prophylaxis of sports injuries can be achieved in risk groups. Another relatively recent phylogenetic muscle is the iliac (Vaughn, 1956). It is similar in shape to the subscapular, but also in function - corresponding to the lower limb. I have not found information in the specialized literature regarding the muscle fiber composition of the iliac muscle in humans, but fast fibers predominate in the psoas (Arbanas et al., 2009), so it can be assumed that the iliac muscle has a similar composition. In septic patients, psoas atrophy was found without tendon wasting (Kubiak et al., 2019), so it is the sensitivity of white fibers to metabolic aggression. The isolated injury of the iliac was also described as an effect of poor technique in the execution of sports exercises (Magaña-Reyes et al., 2016), but the iliopsoas

injury usually occurs, being described in soccer players (Mozes, 1984). The iliac and the psoas make up a musculotendinous unit (Bordoni & Varacallo, 2023), therefore the exercises used to rehabilitate the tendinopathy of the psoas (Rauseo, 2017) can also be used as a means of preventing sports injuries in risk groups by toning the iliac muscle.

Among the muscles of the forearm and hand, extensor pollicis brevis and flexor pollicis longus are found only in hylobatids and in humans on the scale of phylogenetic evolution (Diogo, Richmond & Wood, 2012). The composition in muscle fiber types is not known, but extensor pollicis brevis injuries can occur during kettlebell exercises (Karthik et al., 2013).For the flexor pollicis longus, the composition in types of muscle fibers is not specified in the specialized literature either, but, like the muscle discussed above, it is susceptible to traumatic injuries (Poggi, Massarella & Piccirilli, 2021) (Qureshi et al, 2015).

DISCUSSIONS

The presented data suggest that phylogenetically newly formed muscles, richer in fast fibers, are even more exposed to sports injuries. The question arises whether injuries can be prevented by partially changing the proportions in muscle fiber types. The composition of muscle fiber types can change through exercise (Plotkin et al., 2021). This possibility has already been proposed for the prevention of muscle diseases (Talbot &Maves, 2016). However, the question arises whether this change in the proportions of the muscle fibers does not affect the anatomical and biomechanical articular positioning, with the appearance of specific ailments.

CONCLUSIONS

1. The semitendinosus, iliac, subscapular, extensor pollicis brevis and flexor pollicis longus are phylogenetically new muscles, rich in fast fibers, and for this reason exposed to sports traumatic injuries, against the background of pre-existing metabolic aggressions.

2. It is tempting to prevent sports injuries by changing the composition of muscle fiber types, possibly through physical exercises corresponding to the proposed purpose, but the question arises whether this would not change joint biomechanics.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXVIII, 3, 2023, pp. 53-63
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.68(3).23

BENEFITS OF PRACTICING SPORTS FOR CHILDREN WITH CEREBRAL PALSY. A LITERATURE REVIEW

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Received 2023 July 7; Revised 2023 August 28; Accepted 2023 September 1th;
Available online 2023 September 30; Available print 2023 November 30.

ABSTRACT. Physical therapy is one of the most important concerns in an infantile cerebral palsy diagnosis. Multiple studies debate in various directions about the necessity of rehabilitation and reintegration in society as functional persons. There are children who need to do physical therapy for all their life long, but there are also children who reach the main rehabilitation objectives. What should they all do more than physical therapy programs? Does the finished physical therapy sessions is enough for rehabilitated cerebral palsy symptoms? What we propose is physical activity which includes diversity from the point of view of stimulus, interests, social inclusion, and team involvement. All this means adapted sports practice along the physical therapy sessions. All the children involved are stimulated to change their routine and bring some competitiveness, creativity, fun, to participate with others in physical practice, as physical therapy is in general an activity done by him/herself. Bringing together sport and therapy, children's development is improved from physical abilities, fine and motor skills, psychical abilities and cognitive point of view. Introducing sports between physical therapy sessions or after the rehabilitation program, we actually manage to increase the progression pace and to maintain the gains over the deficiencies. As physical health is related to mental well-being, every child who's involved in sports is actually doing a type of treatment. This review explores the benefits of sports for a cerebral palsy diagnosed child.

Keywords: *physical therapy, sports, cerebral palsy, self-confidence, disabled children.*

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REZUMAT. ***Beneficiile practicării sportului pentru copiii diagnosticaţi cu paralizie cerebrală. Sinteză a literaturii ştiinţifice.*** Kinetoterapia este una dintre cele mai importante preocupări în diagnosticul de paralizie cerebrală infantilă. Studii multiple dezbat în diverse direcţii despre necesitatea reabilitării şi reintegrării în societate a acestor copii ca persoane funcţionale. Sunt copii care au nevoie să facă kinetoterapie toată viaţa, însă sunt şi copii care reuşesc să atingă principalele obiective de reabilitare. Ce ar trebui să facă mai mult decât includerea în programele de recuperare? Sunt suficiente programele terminate de kinetoterapie pentru simptomele de paralizie cerebrală reabilitată? Ceea ce propunem este o activitate fizică care include diversitatea din punct de vedere a stimulului, intereselor, incluziunii sociale şi a implicării în echipă. Toate acestea înseamnă practica sportivă adaptată de-a lungul sesiunilor de kinetoterapie. Toţi copiii implicaţi sunt stimulaţi să-şi schimbe rutina şi să aducă puţină competitivitate, creativitate, distracţie, să participe alături de ceilalţi la activitatea fizică, deoarece kinetoterapia este, în general, o activitate solitară. Adunând sportul şi terapia, dezvoltarea copiilor este îmbunătăţită din punct de vedere fizic, al motricităţii grosiere, al motricităţii fine, psihic şi cognitiv. Introducând sportul între şedinţele de kinetoterapie sau după programul de reabilitare, reuşim efectiv să creştem ritmul de progres şi să menţinem ameliorarea deficienţelor. Deoarece sănătatea fizică este legată de bunăstarea mentală, fiecare copil care este implicat în sport efectuează de fapt un tip de tratament. Această recenzie explorează beneficiile sportului pentru un copil diagnosticat cu paralizie cerebrală.

Cuvinte cheie: *kinetoterapie, sport, paralizie cerebrală, încredere în sine, copii cu dizabilităţi.*

THE IMPORTANCE OF CEREBRAL PALSY DIAGNOSE

Cerebral palsy, the most common type of a central motor neuron injury (Morgan et al., 2016), is characterized by symptoms like alteration of muscle control, muscle fatigue, alterations of the fine motor skills, clonus, synkinesis, dystonia, spasticity and accentuation of osteotendinous reflexes.

According to Pakula et al. (2009), the studies of C.D.C. (the U.S. Centers for Disease Control and Prevention) show that the cerebral palsy incidence is between 1.5 till 4 cases out of 1000 children, depending on the geographical area. On the Europe area, there are until 80 cases out of 1000 births of 28-31 gestation weeks and until 1.7 cases out of 1000 births of at least 37 gestation weeks.

A study by Kancherla et al. (2012) made over the population of U.S., analyzed the year 2005 medical costs of all children registered in the Medicaid medical platform (figure 1). The yearly costs for a child without mental retardation

or cerebral palsy were 1674 dollars, the yearly costs for a child with cerebral palsy was 16721 dollars (1000% out of 1674 dollars) and the yearly costs for a child with mental retardation after being diagnosed with cerebral palsy was 43338 dollars (2600% out of 1674 dollars).

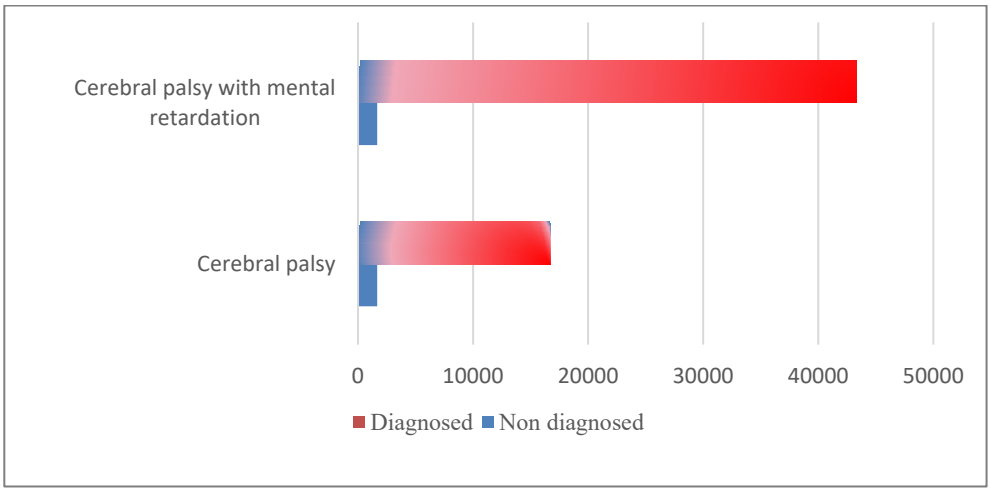

Figure 1. Medical Costs of a Cerebral Palsy Diagnosed Child

Cerebral palsy is usually associated with various other diagnoses and secondary medical conditions. In the study *Cerebral palsy in children: a clinical overview*, conducted by Patel et al. (2020), is described the necessity of a multidisciplinary team management. About half of the cerebral palsy diagnosed children were born at term, with a normal weight and without identifying a risk factor. 90% of all children who survive over 20 years old thanks to an early intervention and appropriate medical care. Through children diagnosed with cerebral palsy, there is a percentage of 75% of children who have quadriplegia and until 95% with diplegia who live at least 30 years; and 65% of children who have a severe cognitive deficiency and 95% with mild cognitive deficiency who can live until 38 years old. Having an appropriate intervention, 3 persons out of 4 can speak and 1 out of 2 doesn't have a cognitive deficiency.

THE CEREBRAL PALSY APPROACH - PHYSICAL THERAPY

A recent study published by Morgan et al. (2021) at the U.C. (University of California), consists in an international guide for specialists aimed to systematize the cerebral palsy into 9 affected parts: motor functionality, muscle tone,

musculoskeletal health, cognitive development, communication, the ability to eat and drink, sleep, visual acuity and the help of parent or guardian.

The specialists from almost all the studies included have the most important recommendations related to the motor functionality and development of cognitive area.

According to Novak, et al. (2017), cerebral palsy represents the most common physical disability and has a very important impact in the population, with an approximately incidence of 1 out of 500 live births. As a child can be diagnosed nowadays before 6 months motor age, comparing to past when he was diagnosed between 12-24 months motor age, the early intervention maximizes the potential functional and neuroplasticity outcomes. The conclusion of this systematic review is that all clinicians, pediatricians, neurologists, orthopedists and physical therapists, should understand the importance of early specific intervention for optimizing the infant cognitive and motor plasticity for preventing complications, secondary impairments and mental well-being.

Another study published in 2023 by Park et al., The effects of neurodevelopmental treatment-based trunk control exercises on gross motor function and trunk control in children with developmental disabilities, concluded that neurodevelopmental treatment-trunk control exercise (NDT-TCE) is an efficient approach measured with Gross Motor Function Measure (GMFM), especially in GMFM B dimension, but with no significance in reactive control. A good trunk control means improvement on developmental stages, from the trunk importance point of view in his role of head and extremities stability provider. NDT-TCE is a method that can be applied on children with disabilities diagnosed with cerebral palsy as a trunk-focused approach.

The study conducted by Das & Ganesh (2019), Evidence-based approach to physical therapy in cerebral palsy, demonstrates the limitations of physical therapy programs in cerebral palsy rehabilitation. Physical therapy is the gold standard in the cerebral palsy treatment and consists in various methods. Even if is recommended and used by all the clinicians involved, its inconsistency is opening for alternatives or add-ons searches. This review found moderate evidence related to the effectiveness of constraint-induced movement therapy for the upper limb recovery, functional training and gait training for improving the gait speed. There is conflicting evidence for the exercises' role on cardiorespiratory and strength training. Another important finding was the ineffective intervention of neurodevelopmental therapy. Reviewing the cerebral palsy approach, researchers found that functional goal-oriented training is the most effective.

THE CEREBRAL PALSY APPROACH – SPORTS AS THE NEXT STEP AFTER THE PHYSICAL THERAPY PROGRAM

According to Booth, et al. (2018), functional gait training has important benefits in cerebral palsy for walking and running motor stages after the physical therapy program. This type of physical activity approach is necessary to do after or at the same time with the other motor stages rehabilitation. The functional gait trainings have a better outcome on walking speed, compared to a standard physical therapy program in (effect size 0.79, p=0.04). Also, this study describes functional gait trainings as being an efficient intervention, safe and feasible that improves the walking and running abilities in both children, teenagers and young adults diagnosed with cerebral palsy. Another conclusion is that walking endurance and everything related to walking motor function benefits from a functional gait training.

A study published in 2022 by Storli, L., Aune, M., A. and Loras, H., *Aspects of developmental pathways toward world-class parasport*, demonstrates that early sport encounters, which is typically in an active or sports involved family environment, have been very important for the athletes with disabilities, shaping their interest in sports practice and focusing on what they can do, not what they can't. This is followed by rich childhood experiences of physical activities through being involved in different coach-led and organized sports. The sports background of a disabled person facilitates contact with the able-bodied peers, working as a substitute for peer-led unorganized physical activities specific to the able-bodied athletes. Furthermore, the intention of becoming an athlete on a high level emerges in the teenager period, where the parents, extended family, friends, coaches and athletes seem to play their role in motivating the improvements and the further progress.

The concept of reverse integration is described in the study of Ramsden, et al., (2023), Sport participation for people with disabilities: exploring the potential of reverse integration and inclusion through wheelchair basketball, where the researchers concluded that prolonged engagement in sports, specifically the wheelchair basketball, was facilitated by the health and social benefits, showing that reverse integration increased mutual understanding of the ability (abilities) and disability impact. The definition of reverse integration is the able-bodied people inclusion into disability sport. Both participants, able-bodied and people with a disability, reported a positive experience, supporting the inclusion of able-bodied as playing an important role in the local sports involvement for the persons with disabilities.

The study *Participant-reported benefits of involvement in an adaptative sports program: a qualitative study*, conducted by Lape et al. (2017), shows the benefits of practicing sports alongside or after the rehabilitation program for subjects with a motor or sensory impairment. The approached themes were physical/health well-being, social relationships, self-confidence and mobility. To gain all the benefits of sports practice, the participants have to confront significant barriers, as hard-to-find programs offer information, transportation or equipment costs.

CEREBRAL PALSY APPROACH – CONTRIBUTIONS OF SPORTS

Athletics is a multitude of disciplines related to one another, which their basics are representative for rehabilitation. It teaches and stimulates the gross motor skills like walking, jumping, running, throwing, or catching (Feitosa et al., 2017).

Basketball is one of the most popular sports for children with disabilities which is promoted in this community by his success on paralympic games and for the ease of playing altogether, disabled and non-disabled participants. It develops the grasping skills, shoulder mobility, eye-hand coordination, balance, strength, resistance and speed endurance.

On the other hand, basketball as a sport has some disadvantages for children diagnosed with cerebral palsy, the most important is the posture, as the body should be in semi-flexion during practice, and the chances of being injured. All these can be managed if there is an injury prevention perspective. A program that trains a proper landing on one and on two legs, core stability, muscular resistance, force and explosion is necessary.

