

"BABEȘ-BOLYAI" UNIVERSITY, CLUJ NAPOCA  
FACULTY OF PHYSICAL EDUCATION AND SPORT  
DOCTORAL SCHOOL OF PHYSICAL EDUCATION AND SPORT

***THE DEVELOPMENT OF SOCIAL COMPETENCIES OF STUDENTS THROUGH  
MEANS AND METHODS SPECIFIC TO ADVENTURE EDUCATION APPLIED IN  
PHYSICAL EDUCATION LESSONS***  
SUMMARY OF DOCTORAL THESIS

PhD supervisor:

PROF. UNIV. DR. GROSU EMILIA FLORINA

PhD student:

GANEA VIRGIL

2019

## Content

Abbreviations .....	viii
Figures .....	ix
Tables .....	xi
Introduction and argumentation of the theme .....	1
Hypotheses and research objectives .....	4
Limitations of the paper .....	5
Partea I THEORETICAL-SCIENTIFIC FUNDAMENTATION OF THE WORK .....	6
Capitolul 1 Adventure education.....	6
1.1. Defining adventure education and related domains .....	6
1.2. The beginnings of adventure education .....	10
1.3. Introducing adventure education into school .....	13
1.4. Objectives of adventure programs.....	15
1.5. Principles of adventure education .....	17
1.6. Principles for organising an adventure education program.....	23
1.7. Examples of adventure programs in school .....	32
Capitolul 2 Benefits of adventure education programs .....	37
2.1. Defining concepts.....	37
2.2. The results of adventure education research .....	42
2.3. Social behaviors and their connection to adventure education .....	51
Capitolul 3 Other important theoretical issues .....	57
3.1. Activities with potential to be included in an adventure program implemented during physical education lessons.....	57
3.2. Conclusions from the theoretical part .....	60
Partea a II-a RESEARCH METHODOLOGY AND PILOT STUDIES .....	61
Capitolul 4 Methodological approach.....	61
4.1. The premises of research.....	61
4.2. Purpose and objectives of the research .....	62
4.3. Research tasks .....	62
4.4. Stages of scientific approach.....	63
4.5. Research methods used .....	65
4.6. Description of measuring instruments used in the research.....	68
4.7. Adventure education activities used in research .....	75
4.8. Organising and conducting pilot research .....	94

Capitolul 5 Pilot study 1: Analysis of the effects of an extra physical education lesson based on games and initiatives done with middle school students.....	95
5.1. Purpose and objectives of the study .....	95
5.2. Hypotheses .....	95
5.3. Subjects .....	95
5.4. Methods and test tools.....	96
5.5. Running the study.....	97
5.6. Presentation and interpretation of data.....	98
5.7. Discussions in connection with the data .....	102
5.8. Conclusions of the pilot study 1 .....	103
Capitolul 6 Pilot study 2: The Effects of an Initiative-Based Learning Unit on High School Students .....	105
6.1. Purpose and objectives of the study .....	105
6.2. Hypotheses .....	105
6.3. Subjects .....	105
6.4. Methods and test tools.....	106
6.5. Running the study.....	106
6.6. Presentation and interpretation of data.....	107
6.7. Discussions in connection with the data .....	111
6.8. Conclusions of the pilot study 2.....	112
Capitolul 7 Final conclusions after the pilot studies .....	113
Partea a III-a PERSONAL RESEARCH REGARDING THE IMPLEMENTATION OF AN ADVENTURE EDUCATION PROGRAM IN SCHOOL .....	115
Capitolul 8 The methodological approach of the main research.....	115
8.1. Purpose, objectives and tasks of the main study .....	115
8.2. Main study hypotheses .....	116
8.3. Subjects .....	116
8.4. Tools and test methods used in the main study .....	117
8.5. The adventure education program implemented.....	119
8.6. Organization and deployment of the experiment .....	122
Capitolul 9 Presentation and interpretation of data.....	125
9.1. Data obtained by completing the ROPELOC self-evaluation questionnaire. ....	125
9.2. Data obtained by applying Johnson's modified Bass test for balance .....	147
9.3. Data obtained from the measurement of forearm strength by dynamometry.....	155
9.4. Data obtained from the MAST test of cardiovascular endurance .....	161