The complexity of basketball is very useful when is used in the therapeutic program as a tool. Each one of its elements, as running, dribbling, throwing, catching, passing, attacking and defending, trains agility, speed, direction changes, core strength, grasping, hand and arm control, jumping, spatial orientation, communication, stress management in a dynamic situation, and much more (Pelemis et al., 2023; Cai et al., 2020; Moss et al., 2020).

Bocce is one of the oldest lawn games who develops motor skills, self-confidence and social contact. One of the biggest advantages is that it can be played almost everywhere and creates the opportunity for children with cerebral palsy to bond one to each other or with their family and friends. According to Huang et al. (2013), the torso and upper extremity coordination and spatial orientation are trained as different texture lightweight balls stimulate playing.

Even if *chess* is considered a sport of the mind, for children with disabilities is also a good alternative of training the fine motor skills, as coordination and grasping, the spatial orientation, strategy, psycho-emotional state, or attention (Mikhaylova et al., 2021). The used pieces are larger than usual and can be fixed on the chess table for easier handling.

Climbing, as the name says, is a sport where participants climb and fall while tracking a specific route already set on the walls. The climber ascends on the route using a rope attached to the top of the wall. It's a known activity for helping people with deficiencies in the rehabilitation and development processes. According to Liu et al. (2022), the climber uses closed-chain movement patterns which is beneficial for his musculoskeletal and neuromuscular system. There are different types of climbing, like deep water soloing, bouldering, or ice climbing, but the most used is top rope climbing. It has an important role for self-confidence, balance, coordination, focusing, agility, muscular force and resistance, planification/strategy and stress-relief.

Cycling is a great sport for children diagnosed with cerebral palsy, from various perspectives. First of all, it trains the endurance, the cardiorespiratory system, balance, strength, proprioception and strengthens the low limbs joints. Then, it increases the mobility of children. This means that one of the benefits is increasing motor capacity, self-confidence, cognitive stimulation, breathing-moving pace coordination, stress reliefs and facilitate accessibility. On the other hand, according to Toovey, et al. (2018), two-wheels bike is a goal for any children with disability, so can be a driver for them to increase their motor capacity in general, and particularly the balance and symmetry.

Football is the most popular sport worldwide (according to Milanovic et al., 2018). Being more than an entertainment and fun activity, football is an intense sport which trains the gross motor skills and social abilities. The trainings focus on high intensity effort, endurance, strength, teamwork and ball control skills. Its social involvement and interest make football one of the best physical activities where children with cerebral palsy can be involved in motor and social skills training (Abasov, et al., 2020).

A study from 2021, published by Sa et al., *Football for people with cerebral palsy: scope review*, reviewed the studies that address football for people with cerebral palsy. The conclusion is that almost all the research was focused on the performance and athletes' sports classes, but not many studied the incidence of injuries and sport classification.

Its physical, psychological and social benefits make gymnastics one of the most efficient and popular sports for children diagnosed with cerebral *Gymnastics* is, alongside athletics, an important part of the basic physical exercises of rehabilitation palsy. From the body alignment and corrected

posture, until balance, speed, resistance, strength, agility, flexibility and motor skills, gymnastics is a complex sport which can be adapted very easily to disabled children (Gitimoghaddam et al., 2019).

Riding, known also as hippotherapy, is considered a nontraditional therapy for children with cerebral palsy. According to Schwesig et al., 2009, it becomes more popular as his efficiency is visible from the point of view of posture and core strength. There weren't many studies about the effects on short-term and long-term practicing. In the last 10 years, was much more approached by researchers. The study *Short-term and long-term effects of riding for children with cerebral palsy gross motor functions*, published by Zaliene et al. (2018), concluded that there are no significant differences on the gross motor functions on a short-term practicing. The long-term has a significant improvement on the gross motor functions, but only for almost half of the subjects. The most important benefits of practicing riding are muscle coordination symmetry, core strength, balance, neuromuscular control, proprioception and joint stabilization.

Swimming is a sport where stereotyped cycle movements have a high energetic cost, but without a socio-educative value, compared to a team sport. As benefits, swimming improves tone, resistance and strength of the muscles, it's an all-over body workout, builds-up cardiovascular fitness, ameliorate coordination, balance and posture, improves flexibility and is a low-impact locomotion for low limbs and spine. The study *Disability and inclusion: swimming to overcome social barriers* published by Imparato et al. (2021) demonstrated the efficiency of swimming for both disabled and non-disabled subjects in a given 8-week training program. Both subjects had an extra physical activity during the program, physical therapy for disabled athletes and Pilates for all the athletes. The results are conclusive, as all the athletes improved their values, while the differences between disabled and non-disabled subjects are the same. The conclusion is that, even though the gap between the two can't be eliminated, the motor and physiological benefits of swimming are for both groups.

CONCLUSIONS

Even if the physical therapy programs are the gold standard in the children with cerebral palsy rehabilitation process, is not enough. By introducing exercises from regular sports basics into rehabilitation program or practicing regular/adapted sports represents a step forward to develop fine and motor skills, amelioration of cardiovascular system, adaptation, socialization, inclusion, teamwork, self-confidence, and much more.

The cerebral palsy diagnosed children are encouraged to go forward and to compete in local or national competitions. This opportunity is given by the facilities for disabled people, the associations or foundations who accept, organize and promote competitions for sports/adapted sports.

Adapted/regular sports are already adopted by many children, teenagers or adults diagnosed with cerebral palsy. The harmonious growth and amelioration of quality of life it should be a driver for all of them to practice sports as daily routine.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXVIII, 3, 2023, pp. 65-83
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.68(3).24

THE ROLE OF COMMUNICATION IN TEACHING SWIMMING

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Received 2023 July 23; Revised 2023 September 3; Accepted 2023 September 4;
Available online 2023 September 30; Available print 2023 November 30.

ABSTRACT. The present research study includes, in the first part, the synthesis of the literature regarding the theoretical framework of meaning construction, from information theory to the semiotics of reception and the concept of "horizon of expectation" in the reception of the teacher's linguistic productions, and in the second part, it includes the research methodology. The results of the research identify the average frequency of responses for all situations. After the study took place resulted 6 important findings like a direct and unambiguous reading strategy for the teacher (P), a considerable loss of meaning between the teacher's language production and the student's reception, higher reading fluency in the GE group, reading difficulties in GT group, recognition of meaning is earlier and more relevant in GE, and the fact that verbal productions make it possible to complete sequence, a misunderstanding for GT. The conclusions reveal that the messages transmitted through verbal and non-verbal teacher-student communication are received rather by connotation than by denotation.

Keywords *(in English): teaching swimming, learning and teaching of swimming, communication, semiotics, linguistic productions.*

REZUMAT. ***Rolul comunicării în predarea înotului.*** Prezentul studiu de cercetare cuprinde, în prima parte, sinteza literaturii de specialitate privind cadrul teoretic al construcției sensului, de la teoria informației la semiotica receptării și conceptul de „orizont de așteptare" în receptarea producțiilor lingvistice ale profesorului, iar în partea a doua, include metodologia cercetării. Rezultatele cercetării identifică frecvența medie a răspunsurilor pentru toate situațiile. După interpretarea studiului au rezultat 6 constatări importante, precum o strategie de lectură

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directă și neechivocă pentru profesor (P), o pierdere considerabilă a sensului între producţia de limbaj a profesorului şi recepţia elevului, fluenţă mai mare în citire la grupul GE, dificultăţi de citire în grupul GT, recunoaşterea semnificaţiei este mai devreme și mai relevantă în grupul GE și faptul că producţiile verbale fac posibilă completarea secvenţei, o neînţelegere pentru grupul GT. Concluziile relevă faptul că mesajele transmise prin comunicare verbală și nonverbală profesor-elev sunt primite mai degrabă prin conotaţie decât prin denotaţie.

***Cuvinte cheie**: predarea înotului, învăţarea şi predarea înotului, comunicarea, semiotică, producţii lingvistice.*

INTRODUCTION

Introduction / Statement of problem

Intervention research in physical education essentially aims to study motor acquisition methods in the teaching/learning system (Siedentop, 1986; Argyris, 1983, 1985; Durand, 1996). In North American research, the teacher's point of view is considered essential. It is a question of describing the system of tasks that he puts in place so that the student learns (Dunkin & Biddle, 1974; Doyle, 1986).

In Europe, in educational research, studies centred on the student's activity postulate that he is an autonomous and active actor in the construction of his motor behaviours (Meirieu 1990, Perrenoud 1995). The learning process is part of a constructivist and reflective approach through and in action (George, 1983). To learn, the student deploys an activity of construction of meaning that involves the interpretation of contextualized data (Doyle, 1986; Suchman, 1987; Kirschner & Whitson, 1997).

This semiotic activity of reading the system of constraints of the learning situation goes beyond the simple processing of information, and requires significant cognitive activity (Piaget, 1976; Vygotski, 1997; Weil Barrais, 1999).

Communication is defined as a production/reading/interpretation activity. The quality of the message transmitted (meaningful knowledge conveyed) depends on the learning of the student. In the didactic relationship, communication between teacher and student is a phenomenon of both verbal and non-verbal interaction (De Landsheere & Delchambre, 1979; Pujade-Renaud & Zimmermann, 1983). The teacher's system of production of meaning meets the student's system of interpretation, in the sense that, in the teaching-learning process, one cannot dissociate the language production activity of the teacher and the activity student's interpretation of this same production. This process constantly

interacts with the knowledge to be acquired. The discourse of the teacher is not a spontaneous and hazardous phenomenon: it is the subject of real expertise in the ability to produce a message that can be interpreted by the student. As such, it is fully part of the professional culture of the teacher (Vermersch, 1978). Didactic communication should therefore be a process during which student and teacher are two partners co-constructing the message around the sharing of a "common horizon of expectations".

The challenge of this study is to better understand how the semiotic activity of the student and the teacher works, and to describe the process of interpretation-attribution of meaning that links them. It is a question of clarifying the interpretation by the pupil of the nonverbal elements of the message emitted by the teacher, by formulating the following research questions: What is the nature of the relationship between this language production of the teacher and the reception /interpretation of the student? What differences in meaning can we identify between the two, and conversely how do their "horizons of expectations" meet? How is this common implicit code constructed in the exchange?

Theoretical foundation

Studies on human communication (Winkin, 1981; Cosnier, 1984) agree that it is multichannel. The verbal utterance shares the meaning of the message with other communication channels, in particular the visual channel which includes gestures and facial expressions, among other things. When a person speaks, he spontaneously produces gestures, and these are mainly used to indicate or represent objects and ideas (McNeill, 1992). These would have a double function of helping to encode the message (updating the thought of the speaker), and of helping the recipient to interpret it.

Kendon (1980) showed that gestures carry information for the speaker. For example, gesture plays an active role in helping verbalization for words related to the representation of space (Butterworth & Hadar, 1989). Thus, iconic gestures (having a link of resemblance with the location in space or a particular object) and indexical (link of contiguity with the space or the designated object) would have a responsibility in the encoding of spatial information in the speaker. Finally, regardless of the type of gestures encountered, studies (Krauss et al., 1996; McNeill, 1992) show that gestures facilitate access to the verbal lexicon by incorporating syntactic and semantic information. All of these results highlight the functional role of gesture in communication.

These works invite us to question the role of gesture in the pedagogical process. The production of gestures constitutes for the PE teacher an essential tool to illustrate and direct his didactic intention: it is a communication tool in

its own right. Understanding motor behavior, human movement in general and the related spatial configurations, is impossible without the help of concomitant visual information (Mahut, 1998). From the point of view of non-verbal language production, we have listed the different gestures used by PE teachers (Mahut, 1998). We observed a strong use of illustrative gestures (70% of the total gesture), which is much higher than the current proportion of 30% in the context of a normal conversation (Cosnier, 1984). This predominance of illustrative gestures marks the communicational specificity in the teacher/student interaction in Physical Education.

This particularity also exists during instruction tasks, when the teacher gives instructions on the knowledge to be acquired. The production of instruction tasks is mainly associated with these iconic gestures (family of illustrative), that is to say gestures presenting a link of resemblance with the object of the discourse. Finally, we have shown that the presence of iconic gestures in nonverbal language production also depends strongly on the discipline taught, the type of sporting activity used, and the style of teaching chosen (Mahut, 1998).

Given the elements mentioned above, what is the role and what can be the conditions of use of the gesture for motor learning purposes? How is the non-verbal message interpreted by the interlocutor, and under what conditions?

It is allowed to think that it constitutes an element of information, in the same way as speech. Our study therefore aims, more specifically, to evaluate the contribution of the iconic gesture to students' understanding of instructions.

From information theory to the semiotics of reception

In this area, two currents of thought clash: positivism and idealism (Husserl, 1950). Positivism attributes to the material world an existence in itself from which human thought would limit itself to extracting meaning. In the context that interests us, this consists in considering that it is enough to describe the world to access reality.

Conversely, idealism holds that meaning is produced by man, that perception is semiotic and orders the world in a network of meanings. In this context, communication requires reading and involves an essential interpretative task (Gadamer, 1976). The expression "to select information" loses its relevance, because it is the semiotic activity of the subject that generates it. Information has no existence of its own, it is the product of the subject's cognitive activity. To be convinced of this, we will remember that at the level of visual percept, the neurons of the eye are in fact isolated cells which can only transmit points.

Characters such as "linearity" and "spatiality", considered at first sight as fundamental in any analysis of the image, turn out to be pure constructions of our cognitive apparatus: "forms do not exist in themselves, they are only

perceived" (Arnheim, 1966). The principle of advanced order is a property of the human mind: "We call order the coincidence, partial or total, of the perceived with a model. From which it follows that an image can be ordered for a spectator (who has a model) and not for another (who does not have it). It is the reader who does the reading" (Groupe, 1992, p 41). Ultimately, perception is semiotic, and the notion of form and object turns out to be non-objective. It is at best a compromise of reading the environment.

From a receiving individual to the interpretant/meaning constructor paradigm

Since the translation of Austin (1970) "When saying is doing", all words are considered as acts. Consequently, any language gesture is interpreted, that is to say read, decoded and put in relation with a network of meanings in a singular context, which is the object of the "semiotics of reception". The interpretative activity of the subject allows him to give meaning to the forms he perceives, according to his own frame of reference. This therefore postulates the infinitely singular and personal character of any reception (Barbier, 2000).

The perceptual and interpretative activity of the teacher's gesture, as a dynamic form, is dependent on the characteristics of the reader/student. The perceptual function is therefore a semiotic function. In either case, it is a perceiving and acting being that imposes its order on the message. The analysis of the learning activity can then be defined as an activity of construction of meaning by the subject, at the end of which he can rearrange his representations.

The constructivist theory of learning (Piaget, 1976; Vygotski, 1997) considers that it is in the interaction with the environment that the subject develops his own adaptation strategies. If we consider the student in a real situation of listening and interacting with the teacher's message, we can say that he implements a real reflective activity that mobilizes his critical thinking and his interpretative faculties. His knowledge is constructed / deconstructed / reconstructed on the basis of a confrontation with the meanings drawn from the teacher's action and language productions.

The concept of "horizon of expectation" in the reception of the language productions of the teacher

The semiotic current of Aesthetics of Reception, stemming from the German School of Constance, is based on the concept of "expectation horizon" (Iser, 1975; Gilly, 1992; Jauss, 2001).

The subject/interpreter assigns a particular meaning and expectation to the information available in the environment they are interpreting. In doing so, he structures the information according to his representations and

experiences, his knowledge, and finally his interpretative capacity. This content transmitted in the form of a multi-codic (Masselot, 1999) and multi-channel message puts the student in a reading situation that produces meaning: this attribution of meaning is only possible in the establishment of relationships with a semantic field. already present.

This common space between teacher and student represents a possible "expectation" of the reader. At the level of the PE learning situation, the teacher shares his semantic universe with the student through the various available and privileged channels that are the visual, auditory and kinaesthetic channels. The elaboration of meanings goes through the co-construction of a semic model or horizon of expectation. Taking an interest in the semiotics of non-verbal language production therefore consists in questioning the student's reading of it, with regard to the teacher's communication intention.

One of the nodes of the didactic process, and ultimately of learning, lies in the sharing of this semantic universe. It is possible to affirm that the message of the teacher in which the contents taught are packaged (McNeill, 1992) only takes on substance through the semiotic activity of the student. Success in building a common code between the teacher and his students would require a case-by-case differentiation of the content taught so that it can be appropriated. However, each teacher is confronted with a differentiated reading of his linguistic productions by the pupils. The question of the reception of the teacher's productions therefore overlaps in part with the problems linked to the notion of pedagogical differentiation.

Study objectives

To account for this co-construction of a semantic universe in the teaching/learning system, mixing both verbal and non-verbal language codes, is ultimately to be at the heart of learning as a relationship to environment on which the individual acts. The main difficulty and at the same time the limit of the present study is to account for the semiotic activity of the receiver of the didactic message. Between what the teacher produces on the linguistic level, and what the student understands, what are the possible differences? How is the reception dynamic of the student established, according to the horizon of expectation available to him? What is the weight of non-verbal productions compared to verbal productions?

This study is the first quantitative part of a survey on the co-construction of language complicity in the teaching/learning system. It is a question of developing a protocol allowing access from the student's point of view to the reading of verbal and non-verbal productions during the interpretation of the didactic message. If we postulate that there is collusion around a semantic

universe that is built during teaching, it is necessary to compare two populations of students: one having followed the support lessons of the test and another having followed the same type of training, but with another teacher.

RESEARCH METHODOLOGY

Subjects / Samples

To identify the degree of proximity of the student to the semantic universe of the teacher, two distinct groups of students are tested. The first group ("Studied Group" GE, n = 11; 3 - girls, 8 - boys) followed the swimming teaching cycle with the teacher concerned. The second group ("Control Group" GT, n = 12; 6 - girls, 6 - boys) includes students with the same level of study but who have not followed a teaching cycle with the teacher concerned during the year. The students' ages are between 10 and 12 years old and the study was conducted in Cluj-Napoca.

Procedure

A test on audio-visual support is developed from a recording of 4 hours of swimming instruction in the 2nd year of swimming. The choice of the swimming APS as a support for the test is directly linked to the results of a previous study which shows a largely majority iconic gesture (Mahut, 1998). The highest proportion of "kinetographic" gestures have the function of depicting an action or a movement. The teacher who supervises swimming is an expert in the discipline; a swimming specialist, he has more than 12 years of swimming teaching experience.

From this recording are extracted seventeen significant sequences in terms of the iconic gestures of the teacher, that is to say representing characteristic moments in a key learning of swimming. The choice of sequences is the subject of consultation with the teacher and with three swimming experts who agree on the relevance, non-redundancy, and semantic richness of these sequences. These sequences all contain, to varying degrees, similarities with gestural forms relating to swimming techniques. Thus, the movement of the teacher's hands can reproduce more or less partially a swimming technique coming to image the adjoining instructions, it may also reproduce the movement of the legs expected for the exercise. Finally, behind the technical form suggested by the gesture, there are underlying principles of efficiency sought by the teacher.

In order to assess the ability to read and interpret the gestures produced by the teacher, a specific test is used: each of the sequences includes a "kinetographic gesture" which is the subject of a successive montage without

the sound then with the sound, 20 seconds apart. The aim is to identify the difference in the impact of gestural signals according to the group to which they belong. The first sequence was chosen to be easily interpretable, and therefore serve as input in the test.

The test therefore presents a total of thirty-four sequences, interspersed with a short time, in order to put the performer under controlled time pressure. It is a question of getting as close as possible to the real conditions of reception in a teaching situation. The total duration of the test is eighteen minutes. The student swimmer is asked to "describe what he sees, then to say what swimming teaching content is referred to". The teacher (P) is himself subjected to the test in order to constitute a reference comment which will make it possible to qualify the level of recognition of the situations for each subject. Indeed, a sequence has no meaning in itself except that attributed by its different interpreters. In the context of a didactic interaction, what interests us is the level of congruence of the responses about the same sequence between the teacher and his various interlocutors, both real and virtual (in the context of the study).

The procedure for collecting verbal data consists of recording the comments made about the video support. When taking the test, the subject is alone with the experimenter who informs him of the conditions of the test and who no longer intervenes throughout the duration of the test except, if necessary, to re-specify an instruction.

These verbalizations are transcribed verbatim and are the subject of a quantitative and qualitative study (Ericsson & Simon, 1993; Chi, 1997). In addition, a questionnaire is completed individually in order to check the student's level in swimming, his physical performance and his degree of qualification. A Mann-Whitney test shows that there is no significant difference in terms of performance between the two groups ($p = .59$).

Corpus processing

Each language production is identified with respect to the sequence number (from 1 to 17) and the type of sequence (non-verbal = A; verbal = B). The verbatim is transcribed in the order of the sequences and according to the different membership groups (GE; GT; P). This verbatim being very heterogeneous and disparate, we are led to reduce the heterogeneity of the discourse. For this, it is a question of identifying the significant units about the teaching content conveyed and what needs to be done, often declined in the form of rules of action. All in order to bring out what is "intersection" in the speeches of each other about the situations viewed. These reduced forms of discourse thus allow the comparison of the various responses. The objective is to evaluate the degree of understanding of the verbal and non-verbal production of the teacher, the comparison of meaning is made from the source speech of P considered as the reference.

We use the notion of semic trait for the counting of responses, the idea being to retain only the essence of the message more than the presence of a specific vocabulary. The definition of these units of meaning or "semic traits" which determine the characteristics of the situation, is done from the general to the particular, that is to say from the recognition of the general context of the situation to the proposal of specific contents. There are therefore two levels of characterization of the sequences presented in the test.

- The first level of characterization of the situation is the prior definition of the context in which language production takes place: for the student, it is a question of situating the global motor task in which P is part. For example, this concerns a brief description of the type of swimming or exercise performed. This prerequisite makes it possible to frame the situation globally, and to check whether the student has grasped the purpose of the learning from the outset. In the event of non-recognition of the context as defined here, the response (if there is one) is counted in the "off-topic" item.
- The second level of characterization of the situation consists in defining it from the point of view of the teaching content conveyed. For example, during a situation in ventral swimming "crawl" (first level contextual definition), the teacher looks for an "increase in propulsive amplitude". Each situation can include several contents according to the definition given by the teacher. All of the specific content of the seventeen situations is grouped under the generic item "content" in order to be counted. A non-response to the presentation of a sequence is coded as "nothing to say". Finally, the "other" category corresponds to the formulation of other teaching content that is possible (defined by the experts after viewing the tape), but not issued by the teacher.

The processing of the students' verbalizations consists of entering the different semic traits in computer software, comparing them to the source discourse. This coding was performed by two independent coders with a fidelity rate of .93. In the event of a dispute, each case is placed in its context and discussed.

The counting of occurrences is based on the following variables: non-verbal situations (A)/verbal situations (B); study group (GE)/control group (GT)/teacher (P); situations 1 to 17; and the items selected (Context, Off Topic, Nothing to Say, Others).

It is a question of evaluating the different levels of reading of the situations according to the groups to which they belong. To do this, the comparisons made are as follows: namely the differences in reading between P and the students of the GE and GT groups; between the two groups GE and GT. The preferential use of sequence A or B according to the groups is evaluated in order to highlight

different reading strategies. The number of responses is counted for all situations combined (A+B), but also differentially according to sequences A or B.

RESULTS

Table 1. Average frequency of responses for all situations

Results	Situation A + B	Situations A (non - verbal)	Situations B (verbal)
Total (24)	52.5	29.6	22.9
GE (11)	54.4	31.2	23.2
GT (12)	46.8	25	21.8
P (1)	99	68	31

Owner date, 2023

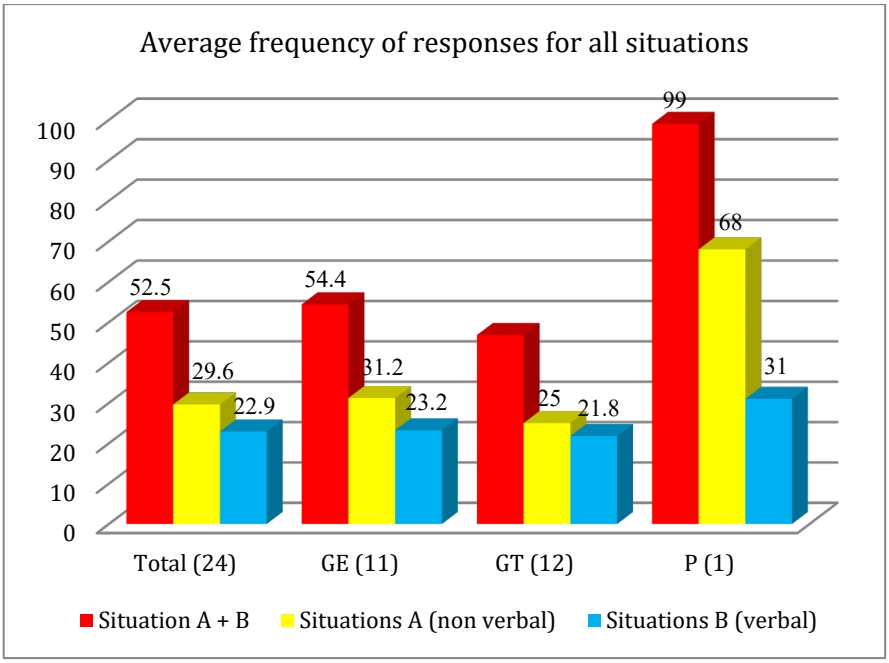

Fig. 1. Average frequency of responses for all situations (Designed by the author, 2023)

Figure 1 represents the total number of responses concerning the 17 situations A (without sound) for the entire population studied and for situations B (with sound) and for each group. The total number of responses for each item is the subject of an inter-group comparison in order to identify the different forms of response, then to establish a group portrait.

Result 1: A direct and unambiguous reading strategy for The Professor (P)

Subject to the test, the teacher is placed in a situation of deferred reception of his own production. Encouraged to decode his own language production without hesitation and to immediately give meaning to the first sequence (sequence A), his non-verbal productions are sufficient for him to recognize the context and the teaching content.

Viewing the following overall sequence (with sound and called sequence B) is an opportunity for him to justify and deepen the teaching content he is aiming for, possibly using speaking time in a complementary way. But in more than one out of two cases, he adds nothing to the preliminary comments produced in sequence A. Everything happens as if the coherence he has built in his teaching is found when viewing the gestures. At all times, he seems able to account for the gestures he uses, their function, their purpose and their link with the teaching content he aims for his students.

Ultimately, one could say that the rigor of his approach is illustrated in the precision of the gestures he uses to underline his intentions to the students. The readability for him of language productions is an indicator of the consistency and fidelity of the non-verbal code he uses, and which he co-constructs with his students.

Result 2: A considerable loss of meaning between the language production of the teacher and the reception of the student

The average quantitative data between each group (GT and GE) compared to the teacher's productions show a considerable loss of the information produced in each sequence. It can be seen that almost 50% on average of the semic features emitted in the teacher's commentary are not reproduced by the students, with variations according to the group to which the students belong. A Mann-Whitney U test shows a significant difference in the distribution of the "quantitative language production" variable for the two populations. The GE group restores an average of 55% of the strokes against only 47% for GT.

If we consider that what is not verbalized by the student covers part of the teaching content that has no relevance for him, we see that a significant part of the teacher's productions finds no resonance in the student. This gap in the semantic space between teacher and student is reduced when the latter has followed the lessons on a regular basis.

Result 3: Greater reading fluency in the GE group

Regardless of the sequence viewed with or without sound, the comments of GE students about the gestures of the teacher are immediately more numerous. As mentioned, there is a higher number of responses (equivalent to a semic trait) in GE than in GT.

It is as if GE, through the experience gained from interlocutions during the teaching sequences, mastered the non-verbal and verbal communication code used by the teacher better than GT. Participation in the course then serves as a basis for the co-construction of a common code which constitutes a foundation for subsequent learning.

Conversely, students who have not followed the lessons cannot access the common sense shared with the teacher and the loss of meaning is the manifestation of this. If reading and interpreting a communication situation requires the ability to verbally restore the meaning produced by the teacher, then there is a specific communicational complicity, linking the teacher and his students. Not immediately accessible by an outside group, this complicity is developed during the teaching sequences. The mastery of the communication code at GE would be at the origin of the best reading of the teacher's message.

Result 4: Reading difficulties in GT

Table 2. Total "nothing to say" responses and average by group and by sequence

Results	**Situation A + B**	**Mean**	**Situations A (non - verbal)**	**Mean**	**Situations B (verbal)**	**Mean**
Total (24)	217	9	53	2.2	164	6.8
GE (11)	121	11	28	2.5	93	8.5
GT (12)	88	7.3	25	2.1	63	5.2
P (1)	8	8	0	0	8	8

Owner date, 2023

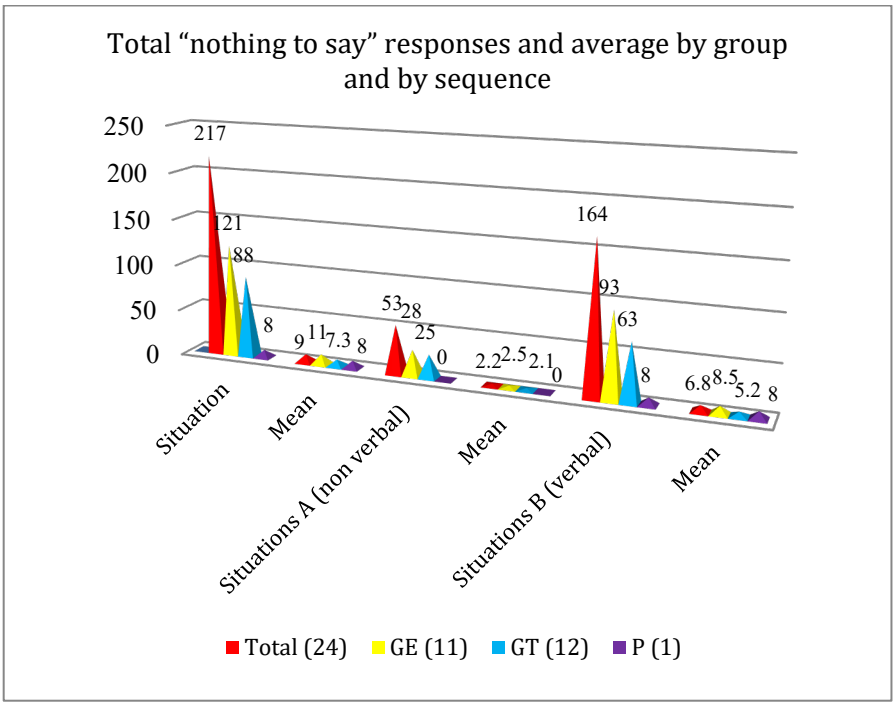

Fig. 2. Total “nothing to say” responses and average by group and by sequence (Designed by the author, 2023)

If we go into the details of the type of response pronounced, we see that the distribution of the number of “nothing to say” items is indicative of different strategies, depending on the groups, in the mode of reading the message of the teacher message. The total number of “nothing to say” items for the whole of the population studied increases from 53 to 164 for all the sequences between A and B. 93 for GE.