Capitolul 10 Discussions, conclusions and recommendations .....	166
10.1. Discussions after analyzing the results obtained with the ROPELOC questionnaire .....	166
10.2. Discussions after analyzing the results of the fitness tests .....	175
10.3. Conclusions and considerations based on the results obtained .....	178
10.4. Final conclusions .....	182
Bibliography .....	184
Annexes .....	208

### **Keywords**

Adventure education, initiatives, social competence, interpersonal skills, physical education, cardiovascular endurance, dynamic balance, strength

## **Introduction and argumentation of the theme**

For some time there has been an alarming increase in the number of Romanians, young or adults, whose behavior shows a total lack of respect for the environment, peers and society in general. These behaviors, called antisocial, prove that there are gaps in the education system in our country, and where parents fail, children can take an inappropriate direction in terms of their social development.

### **Defining the problem to be studied and motivating the choice of theme**

The passion for nature has often taken us on the mountain or in less accessible areas of Romania, where such antisocial problems do not exist or are very rare, and we have been unable to ignore a possible link between the social quality of the "mountain man" and his lifestyle. Given our own experience of life, and the luck of being educated in the spirit of the mountain and nature, we cannot help thinking that if more children have the opportunity to be exposed to those same kind of experiences that we have lived, perhaps, this tendency towards anti-social behaviors could be reduced or even stopped.

The in-depth study of the link between backpacking and antisocial behavior allowed us to get acquainted with adventure education, a form of education found in many countries, which has developed especially well in the United States of America, the UK and other Commonwealth countries, and whose main goal is personal and social development through adventure activities. The social skills, also called interpersonal ones, are the basis for the behaviors in society, and the personal ones refer to self-concept and the factors that determine it, a concept that also seems to influence the anti-social behaviors. Specialists in sociology have been able to link antisocial behavior to the lack of social skills, but they also found links between anti-social behaviors and an unhealthy self-concept. Literature tells us that anti-social students actually have problems to integrate because they perceive social situations wrong or do not have the skills to handle a particular situation. Developing such skills would allow them to manage situations and to function successfully in society.

Adventure education involves practical learning through activities that take the participant out of his comfort zone and, although used by people of all ages with similar outcomes, is especially suited to young people. This form of education is mainly implemented at international level by specialized organizations, but it has also managed to find its place in school curricula, especially through physical education. Even at the level of higher education institutions, the training of specialists in this form of education is done mostly in physical education faculties, either through integrated courses for a teacher's degree or as a separate field of study. Moreover,

the means of adventure education overlap and sometimes confuse with those of physical education or certain sports, even if it is not limited to them.

In Romania, adventure activities are quite widespread, but most organizations are limited to recreational programs or the development of specific skills necessary to practice the activities they offer. Although adventure education has also managed to reach Romania through international organizations such as Outward Bound or the Scouts, the difficulty of enrolling in the program (long waiting list) or their high costs still restricts the access of children and young people's to this form of education .

Given the promising results that studies show about the use of adventure therapy programs to redress offenders or children and young people with problematic behaviors, but also the intrapersonal and interpersonal benefits that adventure education programs have brought to young people in programs, we thought that the development of such adventure education programs in Romania would be beneficial in order to stop this growing trend of anti-social behaviors. In addition, the implementation of such programs in schools would allow the participation of all children in Romania without additional costs on their part, thus increasing the chances of controlling this phenomenon.

The research we want to do comes from the need to create a program model applicable in the context of Romanian education and the need to gather evidence to help convince the Ministry of Education about the value that such a program brings.

**The aim of the research** is to build an adventure education program to help prevent deviant behaviors among young people by developing intrapersonal and interpersonal skills in children. Given the predominantly physical form of adventure education activities, the already loaded program of the framework curriculum, and the way in which this form of education was implemented in other schools at an international level, we have decided that the program we are building will be designed to be implemented in physical education lessons. Moreover, aware of the shortcomings of the education system, we have taken upon us to build the program adapted to the Romanian reality, so as not to require hard to get or expensive resources, and to be easily implemented by the physical education teachers with a minimum of additional specialized training. If successful, our program will therefore add itself to the already existing international inventory of programs, providing a dynamic, but less costly alternative to existing programs.

In the main study, we want to verify the extent to which the built program has beneficial effects on the personal and social development of the participants, as well as to check to what extent this program can help to develop motor skills, thus motivating the introduction of such a program in lessons of physical education. We believe that our study would help complete the research field by integrating well with its needs. Regarding the physical effects on participants in

adventure programs, literature is very poor and specialists really recommend more effort in this direction.