The ability to identify the context of language production overdetermines the ability to verbalize the meaning it conceals. While the GT group has difficulty in immediately verbalizing in the sequences without sound the meaning of the messages emitted by the teacher, they carry out a partial catch-up during the B sequences. Indeed, it seems that the more the student has difficulty in interpreting the teacher’s non-verbal production, the less likely he is to understand what is being asked of him. This split in the ability to decode the language productions of the teacher is a good illustration of the existence of a code that facilitates communication.

Result 5: Recognition of meaning is earlier and more relevant at GE

The number of "nothing to say" items (93 for GE versus 63 for GT) in sequence B is directly linked to the early recognition of situations. This recognition for the GE group occurs as soon as the teacher's non-verbal productions are visualized, unlike the GT group, which preferentially uses verbal support to understand the situation. In addition, the reading of the GE group is more relevant because it presents a higher degree of congruence to the source comment (that of Professor P).

In the end, the students of the GE group (having followed the teaching sequences) attribute most of the meanings as soon as the non-verbal sequence appears (sequences A). The GE group reads from the outset and in a relatively complete and discriminating way, all of the teacher's communication intentions.

The verbal support that comes in second place is useless or even superfluous to them to understand what the teacher means. The absence of comments in situation B for the GE therefore appears to be the product of a global strategy consisting in refraining from continuing the comments when the sequence appears with the sound, because the student considers that he has said d the essentials straight away. There is a similarity between this procedure and that of the teacher himself commenting on his teaching. The verbal production actually reinforces the previous interpretations, and therefore needs no commentary.

Everything suggests that the non-verbal elements of the communication present sufficiently relevant, exhaustive and unequivocal clues for GE.

Result 6: The verbal productions make it possible to fill in the misunderstandings of sequence A for GT

The previous results, particularly with regard to the proportion of "nothing to say" items in sequence B, illustrate a different reading strategy from one group to another. As we have seen, in the majority of cases, situation B does not provide additional information from the point of view of the GE reader. Conversely, the GT group makes more pronounced use of verbal information coming second in the test to interpret the message produced by the teacher. We can think that in the absence of a previously co-constructed non-verbal code, the verbal information, which is the subject of a broad and universal common coding, is the most relevant for a "naive reader" of the data. visual. Everything happens as if there were substitution of one code by the other (the verbal by the non-verbal) when the non-verbal code has not been previously and sufficiently elaborated during previous exchanges.

Despite this, the verbal cues do not make it possible to completely compensate for the prior recognition deficit in sequence A. This is the case of the students in the GT group who, having contextualized sequence A with error, produce comments that are off topic, and reinforce their convictions when reading sequence B, despite the obvious signs of going the wrong way.

We can think that the preliminary interpretation of the visual clues presents in the gesture, have a sufficiently important significance, to come to screen contradictory verbal information. Even though the appearance of the sound allows GE to confirm the relevance of his reading, this adds to the confusion of the GT which continues the erroneous interpretative logic resulting from sequence A.

The fact that the verbal message is more universal, more readable, does not compensate, on the contrary, the lack of interpretation of the reader. It is the connivance with the singular non-verbal code co-constructed by the teacher, which makes it possible to catch up on the ambiguities and the zones of silence of the necessarily incomplete verbal message that the teacher emits in a teaching situation. The implication of the gesture mode would have the effect of considerably reducing the cost of communication, especially in a sound context where the quality of reception is not guaranteed. The teacher would thus rely on this common code to purify his communication in favour of salient features related to learning, thus allowing the student to grasp the essence of the message.

DISCUSSIONS

Despite mastery of the variable "did or did not follow the teachings of P" in the constitution of the samples, two subjects of the control group (GT) clearly stand out from the average response of their group to which they belong. Their response profile is also closer and more congruent with P's comments than the GE group in general. They stand out from their home group by a good level of theoretical knowledge of the swimming activity. This level is assessed for one by the fact that he is engaged in professional training (1st degree), and for the other by a good level acquired in his university training (grades obtained in examinations).

It therefore seems that beyond a certain communicational complicity, the "knowledge of the activity" factor is overdetermining in the ability to decode the non-verbal message, and to decode the overall message in a relevant way. By knowledge of the activity, it is necessary to understand the existence of a certain personal physical practice linked or not to a reflexive practice relating to the teaching of this activity; the addition of these two factors seems to be an additional guarantee of identification of visual language cues.

The external factor "construction of linguistic complicity" favouring the reading of the teacher's productions is here biased by an internal factor: the experiences and knowledge acquired in swimming. This constitutes an additional argument in favour of an active reading of the subject which establishes more or less rich and relevant links between information from the environment and knowledge already available in the corpus.

This phenomenon represents a limitation of our study, insofar as a high level of knowledge in the swimming activity would correspond to a significant ability to decode the gestures produced by the teacher, and to understand what he expects from the swimmer. In return, this observation should encourage the teacher to systematize the coding of his gestures for populations who are not very advanced in learning, because this would make it possible to partially compensate for the lack of meaning they manifest.

This study also highlights the strong quantitative discrepancy in the interpretations of signs between producer and interpreter of the language conveying the teaching content. This discrepancy, which represents a loss of meaning, poses the problem of ambiguity and inequality in the access to the didactic message for the student. Three factors determining the semiotic activity of the student in a situation of attribution of meaning co-constructed with the teacher can then be highlighted:

The first factor, often neglected and rarely described, is the involvement of visual information in the understanding of the language productions of the teacher. In the teaching of swimming, the verbal activity of the PE teacher is not enough to communicate the information necessary to carry outss motor tasks. To interpret the language activity of the teacher, the student can first rely on the visual information available, and this all the more so since a common code has been constructed beforehand. This result goes in the direction of a global semiotic activity during the didactic interaction dealing with a heterogeneous information flow. This activity appears extremely singular in the sense that it makes the subject's external and internal elements interact. These external elements present a certain stability and can be the subject of a precise description (vocabulary used, gestural production). On the other hand, the internal elements specific to the subject call upon knowledge linked to the motor experience and give a particular colour to the language acts (verbal and non-verbal) of the teacher.

The hypothesis of a univocal didactic message generally qualified as "clear" is invalidated in favour of a student/reader constructing meaning, interpreting in an ambiguous and open interactional environment. A connivance, co-constructed in the interaction, constitutes the second factor that we qualify as metalinguistic: to understand each other, student and teacher develop a

common code of communication which goes beyond the general linguistic baggage. This prerequisite is particularly salient in the non-verbal domain of communication, which does not have a prior, established and universal code like the verb. This sector of production can however be the object of a powerful codification on the part of the teacher, even if it is not exempt from ambiguity.

Finally, as a third factor, a variable internal to the decoding subject is based on his degree of knowledge of the activity: this overdetermines the quality of the interpretative activity of the language production of the teacher. This tends to underline the inequality in the ability to give meaning to a verbal and non-verbal statement.

CONCLUSIONS

The interaction of the student reader and the language productions of the teacher leads to the emergence of non-verbal codes which, without being universal, nevertheless make it possible to read and understand the intentions of the teacher. We touch here on the profession of student in its most implicit part, that which relates to the hidden curriculum (Perrenoud, 1995). If interpreting the language productions of the teacher is part of the student's job, the structuring of this symbolic universe is a prerequisite, even informal, for effective interaction and the acquisition of knowledge. This phenomenon takes on particular importance due to the specific conditions of teaching swimming, in a context where verbal production is by definition inappropriate and disturbed by the sound level of swimming pools.

In conclusion, the perspectives of this study therefore concern both the training of teachers, in a field related to non-verbal communication, and the profession of student, in informal aspects little explored. A good student would therefore no longer be one who is content to be attentive and "take relevant information", it would above all be an interpreter capable of reading in the productions of the teacher. Classical conceptions of the role and activity of the student and the teacher would therefore be greatly modified.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXVIII, 3, 2023, pp. 85-92
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.68(3).25

EXAMINING THE EFFECTIVENESS OF FOREIGN COACHES IN THE HUNGARIAN FIRST-CLASS FOOTBALL CHAMPIONSHIP

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Received 2023 May 23; Revised 2023 July 28; Accepted 2023 September 4;
Available online 2023 September 30; Available print 2023 November 30.

ABSTRACT. During my investigation I was analyzed the Hungarian First Class Football Championship from the 2014-2015 season up to the 13th round of the 2022-2023 season, all the foreign head coach, taking into account his victories, draws, and defeats. In the 2014-2015 season they took part in 150 matches with 69 wins, 38 draws and 43 defeats. But in the 2015-2016 season they led their teams in 165 matches, where they won 62 wins, 38 draws, and 65 defeats. In the season 2017-2018: 198 games, 80 wins, 51 draws, and 67 defeats. In the season 2018-2019: 41 games, 24 wins, 7 draws, 10 defeats. In the season 2019-2020: 174 games, 80 wins, 39 draws, 54 defeats. In the 2020-2021 season: 117 matches, 59 wins, 24 draws and 34 defeats. In the season 2021-2022: 147 games, 66 wins, 38 draws, and 43 defeats. In the 2022-2023 season I have my results for the 13th round, which are as follows: 53 games, 21 wins, 21 draws, and 18 defeats. And the total of 1045 matches: 461 wins, 256 draws and 328 defeats. According to this data, 44,11 % is the victory rate for foreign coaches during the periods examined.

Keywords: *football, foreign coach, effectiveness.*

INTRODUCTION

As an introduction I would like to write a little bit about team composition, team spirit and the relationship between sports and education.

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The team composition and team spirit: Players and coaches often write about the success and failure of how well the team is working together. The failure is then explained by the fact that the team as a whole is not harmonized, and for success they say the team has performed as a whole and the actual cause of the result is in the good camaraderie.

If we want to illuminate the relationship between performance and team composition, this requires more accurate examination of the concept of „team composition", and the factors that influence it. Already in several studies in the fifties, there are mostly fortifications that have an impact on players that remain in the team or in the group.

Problems with the relationships between sports and education:

It is worth taking a look at the work of the theoretical professionals, who prepare for the creation of modern sport, how did they think about the relationship between sports and education. Obvious to turn straight Baron de Coubertin and flatten hi famous "Sport Pedagogy"! The creator of the modern Olympics has collected all the essential ideas of the predecessors and contemporaries about the possible education effects of sport. Some data about the 2021/2022 season from Hungarian First-Class Football Championship (NB1).

Sports Pedagogy in terms of approach the coach's main task is to pass on their knowledge to the children, develop and educate them. The presence of the coach is an activity that enhances human performance. Sports pedagogy examines sports activities as a means of personality development. The coach considers it important for children to lead a lifestyle free from harmful addictions and to maintain a healthy lifestyle. Additionally, they should continuously educate themselves in order to expand and apply their knowledge. It is important for the coach to perform their tasks with passion and dedication. Athletes should feel and trust their coach. The coach should be prepared for every training session, and present new training plans to the students so that they can learn and implement new techniques. Most importantly, the coach should establish a good relationship with the athletes. Directness, trust, honesty, joy, and sorrow in their shared work can result in the athletes' belief in sports, which can lead to the team's success.

Sports psychology distinguishes between human movement and motor actions. It deals with the psychological characteristics of athletes and how to help them reach higher levels of success. The team shares common goals, tasks, internal organization, and cohesive strength, which are examined through various methods. The Moreno sociometrist procedure shows that group

structures can vary among different teams. Group dynamics are analyzed in relation to team performance. Round-robin tournaments and ranking lists are examined using mathematical theory methods.

The main characteristics that determine group performance are:

- Common goals and tasks.

- Official and unofficial relationships among group members, as well as the system that encompasses these, referred to as group structure, which manifests outwardly as group organization.

- Behavior norms and value systems that are jointly assumed and realized along with roles.

- Group cohesion (internal organization, cohesive force).

- Leadership; and finally,

- Relationships with larger social units above the group in the organizational hierarchy.

The structure of a team is examined through various methods. The most common of these is the Moreno sociometrist procedure. The sociometrically identified group structures can vary significantly among different teams. However, it should be noted that sociograms provide only a formal description of a team. In recent group research, various mathematical methods have been gaining popularity. These methods primarily analyze group structure, group dynamics, and group performance. This mathematical theory and approach can be applied with great benefit to three main areas in sports (Lenk, 1970): the analysis of sports organizations, ranking lists and fixtures, and the examination of team dynamics. As for the issues of team building, an important and comprehensive study by Ferenc Pataki was published in Hungary in 1969. Team building begins with assessing the motivational basis of the members and determining which motivational groups should be strengthened in the continuous development of athletes. During team building, efforts should also be made to foster appropriate team spirit. Quoting Lenk and Adam, it is stated that the coach's experiences often precede science in a general or intuitive manner, but they may not be able to convince others of the truth of their opinions about specific cases, as others passionately adhere to their old, mistaken views, and often the coach himself cannot articulate the problem. "It would be of great benefit to practice if science could develop a usable conceptual framework and terminology, of course, only if coaches and athletes can start something with it." Therefore, practical sports professionals and scientists rely on each other mutually (Rókusfalvy, 1974).

The foreign coaches who come to our country to work as coaches are already trying to reconstruct the given domestic team where they work according to the ideology represented by their own country. It is useless to compare the budgets of the international clubs from the top 5 leagues with the budgets of the Hungarian first division, because huge differences appear between them (Tóth jr, 2017).

Football has reached a level where every little detail matters. By now, football as a sport has gradually grown into a discipline, so all aspects have been carefully examined. In a professional football match, every little detail is worked out before the match in order to prepare for the opponent (Tóth jr, & Sóvári, 2022).

NB1	Study sample	Average age of coaches	Median tenure duration of coaches
2021/2022	20 Coaches	52.8 years	99 days

Fig. 1. Details

RESEARCH HYPOTHESES

My first assumption is that, at the end of the 2016-2017 season Hungarian football teams do more ahead of the table with foreign coaches, then with Hungarian coaches.

My second assumption is that the Hungarian football teams win more matches with foreign coaches than with Hungarian coaches in 2016-2017 season.

MATERIAL AND METHODS

In my study from the 2014-2015 season to the 13th round of the 2022-2023 season, I would like to present the results of foreign coaches, how the championships ended with them. Helped to examine the results the Eredmények.com. I performed the statistical calculation based on the Mann-Whitney-U test. Consequently, we can deduce that nearly 50% victory rates they can reach per season. After collecting this data, I performed a statistical calculation.