The success of this program would increase the role of physical education and specialists in the development of children and young people, and automatically increase the importance of this subject, with all the benefits this can bring (such as more lessons of PE per week).

The **scientific originality** of the work is related to the fact that we build an adventure education program to be implemented in Romanian schools as an integral part of the curriculum, adapted to the realities of the educational system, but also to the quantitative research on the benefits of this program, which is a novelty in Romania and even makes an important contribution to international research through the study of physical benefits.

The **applicative value** of the paper is given by the adventure education program that can be adapted as a unit of learning within the physical education program or as a separate subject as part of the additional school curriculum, and can play an important role in diminishing the antisocial actions of students.

#### **Limitations of the paper**

In analyzing and generalizing the results of this study, it is important to consider all the factors that may affect the effectiveness of an adventure education program, as they will be presented in the theoretical foundation of the paper, especially the group of participants, or the personality of the individuals, attention and level of the teacher's involvement. The principle of voluntary participation, specific to these types of programs, allows the student to limit his involvement in activities, and this can have effects on the benefits gained, and the effectiveness of the transfer of skills to the real world is dependent on the teacher's ability to create the right context and guide the process for studying.

The group of subjects consists of pupils studying at a private school who had access in parallel and other modern methods of education, which is why it is recommended that the analysis of the final results be made in comparison with the control group.

Regarding the tests used, the ROPELOC test, although used to test intrapersonal and interpersonal skills in adventurous conditions, is nevertheless based on self-evaluation, and therefore all the limitations of this form of testing apply, including the tendency of subjects to overestimate themselves, so the interpretation of the final results should be done in the right context.

The paper is divided into 3 parts, theoretical foundation of the paper, research methodology and personal research, and is structured on chapters.

**Chapter 1** begins with the definition of Adventure Education as a branch of education dealing with the development of intrapersonal and interpersonal skills, and clarifies the relationship it has with fields such as ecological education, outdoor education, experiential education, wilderness education, fields from where it has been inspired and with which it is often confused. We need to recall that interpersonal relationships refer to the way in which two or more people relate in a group and intrapersonal refer to the way an individual relates with himself. In this chapter we also explain the differences between the various terms used to describe adventure programs such as adventure therapy, adventure programming, adventure recreation, and adventure development. Throughout the paper, the term adventure education will be used as a generic term describing all programs that have more than just recreation in mind.

In **subchapters 1.2 and 1.3**, we describe in brief the history of the emergence and initial spread of adventure education, beginning with the emergence of the Outward Bound program. The historic part is centered on USA, as here these programs have had a fantastic spread, but it also makes reference to Europe or Australia where the programs were successful. In subchapter 2 we talk about adventure education in general, while in the 3rd one we mention the first stages of the introduction of adventure education programs in school and the way they have evolved.

**Subchapter 1.4** outlines the objectives targeted by adventure-based programs, presenting the different classifications that specialists have considered. It is worth mentioning that this chapter refers both to the objectives of educational and development programs and to recreational or therapeutic programs. An important aspect highlighted in this chapter is that although physical development was one of Outward Bound's original goals, and adventure activities require physical involvement, physical development is generally not an objective of adventure education programs.

**Subchapter 1.5** describes the principles and theories that, according to the literature, explain the positive outcomes of adventure education programs. The important issues mentioned are:

- Learning through direct experience - a principle supported by Plato, Aristotle, Piaget and Dewey, which involves learning through repeated mistakes;
- Development through challenge - Principle explained by Bandura's Self-Efficacy Theory and Harter's Model of Perceived Competence, which is based on the fact that by overcoming tasks, individuals learn to overcome their self-imposed limits;
- Teamwork - explained by Vygotsky's social constructivist theory or Bandura's socio-cognitive one, which support the idea that learning is a social phenomenon;
- The need for adventure - explained by Csikszentmihalyi's flow concept;



- Risk, fear and anxiety - aspects closely related to each other, without which the dissonance needed for change is not created;
- Reflection and transfer - the true value of a program, which allows the use of learned lessons in other contexts as well.