RESULTS

An interesting thing about my first column chart („Matches of foreign coaches per season") is to show you that the same number of foreign coaches as many matches they controlled. So, you can also compare them together.

The most wins have been achieved in the 2016-2017 season, and the least victory was in 2015-2016 season.

The most draws have been achieved in 2017-2018 season, and the less draws in 2014-2015 and in 2015-2016 seasons.

The less defeats in 2014-2015 season, and the most defeats in 2015-2016 season.

The column chart also shows that the 2015-2016 season was not so successful as the other four seasons.

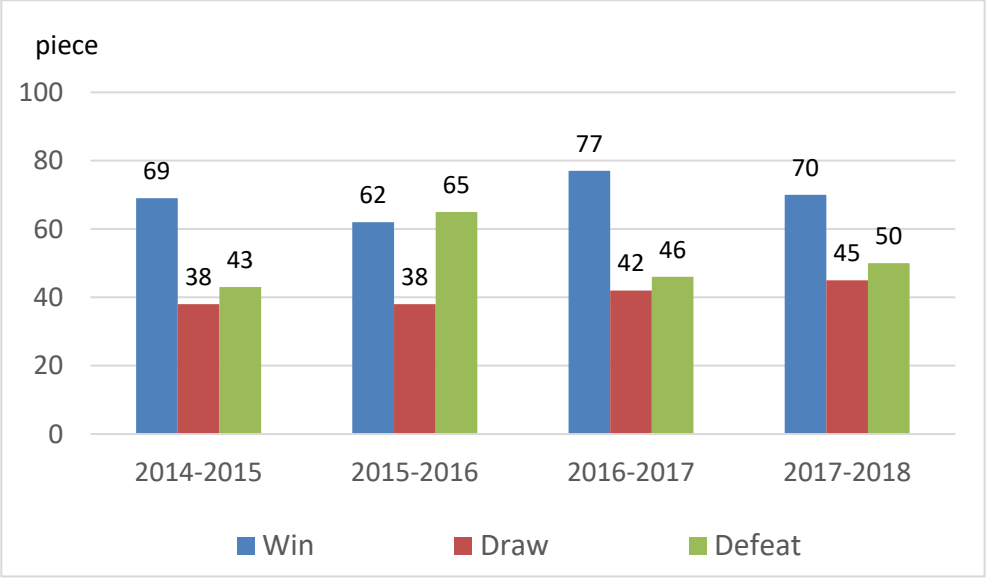


Fig. 2. Matches of foreign coaches per season

In the 2018-2019 season there were not so many matches where foreign coaches led Hungarian teams, as in the other seasons.

The blue line means the season has not completed yet, that's why I could look at this season only until round 13th.

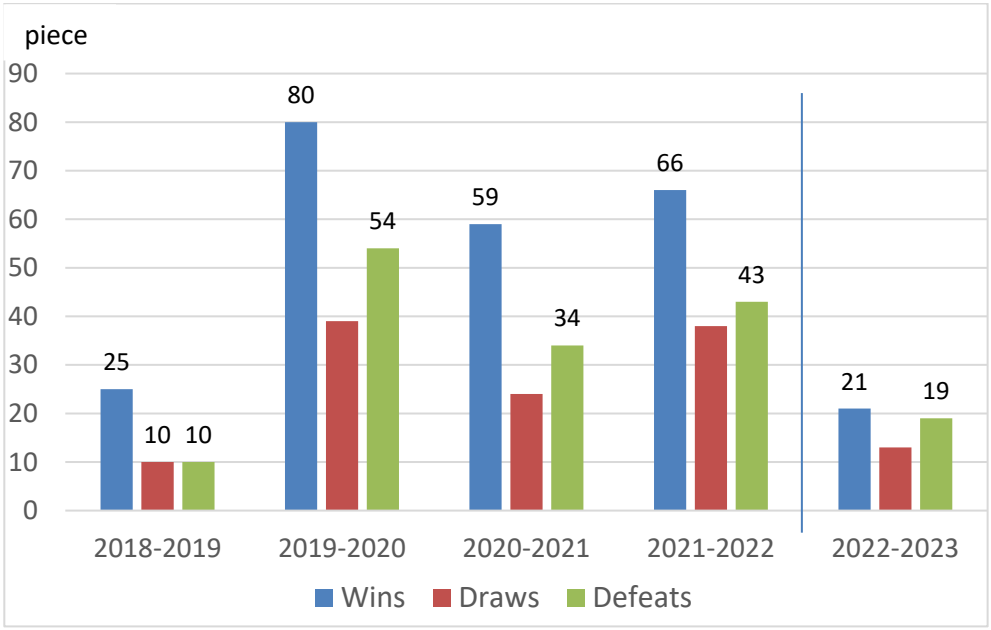
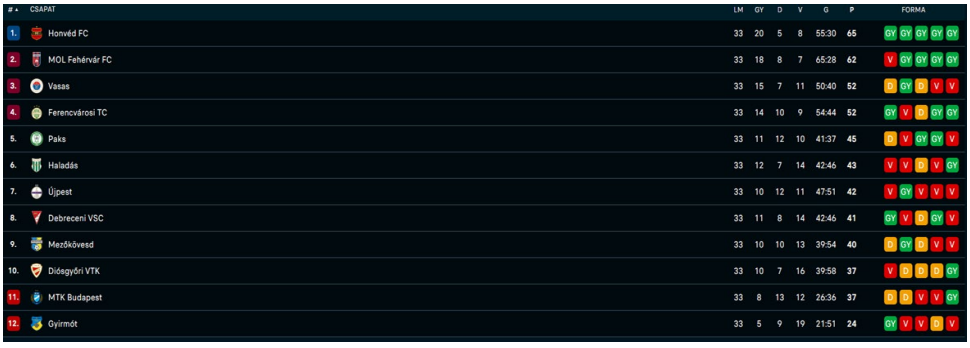


Fig. 3. Summary of foreign coaches' matches by seasons

The following photo shows my hypothesis has not been confirmed, as Újpest was overtaken by two football teams which has had Hungarian coaches. But I have done a computation based on the single-edged Mann-Whitney-U test, and its result: p=0.005. From this we can conclude that, the statistical calculation is confirmed by my hypothesis: Hungarian teams reach more with foreign coaches, than with Hungarian coaches.

My conclusion is that my first hypothesis is confirmed as the statistical calculation based on single-edged Mann-Whitney-U test's result: p=0.005.



#	CSAPAT	LM	GY	D	V	G	P	FORMA
1.	Honvéd FC	33	20	5	8	55:30	65	GY GY GY GY GY
2.	MOL Fehérvár FC	33	18	8	7	65:28	62	V GY GY GY GY
3.	Vasas	33	15	7	11	50:40	52	D GY D V V
4.	Ferencvárosi TC	33	14	10	9	54:44	52	GY V D GY GY
5.	Paks	33	11	12	10	41:37	45	D V GY GY V
6.	Haladás	33	12	7	14	42:46	43	V V D V GY
7.	Újpest	33	10	12	11	47:51	42	V GY V V V
8.	Debreceni VSC	33	11	8	14	42:46	41	GY V D GY V
9.	Mezőkövesd	33	10	10	13	39:54	40	D GY D V V
10.	Diósgyőri VTK	33	10	7	16	39:58	37	V D D D GY
11.	MTK Budapest	33	8	13	12	26:36	37	D D V V GY
12.	Gyirmót	33	5	9	19	21:51	24	GY V V D V

Fig. 4. Table at the end of the 2016-2017 season

My second hypothesis was confirmed too. I can prove this based on statistical calculations used by single-edged Mann-Whitney-U test, and the result is: p=0.017.

The chart below shows that Hungarian coaches controlled Hungarian football team in more matches, still the teams led by foreign coaches have won more games.

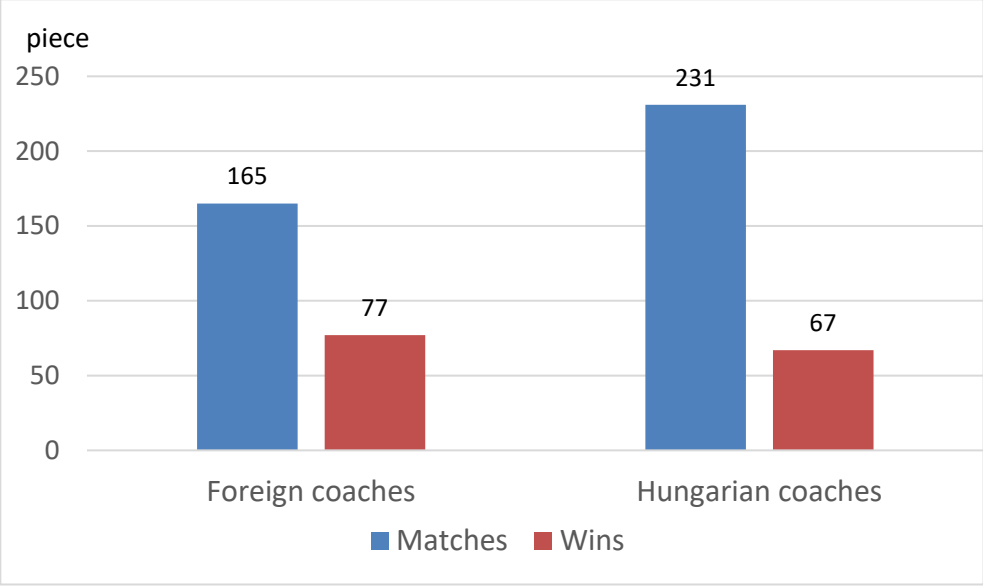


Fig. 5. Matches and wins for the season

CONCLUSION

In summary, I can tell the foreign coaches' psychology, pedagogy and what they bring from their homeland manifests in the mentality, which succeeds in impacting their football team.

The Hungarian coaches do not emphasize psychology and pedagogy, but it can be decisive before the big matches, as the mentality stronger teams are likely to live football field victorious. I also can give a personal example. The connection within the adult team where I am currently actively playing football is mentally and psychologically very deep.

The coach tries to do the best to get the team out of this bad situation, but this bad mental state may affect the outcome of the championship.

However, I have a positive example too. This is still from the youth team I used to be playing. The youth team was a group of friends and that was the power of the team. We played liberated and self-confidence in all training sessions, and weekend matches. We did everything for each other, in a team, not everyone for just themselves and self-serving. That's why we managed to win the championship title then.

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(RECOMMENDED CITATION)
DOI:10.24193/subbeag.68(3).26

THE CONTRIBUTION OF CONSTRUCTIVISM IN TEACHING SWIMMING

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Received 2023 July 28; Revised 2023 September 3; Accepted 2023 September 4;
Available online 2023 September 30; Available print 2023 November 30.

ABSTRACT. This article aims to take stock of the possible contribution of constructivism to the renewal of the pedagogy of swimming. If the pedagogies oriented by constructivism have profoundly renewed the ways of understanding the teaching of team sports, the same is not true with regard to the teaching of sports disciplines that are predominantly technical. By identifying the differences and the points in common between the various forms of constructivism, the article proposes a pedagogical framework oriented by this epistemology that can be mobilized in the teaching of swimming. Two case studies and their consequences for learning are proposed in the teaching of butterfly and breaststroke techniques.

***Keywords**: teaching swimming, learning and teaching of swimming, constructivist perspective.*

REZUMAT. Contribuţia constructivismului în predarea înotului. Acest articol îşi propune să urmărească o posibilă contribuţie a constructivismului la reînnoirea pedagogiei specifice înotului. Dacă pedagogiile orientate de constructivism au reînnoit profund modalităţile de înţelegere a predării sporturilor de echipă, nu acelaşi lucru este valabil şi în ceea ce priveşte predarea disciplinelor sportive predominant tehnice. Prin identificarea diferenţelor şi a punctelor comune dintre diferitele forme de constructivism, articolul propune un cadru pedagogic orientat de această epistemologie care poate fi mobilizat în predarea înotului. Două studii de caz şi consecinţele lor în învăţare, sunt propuse în vederea predării tehnicilor de înot fluture şi bras.

***Cuvinte cheie:** predarea înotului, predarea şi învăţarea înotului, perspective constructiviste.*

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INTRODUCTION

Introduction / Statement of problem

Constructivism and pedagogy in teaching swimming

Constructivist perspectives and ideas about or about learning have been a major influence on thinking about teaching and education over the past thirty to forty years (Fox, 2001). As Amade-Escot and O'Sullivan (2007, p.186) note in this regard, "constructivist theories are at the heart of educational thought". However, constructivism does not present itself as a theory or a teaching method, but as a theory of learning (this is why we will speak of "pedagogy oriented by constructivism" and not of "constructivist pedagogy"): the focus is therefore more on student learning than on the behaviour or activity of the teacher. Nevertheless, compared to traditional and prescriptive approaches inspired by behaviourism, constructivism suggests a radically different approach to teaching (Fosnot, 1996; Light, 2008). Initially applied in the context of mathematics education (for a francophone perspective, see for example Vergnaud, 1990), constructivist perspectives on learning have, in the context of more recent contributions to the reformatting of school curricula in the world of teaching physical education.

Thus, while the influence of constructivism is evident in the approaches popularized in the 1960s (Rink, 2001), their contribution was more significant from the 1990s. education is in part due to a renewed interest in the Teaching Games for Understanding (TGfU) approach in those years when researchers attempted to identify the consistency of constructivist explanations of learning. with the learning generated by this approach to teaching sports games (Kirk & Macdonald, 1998). It was also during these same years that French researchers argued the interest of mobilizing constructivist perspectives to rethink the teaching of physical education (Gréhaigne & Godbout, 1998).

Constructivism, to which we also associate the ideas of Lave and Wenger (1991) on situated learning, has therefore significantly influenced the way of thinking about learning and pedagogy in the teaching of games (Kirk & Macdonald, 1998; Richard & Wallian, 2005; Gréhaigne, Richard & Griffin, 2005). However, this contribution of constructivism has been less marked in terms of its mobilization to guide teaching and understand learning beyond games and team sports.

Research carried out in this field, however, suggests that constructivism constitutes an interesting and productive path likely to orient the teaching of other sports activities taught in the context of physical education, such as, for example, creation in dance (Chen, 2001), movement education in primary school (Rovegno & Chen, 2000), or even athletics (Light, 2008).

The writings and research on swimming in France (Catteau A., 2002; Catteau R., 2008; Refuggi, 1998) also suggest, through their references, that constructivist ideas can guide teaching and research on learning in sports swimming. However, this potential contribution of constructivism to the teaching of swimming currently remains a neglected dimension in Romanian literature, we found resources on this topic only abroad.

In the continuity of this work on the learning and teaching of swimming anchored in a constructivist perspective, this article proposes a flexible pedagogical framework for teaching swimming oriented by constructivism.

Theoretical foundation

Constructivist ideas about learning

Diversity of constructivism

Constructivist perspectives on learning reject the idea of objective reality, and in this sense define learning as an interpretive process shaped by experience and knowledge from which learners construct their own version of reality (Davis, Sumara & Luce-Kapler, 2000). However, beyond this apparent unity in the conception of learning, constructivism covers a variety of theories which, although sharing some common principles, may appear contradictory (Davis et al. 2000). These various forms of constructivism can be described from an opposition between a cognitive, psychological and individual constructivism and a socio-cultural/social constructivism (Davis & Sumara, 2003; Fosnot, 1996; Phillips, 1997).

Psychological constructivism is defined on the basis of the work of Piaget, subsequently developed by several theorists who had an influence in the educational field such as Von Glasersfeld (1995). Piaget's ideas on learning developed from his work in adaptive biology and can from this point of view be described as neo-Darwinist (Bronckart, 1999). Within the framework of the "Geneva school", learning is conceived as a process through which an actor actively constructs new knowledge from his past experiences in a process of cognitive rebalancing following a disturbance (Cobb, 1996, p.38). This cognitive constructivism focuses more particularly on the quality of individual interpretation and the development of knowledge, viewing learning as an essentially individual process (Cobb, 1996).

Social constructivism (or socio-constructivism) takes a more macro perspective to view learning as a social and interpretative process. Based on the ideas and work of Vygotsky (1934), but also developed by the later work of Bruner (1966), it was also influenced by the writings of other authors such as Dewey. This form of constructivism questions the almost exclusive focus on individual cognition of cognitive constructivism to propose the idea that learning is

culturally and socially situated within a larger framework of activity. Thus, while both approaches emphasize the importance of experience and activity, notable differences persist, for example regarding the question of whether knowledge is constructed at the individual level or is socially distributed (Cobb, 1996; Davis & Sumara, 2003).

These disparate orientations can however be seen as having more points in common than real divergences, but the diversity of forms of constructivism can also appear problematic (Cobb, 1996; Davis & Sumara, 2003). Several authors have nevertheless attempted to circumscribe these difficulties by suggesting a certain number of principles that all constructivist approaches share in the context of education (Fosnot, 1996) and in the more specific context of physical education (Rovegno & Dolly, 2006).

Davis and Sumara (2003) have thus carried out this work based on what they consider to be the three principles at the heart of constructivism in the formation of a theory of complex learning (CLT). Developed within this framework, the first suggestions for research on physical education teaching in 2008 (Light, 2008) have since gained some recognition in the physical education literature (Jess, Atencio, & Thorburn, 2011).

This CLT does not present itself as an alternative to constructivism but tries to circumvent some contradictions at the heart of the diversity of constructivist approaches so as to usefully guide the teaching of physical education (Light, 2008; Jess et al., 2011).

Complex Learning Theory CLT identifies three principles at the heart of constructivism compatible with complexity theories. These principles are as follows: Learning is a process of adaptation: strongly influenced by the ideas of Piaget, CLT adopts a neo-Darwinian definition of learning by defining it as a process of adaptation and transformation. In this framework, learning is seen as a continuous and complex process of transformation that takes place within "a changing landscape of activity" (Davis & Sumara, 2003, p. 125).

Learning is a social process: CLT recognizes the social nature of learning and cognition and how knowledge is co-constructed within social interactions. From this perspective, cognition and mind are located within what Saito describes as "a broad framework comprising the historical and socio-cultural milieu in which human beings live" (Saito, 1996, p.400). Learning is a holistic process: CLT rejects a realistic conception of cognition and learning as a transmission of knowledge. On the contrary, it envisages learning as an interpretative process without the need for a reference to a pregiven (but on the contrary constructed) external reality and a non-separation between the learner and what is learned.

Swimming instruction and constructivism

In the international literature, interest in constructivism in physical education has mainly tended to focus on the teaching of sports games from the TGfU approach (e.g. Butler, 2006). This interest is primarily linked to the help that constructivism can provide in understanding and optimizing learning within dynamic physical (and social) environments (Light, 2009). Thus, the TGfU approach and its subsequent variations have attracted the attention of researchers and educators alike (Light, 2005).

Constructivism and its developments such as CLT (Davis & Sumara, 2003) or enactivism (Varela Thompson & Rosch, 1993) are thus able to guide the teaching of collective sports games. The dynamic character of the environment as well as its social nature fully justifies pedagogical approaches such as TGfU, "Game Sense" characterized by the importance given to reflection on action (we note here the implicit reference to the work of Piaget entitled "succeeding and understanding"), the debate of ideas (Gréhaigne, Richard & Griffin, 2005) and the collaborative formulation of ideas and tested and evaluated solutions to tactical problems. All these characteristics are thus congruent with the definition of a constructivist-oriented education as defined by Fosnot (1996).

However, a less marked interest in the development of an education oriented by constructivism can be highlighted with regard to individual sports emphasizing technical learning such as athletics and swimming. One of the possible explanations for this weakness is undoubtedly linked in part to the stable nature of the environment in which these activities take place and to the importance given to technique and repetition (Light & Wallian, 2008).

The idea that constructivism can be mobilized to propose a renewed teaching of techniques is also likely to be discouraged by the belief in an oppositional relationship between techniques and tactics that has dominated debates on the teaching of games since the 1990s. and which continues to influence current debates. Unlike team sports, in teaching a discipline like swimming, there is no questioning the importance of technique.

Although there are some tactical considerations in relays as well as over long distances, most of the teaching focuses on technique as a central, if not crucial, aspect (Rusnak, 2008). This does not mean, however, that it should be taught through drill or direct instruction. Beyond theoretical perspectives that see in these forms of instructions a form of illusion (Durand, 2008), one can only note the existence of some gray areas or some paradoxes, like the teaching of decision-making in team sport, in the guiding approaches to teaching in this field.

Let us give an example: while coaches and teachers perform exercises to develop feelings, these cannot be directly instructed in so far as the teacher or coach cannot make the swimmer feel the water somehow. In this context, he

can only provide experiences from which the swimmer is likely to feel something, but this requires an indirect teaching likely to be, in this context, oriented by constructivism. In the next section, we suggest some features that could provide a useful framework for renewed skills instruction guided by constructivist theories of learning. We do not propose here a prescriptive or rigid framework, but rather a framework of thought likely to constitute a tool for the teacher or the trainer based on seven pedagogical characteristics shared by learner-centred approaches and based on the questioning models for the teaching of team sports. This is followed by two practical examples of this type of pedagogy in teaching swimming.

A pedagogical framework for teaching swimming

While acknowledging significant variations in teaching practices, individually, or more broadly internationally, it is possible to recognize a traditional style of teaching and coaching in swimming. This tends to favour direct instructions, to limit interactions between swimmers or between the teacher and swimmers, and to limit in terms of communication these latter interactions to instructions. While in groups of young swimmers, teaching and training emphasize technique, the focus quickly shifts to the physiological aspects once swimmers are engaged in more serious competition. This translates into a heavy commitment in terms of time and energy among swimmers (Lang & Light, 2010). This approach to teaching refers to the idea that the swimmer is a "mute machine" (Light & Fawns, 2001) and is underpinned by an objectivist vision of knowledge where the acquisition of this knowledge is ultimately of the transmission between the teacher or coach and the swimmer.

Under this approach, swimmers become dependent on the teacher for feedback and instruction and are ultimately discouraged from becoming intellectually engaged in their discipline by remaining locked into a form of detrimental heteronomy. Alternatives to this traditional approach to teaching in team sports, such as TGfU (UK), Game Sense (Australia) and Tactical Games (USA) or Pedagogy of Tactical Decision Models (France) employ a pedagogy centred on the learner and based on a student inquiry activity. While these alternatives differ in several aspects, they do share some common characteristics.

They all propose to (1) design a physical environment as a major educational tool; (2) mobilizing a form of questioning between teacher and student to stimulate reflection on action; (3) provide indirect, i.e. non-prescriptive, instruction; (4) fostering communication between students and between students and the teacher, where language plays a central role; (5) promote reflexivity; (6) rely on collective problem solving based on the formulation of tested and evaluated solutions; (7) connect problems and solutions on the basis of the

formulation of principles, rules of action or what Fosnot (1996) calls "big ideas". Even if the teaching of team sports differs greatly from that of the teaching of swimming, the identification of these seven principles is likely to make it possible to usefully guide the teaching of swimming, like that of other sports disciplines.

These seven principles reflect constructivist perspectives on learning as well as proposals for certain propositions developed from constructivism, such as situated learning (Lave & Wenger, 1991), enactivism (Varela, Thompson & Rosch, 1991) or even CLT (Davis & Sumara, 2003). Approaches to teaching that share most of these characteristics can be characterized as constructivist-oriented, with the degree of variation depending on how similar the teaching is to these principles.

The style of teaching offered in swimming is in this context more one of guided discovery than problem solving (Mosston & Ashworth, 1986) insofar as the emphasis is placed on understanding the technique. Ultimately, this style of teaching is not completely guided by constructivist principles that place more emphasis on forms of open inquiry that are more of a problem-solving approach (Fosnot, 1996; Light & Wallian, 2008). This style is nonetheless oriented by constructivist ideas and consistent with the three key principles identified by Davis and Sumara (2003) in their CLT.

In principle, this approach to teaching swimming encourages swimmers to understand why they are using a technique and not simply to understand how to implement it. In this framework, the emphasis is on understanding based on the understanding of principles and rules of action, as in the TGfU approach.

However, significant differences remain. While in teaching team sports the principles are related to the manipulation of space and time, the technique and detail of its execution in swimming is associated with two fundamental concepts of swimming: (1) reducing resistors; (2) increasing propulsion. The linking of the techniques used, and these principles appears capable of enabling swimmers to develop a conceptual understanding of their swimming and constitutes a knowledge base comprising bodily and rational knowledge, as well as a conscious understanding developed from language. It is from this knowledge gradually incorporated through experience that swimmers are likely to interpret what the teacher says to them, what they feel and what they do in the water to develop in as autonomous swimmers capable of asking and elucidating questions on their own.

As in the teaching of team sports, the relationship between body and mind expressed in the relationship between language and action is a crucial question, and illuminates the relationship between an actual, embodied and unconscious knowledge and a rational, conscious and articulate knowledge (Light & Fawns,

2003). Teachers design learning experiences by introducing an obstacle designed as a problem to be solved, allowing time for swimmers to adapt based on adaptation and reflection on action.

The teacher asks the swimmers to reflect and interact with each other to identify the problems and discuss the solutions they have implemented based on their reflection on the action. The next sequence consists of evaluating solutions, discussing these solutions and refining them. These sequences are implemented in small groups who then present them to the whole class.

Throughout the discussions, swimmers are encouraged to relate problems and solutions to the key principles of swimming: reducing resistance and improving propulsion. To facilitate this learning, the following examples incorporate the seven pedagogical characteristics identified as common to learner-centred team sport pedagogies.

RESEARCH METHODOLOGY

Study case 1: The second butterfly wave

This example centers on improving the technique involved in the second butterfly undulation by developing a better understanding of why it is performed and how it fits into running, its primary function being to provide thrust allowing the exit of the head for the inspiratory phase. This example is based on the teaching experience of the author of this article with a small group of competitive swimmers aged between 13 and 16, in Cluj-Napoca. Romania as part of a demonstration of the pedagogy that we argue in this article.

After a warm-up, the swimmers were organized into small groups of two swimmers per line and they were asked to swim the butterfly with one arm by breathing from the front and not from the side. We then asked them how they felt swimming in this particular situation which induced a reduction in propulsion, and to identify the particular difficulties experienced. Most swimmers mentioned difficulty in inhaling as they had difficulty getting their mouth out of the water. We then asked them how they could overcome this problem by guiding them to get an answer about the ripple. We then asked them to identify which undulation was problematic in this situation (there are two undulations per butterfly cycle).

After a discussion with the whole group on this subject, we asked each pair of swimmers to work together for five minutes to discuss, develop solutions to this problem, test them, and evaluate which wave was the most effective and how it should be done. We then asked them to teach each other (Mosston &

Ashworth, 1986) the solutions found for five minutes as well. This involved one swimming while the other guided the work of their pair through observation and by making comments and suggestions before switching roles afterwards. Following this, we brought together the team of eight swimmers to collectively discuss their experiences and asked them to share their findings with respect to the principles of thrust/propulsion and resistance reduction. We ended the session by asking them to perform a full stroke butterfly, asking them to focus and embrace the changes in their second wave, and finally asking them how they felt after the procedure. This sequence can be completed in 20-30 minutes even with a large group of swimmers.

Study case 2: Developing the Sensation of Water

This example reports on an observation made with a coach working with swimmers aged 8 to 12 in a competitive group in Cluj-Napoca, Romania. Developing sensations is an important aspect of swimming correctly, especially in breaststroke. The sensations allow the swimmer an interpretation and an adjustment of his kinesthetic experience which implies an understanding and an implicit learning, that is to say incorporated, which develops over time. However, as important as this sensory experience may seem, this "meaning" is a relatively vague concept for the teacher or coach. Like the "sense of the game" for high-level team sport players, this sensitive aspect of swimming corresponds to a grey area for coaches and teachers: it cannot be developed from instructions direct and is often seen as an innate quality in many teachers or coaches (Light & Evans, 2010). If feeling cannot be taught with direct instruction, coaches design situations in which swimmers have particular experiences from which they learn by doing, and in which feeling and sense experience are the central aspect of learning. While these situations are commonly referred to as "exercises" by teachers, however, it does not involve a simple repetition, a simple practice of technique.

These situations help develop the sense of water and are designed for swimmers to have particular kinesthetics experiences to interpret and use to improve their swimming. One of these situations proposed in the teaching of the breaststroke consists in proposing to the swimmers to perform a sculling movement to propel themselves to feel the ideal positioning of the hands and forearms at the beginning of the arm movement ("front scull").

At the same time, swimmers are asked not to use their legs or in a limited way, possibly by offering them the use of a pull-boy (a video of this type of situation can easily be found on the internet, by example: http://www.youtube.com/watch?v=XIhyw-uAXfo). The problem to be solved for the swimmer then consists in advancing in the most efficient way possible by using only the beginning of the

stroke of the arm in breaststroke. This situation emphasizes the importance of feeling the propulsion achieved during the first part of the stroke and challenges swimmers to execute it efficiently in order to compensate for the imposed constraints. It develops the sensitivity between the forearm, the hand and the water through a process of problem solving exploring the different efficient ways of performing these actions from sensations more than through a conscious cognitive process. Teachers in this setting do not generally offer technical advice, but rather rely on swimmers to develop a mobilizable sculling sensation in the breaststroke.

This situation allows a better feeling of "catching" and the movement of the hands and forearms through the water. This involves a pre-reflective form of consciousness which can be seen as a bodily adaptation or a form of reflection in action (Varela, Thompson & Rosch, 1993). Typically, this type of situation set up by the teacher does not go beyond structuring the experience of the swimmer by performing the exercise. A pedagogy oriented by constructivism would make it possible in this context to prolong and optimize learning. This would involve, for example, asking swimmers to reflect on their experience to build a conscious understanding that can be shared among peers through language. This dialogue then serves the maximization of the thrust which affects both the technical aspects of the scull, but also the sensitive aspects related to the use of this technique. Contrary to a widespread idea in this context, young swimmers are able to describe their sensory experience and share it via language (e.g. Lémonie, 2009) and it is on this possibility that such a type of pedagogy can develop.

RESULTS AND DISCUSSIONS

Even if the first of the examples focuses on technical acquisition and the other on the development of sensations, each of these two practical examples shares the seven pedagogical characteristics of a pedagogy oriented by constructivism as we have been able to describe them. They involve the teacher constructing situations designed to facilitate particular learning and experiences and the swimmer's understanding of their swimming. In both cases, this involves imposing a constraint that the swimmer must overcome, and which involves an exaggeration, as suggested by one of the principles of the TGfU approach proposed by Griffin and Patton (2005).

This is what Davis and Sumara (1997) call an "enabling constraint", that is to say a constraint allowing (enabling) learning. This also implies the use of certain rules by the teacher with regard to how a swimmer can compensate for this constraint so that the teacher can design, structure the situation, but also

guide and encourage learning based on this type of experience. Swimmers are also encouraged to reflect on this experience, which according to Dewey (1997) appears as a second form of experience. They are questioned individually and collectively to stimulate their reflection (individual and distributed) and their dialogue rather than questioned on what they should do, which limits reflection and interactions. They are engaged as active learners rather than treated as passive receivers of objective knowledge. They are encouraged to form small groups to engage in the debate of ideas (Gréhaigne, Richard & Griffin, 2005), formulate strategies and solutions, test them, evaluate them and present them to the class (Fosnot, 1996). This involves interpreting from their previous experiences and interacting with others to build and bring out both their understanding and new knowledge. This refers to a neo-Darwinian conception of learning as a process of change by adaptation suggested by (Piaget, 1974) as well as to one of the three principles of complex learning theory (Davis & Sumara. 2003).

After the setting up of situations offering experiences allowing the emergence of particular problems, the teacher asks questions which, even if they are designed to bring out a predetermined learning, can be of a very free nature, like Wright and Forrest (2007) argue the need for it in the teaching of team sports. At least initially, they should be open in nature (Carlsen, 1991). Swimmers are asked about the key concepts ("big ideas") of reducing resistance and increasing propulsion and thrust.

Understanding the importance of these concepts and how any technique relates to them is likely to enable swimmers to become self-directed learners who understand why a technique is performed in a certain way and who develops reflection in action. If young swimmers understand why they perform a technique in a certain way in relation to key swimming concepts they can build an experience from which, later, more complex instructions can be interpreted and adapted to their own way of life. swimming as a process of production of meanings.

By understanding, we mean not only the ability to reflect and articulate knowledge, but also the idea of embodied knowledge and its emergence. The conversation (Light & Fawns, 2003) between these two ways of knowing allows swimmers an in-action and after-action reflection to take that experience to a reflective level of consciousness for conceptual considerations. This helps to develop young swimmers as independent learners. Of course, they retain the benefit of the assistance of the teacher (or coach) and the social interactions with their peers in which they are actively engaged during the learning process.

The pedagogy proposed here engages swimmers in learning and promotes their ability and inclination to interpret, to work from what the teacher says, to mobilize their reflexivity and to become autonomous learners.

In swimming instruction, this involves more of a teaching style that leads to discovery rather than a problem-solving style (Mosston & Ashworth, 1986) where students are guided to discover predetermined techniques, but where the teacher must be open to new ideas and new solutions. In this sense, the pedagogy that we suggest in the context of this article reflects many of the characteristics of a pedagogy oriented by constructivism as suggested by Fosnot (1996) and relies heavily on the creativity of the students. It promotes experiences and social interactions in which learners face and adapt to physical challenges reinforced by the social aspects engaged through the conversation between an experience of a reflective body and the generation of a dialogue that the body expressed in speech (Light & Fawns, 2003).

CONCLUSIONS AND THE IMPLICATIONS FOR YOUTH SWIMMING

The pedagogy suggested in this article expresses a significant departure from traditional approaches to teaching and coaching. This involves challenges quite similar to those faced by coaches or teachers engaged in the teaching of team sports in physical education and who try to integrate the TGfU approach (Butler, 2005; Light, 2004).

Transforming one's teaching, from a teacher-centered approach to a student-centered approach, implies a change in the role of the teacher: instead of prescribing and directing learning, this change of role implies that accompanies and facilitates student learning. In activities such as swimming where there is a strong focus on technique, this transformation of teaching represents a significant challenge.

For teachers this should not constitute too difficult an obstacle if they are able to draw on and draw from their own experience in teaching other sports disciplines involved in physical education training curricula and where pedagogy involves a learner-centred and inquiry-based approach. However, this obstacle is more delicate for coaches working in an activity characterized by significant control by the coach, reflecting a conception of athletes considered as "dumb machines" (Light & Fawns, 2001).

The approach suggested in this article is also more time-consuming than a traditional approach to teaching but works as a valuable investment for students. Its adoption implies a long-term vision on the part of teachers, coaches and possibly other people involved such as parents. Furthermore, we are not suggesting that each lesson should follow the lesson structure we have outlined

and outlined. Each of the activities that we have proposed in this article takes about twenty minutes and this approach can also be mobilized only when necessary. In a group of competitive swimmers, perhaps it is appropriate to suggest this form of pedagogy at the start of the season before the intensity of training increases. For school-based teaching, however, this approach can be seen as both a good way to have students build their strokes as well as a way for students to learn how to learn.

Young swimmers who learn this way develop a deep understanding of technique and are likely, by becoming true self-directed learners, to identify and correct any technical problems and adapt changes in their technique to their own style. This should be rewarding for coaches, teachers and swimmers alike, although this more egalitarian relationship that promotes swimmer empowerment can be experienced as relatively uncomfortable.

The types of training offered in the training to which aspiring swimmers had to submit may have led to the abandonment of the practice because of the forbidding and boring nature of the type of teaching offered (see for example, Gould, Feltz, Horn & Weiss, 1982; Lang & Light, 2010). This is not just related to the intensive nature of the training, but also to the fact that traditional approaches do not promote intellectual engagement even when adolescents are curious and ask questions and feedback about what they are doing. The pedagogy that we advocate in this article is likely to make the practice of swimming more interesting and exciting in so far as it involves swimmers intellectually in understanding the how and why of their actions. This pedagogy makes them think before, during and after the action, and press the button for the brain to start working.

Helping swimmers to find in learning, to engage in dialogue with their line partners and with the teacher or coach is likely to allow the production of an intellectual and social environment which contrasts with formations where the pupils do not just reproduce, repeat and watch the blue line at the bottom of the pool length after length, day after day. In addition to helping to develop one's technique and improve one's swimming, this form of pedagogy contributes to combating the worrying disengagement from practice at the start of adolescence (Gould et al., 1982). The main problem with the adoption of this type of pedagogy is ultimately the type of more egalitarian relationship that it promotes between the teacher and the swimmers, and which can be experienced as uncomfortable. It is also possible for coaches and teachers to struggle with the development of autonomous learners.

As Lang and Light (2010) suggest in a study of swimming coaches, the preference for high volume training may result from insufficient knowledge of technique on the part of the coaches. Although coaches can develop their own

understanding of technique with this type of pedagogy, the fact remains that the understanding required to engage in a productive dialogue with swimmers can constitute a major obstacle to the adoption of such pedagogy. Even if there are some obstacles to the implementation of this type of pedagogy, we have highlighted in the context of this article all the benefits it allows for young swimmers. If this approach is adopted within the framework of the training of coaches and in the support of swimmers in the youngest categories, it would constitute an ideal preparation for swimmers wishing to engage in competitions.

The less emphasis on physiological aspects and competition in these age categories is thus likely to provide a useful space to engage children intellectually in swimming and to develop a better understanding of the technique by promoting an open mind and curious. If the construction of swimmer education relied on constructivism-oriented pedagogy as we suggest, swimmers aged 14 to 15 could rely on a well-established knowledge and understanding of swimming and would demand careful attention, less sustained than younger swimmers.

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STUDIA UBB EDUCATIO ARTIS GYMN., LXVIII, 3, 2023, pp. 109-122
(RECOMMENDED CITATION)
DOI:10.24193/subbeag.68(3).27

ISLAND PEAK – A POPULAR DESTINATION FOR MOUNTAINEERING IN THE HIMALAYAS. METHODOLOGICAL AND PRACTICAL ASPECTS

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Received 2023 September 4; Revised 2023 September 28; Accepted 2023 October 2nd; Available online 2023 September 30; Available print 2023 November 30.

ABSTRACT. Island Peak is located in the Solu-Khumbu region of the Himalayas (Nepal), and is a destination for beginner climbers, for acclimatization (at the altitude of 5000-6000 m), and training (practicing techniques for moving on exposed rock and ice, traversing crevasses on metal ladders, climbing on fixed ropes, moving on ice ledges, abseiling). The popularity of the massif is because it was noticed and climbed for the first time by members of the British expedition in 1953, but also from other causes, such as: easy access on the Dinboche-Chukkung-PareshayaGyab route; the short and relatively easy standard ascent route, but with enough technical challenges (slope, exposed rock, ice plateau with crevasses, ice wall, and exposed rock, narrow ridge with ice ledges), the passage of which is good training for climbing peaks above 7000 m and testing climbing skills; the proximity of the southern face of the Lhotse Peak; scenic perspectives towards Lhotse summit (8516 m), to the Imja, Lhotse Shar, and Lhotse glaciers, to the Baruntse ridge (7000 m), and the iconic Ama Dablam Peak (6856 m).The basic work is the result of direct research carried out by the author on the Island Peak massif and highlights, on the one hand, its geomorphological features, and on the other hand, the methodological stages of organizing and carrying out an expedition on this peak, relevant from sport and medical point of view.

Keywords*: climbing, trekking, mountaineering, Everest Base Camp Trek, summit day.*

REZUMAT. ***Island Peak – o destinaţie populară pentru alpinism în Himalaya. Aspecte metodologice şi practice.*** Vârful Island Peak este situate în regiunea Solu-Khumbu, din Munţii Himalaya (Nepal) şi reprezintă o destinaţie pentru

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alpiniștii începători, pentru aclimatizare (pe nivelul altimetric de 5000-6000 m) și antrenament (exersarea tehnicilor de deplasare pe rocă expusă și pe gheață, traversarea crevaselor pe scări metalice, cățărare pe corzi fixe, deplasare pe cornișe de gheață, coborâre în rapel). Popularitatea masivului este data de faptul că a fost remarcat și urcat pentru prima dată de către membrii expediției britanice din 1953, dar și din alte cauze, cum ar fi: accesul ușor pe ruta Dinboche-Chukkung-PareshayaGyab; traseul standard de ascensiune scurt și relativ ușor, dar cu suficiente provocări tehnice (pantă, rocă expusă, platou de gheață cu crevase, perete cu gheață și rocă expusă, creastă îngustă cu cornișe de gheață), a căror parcurgere reprezintă un bun antrenament pentru ascensiunea pe vârfurile de peste 7000 m și testarea abilităților de cățărare; proximitatea feței sudice a vârfului Lhotse; perspectivele scenice spre vf. Lhotse (8516 m), spre ghețarii Imja, Lhotse Shar și Lhotse, spre creasta Baruntse (7000 m) și spre vârful iconic Ama Dablam (6856 m). Lucrarea de bază este rezultatul cercetărilor directe efectuate de autor în asupra masivului Island Peak și evidențiază, pe de-o parte, trăsăturile geomorfologice ale acestuia, iar pe de altă parte etapele metodologice de organizare și desfășurare a unei expediții pe acest vârf, relevante din punct de vedere sportive și medical.

Cuvinte cheie: *alpinism, trekking, mountaineering, Everest Base Camp Trek, summit day.*

INTRODUCTION

The Himalaya-Karakorum mountains represent the highest mountain system in the world, which aroused the curiosity of climbers at the beginning of the 20th century when the first attempts to climb Everest (8848 m) took place. After 1953, when Tenzing Norgay and Edmund Hillary reached the summit of Everest through the Khumbu Valley, and the South Col, and after 1960, when a Chinese expedition reached the summit of Everest through Tibet, and the North Saddle, a socio-economic phenomenon was opened and sport that has grown over time, reaching today to be considered mass tourism. One by one, between 1950 and 1964, all 14 peaks of 8000 m were conquered, then moving on to the peaks of 7000 m and 6000 m.

As the ascents of Everest and 8000 m peaks multiplied, so did the criteria of sports performance, such as:

- the first climber on the summit;
- the first to reach all the peaks of 8000 m;
- the first to reach all 8000 m peaks in a certain period;
- the first to reach a peak of 8000 m in winter;
- the first to reach the top without additional oxygen;

- the first climber from a country to reach a peak of 8000 m;
- the first expedition from a country to reach a peak of 8000 m;
- the first mountaineer to reach the peaks of 8000 m several times;
- the mountaineer who reaches a peak of 8000 m without the help of a guide;
- the youngest climber on a peak of 8000 m;
- the oldest climber on a peak of 8000 m;
- the first woman on an 8000 m peak;
- the first woman to climb all 8000 m peaks;
- the ascent without additional oxygen;
-discovering a new route to a peak.

The commercial dimension of mountaineering in the Himalayas, in recent years, includes, in addition to the ascent of the 8000 m peaks, trekking, on certain routes, to the Base Camps of the 8000 m peaks (Everest Base Camp Trek, Annapurna Base Camp Trek, Cho Oyu Base Camp Trek, Ama Dablam Base Camp Trek, etc.), as well as the ascent of 5000-6000 m peaks (Gokyo Ri-5360 m, Labouche-6135 m, Island Peak-6189 m, Mera-6476 m, etc.). Thus, numerous mountain tourism agencies have appeared in the countries that own the high mountains (Nepal, China, India, Pakistan), but also in other countries (UK, USA, etc.), which organize guided tours and guarantee the success of these recreational activities and sports.

In the present paper, based on personal experiences, the Island Peak massif (6189) is presented as a destination for novice climbers and training before ascents of 8000 m peaks. The peak was noted by members of the British Reconnaissance Expedition in 1951 (Eric Shipton, Edmund Hillary) and used as an acclimatization ground by the members of the 1953 expedition (Charles Evans, Alfred Gregory, Charles Wylie, Norgay Tensing), who named it "Island Peak", and the main peak was reached in 1956 by German mountaineer Hans-Rudolf Von Gunten.

LITERATURE REVIEW

On the Khumbu region of Nepal, and the summit of Everest, numerous researches have taken place, over time, concerns, among others, the sustainability of activities (Beza, 2010; Elvin et al., 2020), the assessment of the degree of pollution (Imogen et al ., 2020), glaciers and climate change (Owen et al., 2009; King et al., 2020; Mayewski et al., 2020), geographic risks (Miner et al., 2020), weather-climatic aspects (Perry et al., 2020), ecological aspects (Spoon, 2011), cultural and ethnographic aspects (Norgay, 2004; Sinanan, 2022), the evolution

of Everest ascents (Wylie, 1954; Salisbury et al. al., 2020), medical and sports aspects (Cerretelli, 1976; West et al., 1983; West, 1984; Westerterp et al. 1992; Grocott et al., 2009; Karinen, Tuomisto, 2017; Huey et al., 2020, Woodward, 2020), and tourism aspects (Stevens, 1993; Egan, Stelmack, 2003; Sanjay, 2015; Jacqueme, 2017; Sun, 2021).

In recent years, similar research efforts have intensified due to several s equipment, and information technology (internet, telephony, applications), the intensification of tourist activities and, implicitly, the increase of pressure on mountain environment, support of research projects by certain organizations (e.g. National Geographic and Rolex Perpetual Planet Everest Expedition, 2019), etc.

There are only tangential references to Island Peak, in works on Everest ascents (Wylie, 1954; O'Connor, 1989). Therefore, there is a considerable bibliographic base, about Mount Everest and the surrounding geographical area, which we used to interpret various geographical and sports aspects to develop the present study.

METHODOLOGY

To carry out this study, the following methodological steps were completed:

-consultation of specialized literature and some cartographic materials, related to the Himalayas Mountains, the Everest Base Camp Trek route, and the area around Everest Peak, including the Imja Valley and the Island Peak;

-preparation of the research expedition in the Khumbu region (routes, equipment, training);

-carrying out some field research, in the Solu-Khumbu region of the Himalayan Mountains (Dudh Kosi Valley, ImjaKhola Valley, Island Peak massif), and an ascent to the top of Island Peak in April 2023.

STUDY AREA

Island Peak/ImjaTse is located in the Himalayas, in the eastern part of Nepal, in the Eastern Development Region, Koshi Province, Solukhumbu District (fig. 1). From a geomorphological perspective, the peak is located on a secondary ridge, which detaches from the Lhotse ridge, bounded by the Imja glacier to the south, Lhotse glacier to the west, and Lhotse Shar to the east (fig. 2).

The geographical coordinates of the peak are: 27° 55′ 14.84″ N, 86° 56′ 6.58″ E, and its name was given by some members of the British Expedition of 1953 because it resembled an island surrounded by a sea of ice. In 1983, the peak was renamed ImjaTse, but the term Island Peak is more commercial and remains more popular among climbers.

Access to Island Peak is via the Lukla-Namche Bazar-Tenboche-Dinboche-Chhukung-PareshayaGyab route, with a paved road and hiking trail.

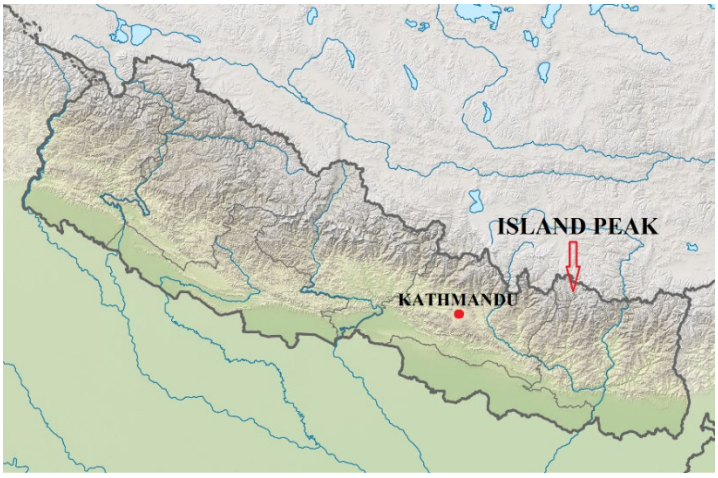

Fig. 1. Geographical position of Island Peak in Nepal (source: with changes)

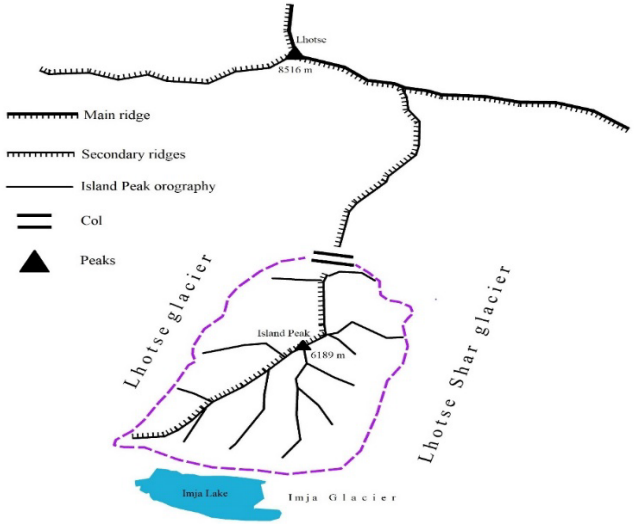

Fig. 2. The geomorphological location of Island Peak in mountain area (source: Island Peak Climbing Map, 1:40000, with personal contribution)

RESULTS AND DISCUSSION

The research carried out in the Solu-Khumbu region considered several areas, such as the geography of the region and the Island Peak massif, the tourist organization of the massif, and the sports and medical aspects related to the ascent of the Island Peak peak.

1. Geomorphology of the Island Peak massif

The Island Peak massif represents the terminal part of a secondary ridge detached from the main Lhotse Shar peak in the SSW-NNE direction and is bounded by the Imja Pass (5700 m) to the SSW, and the Lhotse glaciers to the SE, Lhotse Shar to the NW, and Imja to the N.This secondary ridge is slightly sinuous and very narrow, covered with an ice ledge that spills over the SE slope and descends to an altitude of 5440 m. From here, the ridge breaks free of the ice, takes on a rounded appearance, and plunges into the Imja Valley (fig. 3).

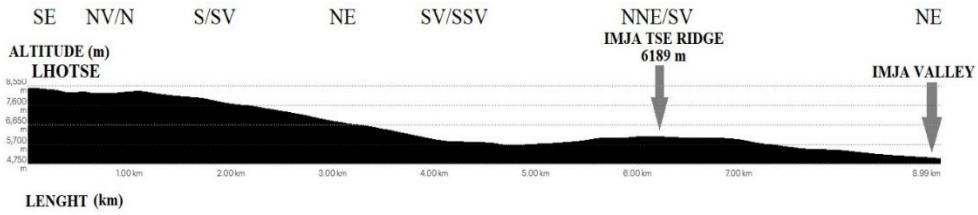

Fig. 3. The longitudinal profile of Lhotse-Island Peak Ridge
(source: Island Peak Climbing Map, 1:40000, with personal contribution)

Island Peak (6189 m) represents the highest part of the massif, has a narrow and elongated configuration, and is a sub-peak of the parent peak Lhotse, from which it has a prominence of 469 m (fig. 4).

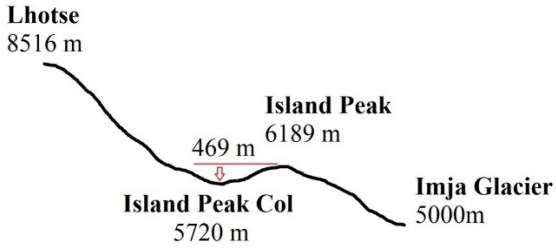

Fig. 4. The topographical prominence of Island Peak
(source: Island Peak Climbing Map, 1:40000, with personal contribution)

From the top, a series of secondary peaks emerge, oriented divergently, towards the surrounding valleys, delimited by several cryo-glacial ridges. The SE flank of the peak and the summit are covered with ice, and the NE flank has ice-marked sectors of steps, and crevasses, and sectors of exposed rock. Also here, below the peak, there is a crevasse ice plateau, spread between 5800 m and 6000 m (fig. 5).

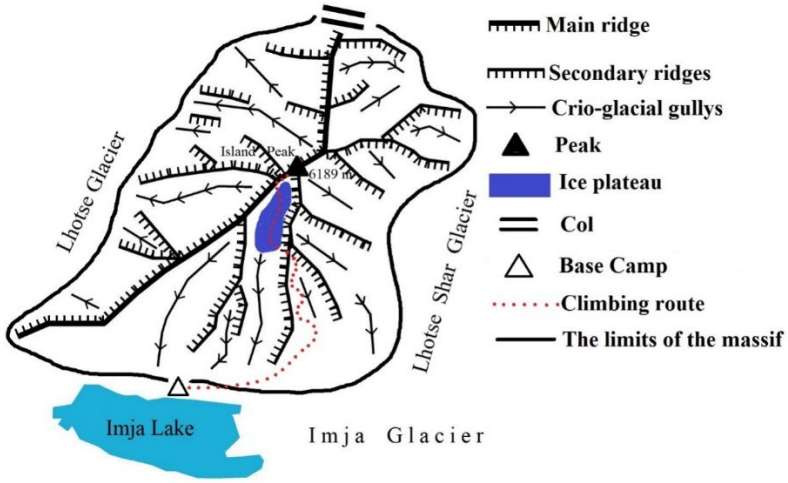

Fig. 5. The geomorphologic map of Island Peak
(source: Island Peak Climbing Map, 1:40000, with personal contribution)

2. Tourist organization of the Island Peak massif

Located in the vicinity of Mount Everest and Mount Lhotse, the Island Peak massif is a destination frequented by climbers for acclimatization, training, and scenic views of the south face of Lhotse Peak, Baruntse Ridge, Imja Valley, and Ama Dablam (fig. 6). The tourist infrastructure present here consists of:

-tourist trail on the route Dingboche-Chukkung-Imja Valley-PareshayaGyab Base Camp;

-PareshayaGyab base camp (5080 m), equipped with tents (fig. 7);

-tourist trail on the route PareshayaGyab-Imja Valley-Upper Camp (5600 m)-Island Peak;

-tourist trail on the route PareshayaGyab-Inja Valley-Imja Col-Upper Camp (5600 m)-Imja Ridge-Island Peak;

-metal ladders placed over the crevasses on the Imja ice plateau (5800-600 m);

-fixed ropes placed on the NW wall below the summit, with exposed rock and ice, and on the ice ridge;

-marking of Island Peak with multi-colored flags.

Fig. 6. Island Peak seen from Chukkung
(source: author)

Fig. 7. Pareshaya Gyab Base Camp
(source: author)

3. Sports aspects

a) The preparation of the expedition involved the following stages:

1) Physical and mental preparation:

-training for physical condition (endurance trekking with a backpack, scrambling, running, cycling);

-swimming underwater to adapt the body to the lack of air, and increase lung capacity;

-performing some exercises to increase the pulmonary capacity of the lungs;

-practicing different motor skills (walking uphill, walking downhill, jumping, climbing, maintaining balance on uneven ground, and narrow surfaces);

-mental preparation for survival at high altitude: prior information about the living conditions in the Himalayas, about altitude sickness (symptoms, prevention, treatment), about the various conditions that can appear on the route, at high altitude, about the way of eating, about traveling on rocky terrain, and on ice, about the culture, and customs of the locals;

2) Choosing the optimal equipment, which is useful (comfortable and necessary for protection against low temperatures, wind, moisture, and precipitation), functional (eliminates stress, keeps you safe), and light (reduces fatigue while traveling on the trail).

b) During the expedition, it was as follows:

-the use of travel equipment on rocky, soil, and icy terrain;
-systematic acclimatization;
-dosage of effort;
-proper nutrition;
-hydration;
-rest;

c) The ascent to the peak had the following stages:

1) The acclimatization and training stage, during which a fixed rope climbing workshop with a blocker, and abseiling was organized in the base camp;

2) The stage of travel to the summit, after midnight, from the PareshayaGyab Base Camp, where travel techniques were used on the exposed rock, and the ice (moving with corners, traversing crevasses equipped with fixed rope railings, climbing on ropes fixed, abseiling);

To reach the summit, there are two routes. For the present study, the normal route was followed, starting from PareshayaGyab Base Camp (5080 m), located on the lateral moraine of the Imja Glacier, ascending through a stony

valley on the NW flank, and reaching the base of the ice plateau below the peak. After traversing the ice plateau, crossing several crevasses, equipped with metal ladders, the route approaches the rock, and ice wall on fixed ropes to the summit, then follows the ridge marked by fixed ropes to the summit.

3) Summit day and photo session, in the morning;

4) The withdrawal stage towards the PareshayaGyab base camp;

d)Recovery after climbing consisted of:

-light walks, light food, hydration, rest;

4. Medical aspects

During the expedition, acclimatization was done gradually, on the route Lukla (2860 m)-Namche Bazar (3340 m)-Tenboche (3867 m)-Dinboche (4400 m)-Chukkung (4700 m)-PareshayaGyab (5082 m). As such, the altitude sickness was greatly alleviated, the present symptoms being: slight headache and dizziness, feeling tired, the need to hyperventilate, reduced appetite, insomnia, and during the ascent to Island Peak, on the 5600- 6189 m, the feeling of fatigue and dizziness increased, and some abdominal discomfort was felt.

During the ascent to the top of Island Peak, the cardiac activity was monitored, based on the Huawei Health application, on the Android phone Samsung Galaxy A 53 5G, a fact that emerges from tables 1-4.

Table 1. Resting heart rate
(5082 m, PareshayaGyab-Island Peak Base Camp)

Member of expedition	Age	RHR b/m
Author	59	85

Table 2. Maximum heart rate

Member of expedition	Formula 220-age	Value of MHR b/m
Author	220-59	161

During the ascent from the Pareshaya Gyab Base Camp (5082 m) to the altitude of 6189 m, the value of the heart rate was 140-150 bpm, so below the limit of the maximum heart rate, which, however, denotes an intense effort at an altimetric level unacclimatized (5000-6000 m).

Table 3. Backup heart rate

Member of expedition	Formula MHR-RHR	Value of BHR b/m
Author	161-85	76

In this case, the optimal heart rate during the ascent on the altimetric level 5082 -6189 m was (table 4):

Table 4. Optimal Heart Rate

Member expedition	BHR 75% b/m	RHR b/m	Value of OHR b/m
Author	80x75%=60	85	145

As seen in Table 4, an age-optimal heart rate was recorded below the maximum heart rate value and based on a sufficient heart rate reserve. However, the effort was intense, representing 90-93% of the maximum heart rate (fig. 8).

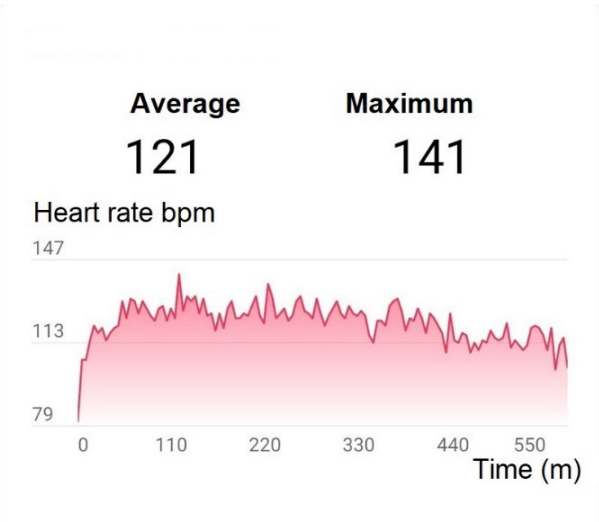

Fig. 8. Graph of heart rate during climbing Island Peak
(source: Huawei Health App.)

CONCLUSIONS

The Island Peak massif, located in the Solu-Khumbu region (Nepal), is a destination for beginner climbers, used for acclimatization (altitude level 5000-6000 m), and training (practicing moving on exposed rock, on ice, climbing on fixed ropes, descending in abseiling, traversing crevasses on metal ladders, equipped with rope railings).

The commercial character of the massif is given by:

-easy access on the Dinboche-Chukkung-PareshayaGyab route;

-the short and relatively easy standard ascent route, but with enough technical challenges (slope, exposed rock, ice plateau with crevasses, ice wall, and exposed rock, narrow ridge with ice ledges), the passage of which is good training for climbing peaks above 7000 m, and testing climbing skills;

-the proximity of the southern face of the Lhotse Peak;

-scenic perspectives towards Lhotse (8516 m), to the Imja, Lhotse Shar, and Lhotse glaciers, to the Baruntse ridge (7000 m), and the iconic Ama Dablam Peak (6856 m).

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