**Subchapter 1.6** outlines the important aspects to be considered when organizing an adventure education program. Although the programs themselves may be very different, there are common elements to the programs that work. These aspects are:

- Environment - the key element is novelty, but natural environments are recommended because the consequences are unavoidable and apply to everyone;
- Activities - must be challenging, have a clear purpose and not be impossible for the participants to solve; in addition, activities must have an uncertain outcome, clear consequences, present risk, and require active involvement and voluntary participation;
- The risk - must be proportionate to the level of competence of the participants;
- Structure and length of the program - long programs are more effective, but success depends on the order of activities, which must progressively increase in difficulty;
- Targets set - must be clear; setting objectives for the individual and group is the first step in choosing the right activities and methodologies;
- The Group - the right size is somewhere between 7 and 15 members and operational rules have to be established before the start in order to create a relationship of trust and cooperation;
- Participants - although it is important to know the level of development of the participant, the most important aspect is voluntary participation;
- Leader – he is a bridge between the participant and the program and must have specific competencies to ensure deployment, safety and learning;
- Facilitation - there are eight models of facilitation that have developed over time, and 3 of which are indicated for adventure education programs; the facilitator has to capitalize on the context;

**Subchapter 1.7** makes a brief presentation of existing programs happening in other schools, highlighting the differences between them. The programs presented vary in terms of resources, location, duration, exposure to risk, spreading and learning potential, but most of them are integrated in the physical education component of that school. An important program is Project Adventure, the program that first introduced adventure education inside the school in an organised way,

**Chapter 2** focuses on the benefits of adventure education programs.

In **subchapter 2.1** are defined some of the concepts found among the benefits of this form of education, and considered important in relation to our work either because they are used in the research or because they are related to the objectives pursued. Concepts explained in this chapter are: intrapersonal skills, self-concept, self-efficacy, self-esteem, efficacy in life, resilience, locus of control, interpersonal skills (also referred to as relational or social), social competence, teamwork and leadership.

**Subchapter 2.2** makes an analysis of the research done on adventure programs. In order to be easier to follow, the benefits are grouped using what we consider to be the most practical organization among those presented in the literature:

- *Self constructs* - have emerged as a benefit early in the history of adventure education, and as such are found in many studies; among the benefits found, we mention the overall efficacy or self-efficacy, self-esteem, self-confidence, self-regulation or self-awareness; Neill (2002) calculated a small to medium effect size ( $ES = 0.34$ ) for outdoor education programs on aspects such as the self-concept;
- *New skills and abilities* - Although technical skills are the main skills acquired in adventure programs, they are not particularly pursued in research; research in the field has identified improvements to competences like problem solving, decision making, conflict resolution, critical thinking, resilience, planning, skills that help develop the independence of participants;
- *Values* - are usually stable over time, but adventure education can boast of changes in morality and ethics, spirituality, development of responsible behaviors and attitudes, or change to perspective;
- *Group benefits* - are an important aspect in programs for families, work teams or groups; improvements in group dynamics, trust, cohesion, team spirit and collective effectiveness have been observed.
- *Group-dependent benefits* - are most sought after because they help with the integration into society; adventure programs have proven to be consistent in developing communication skills, cooperation, teamwork, social skills, leadership, or even social competence as a whole;
- *Moods* - adventure activities seem to have an effect on reducing the effect of cognitive fatigue, which can further lead to improved academic results;
- *Metaanalysis* - refers to studies that collect the results of quantitative research to synthesize them and which use the effect size to give an overview; meta-analyzes in the

field have generally indicated small to medium effect sizes, which is close to the average of educational programs.

In **subchapter 2.3** we make the link between prosocial and antisocial behaviors and adventure education. Specialists have identified a link between anti-social behaviors and a lack of social skills, and have come to the conclusion that anti-social students actually have trouble integrating because they perceive wrong certain social situations or lack the skills needed to manage a particular situation, and for this reason they use hostile attitudes. In the same time, prosocial behaviors, which indicate care for the well-being of others, facilitate group living. Studies have shown that self-efficacy also has a positive impact on the ability to function in a prosocial way. Regarding the link with adventure education, it seems that it has become a tool for work with antisocial people and is often used in therapy with positive effects.

**Chapter 3** is just a presentation of the adventure education activities considered for the program we want to implement in school, namely rope courses and orienteering, then to present the conclusions drawn from the first part of the paper. The term *rope courses* is used to describe a broad category of activities that include warm up and bonding activities, icebreakers, trust activities, initiatives and low or high elements, and they seem to be the preferred option for programs taking place in urban areas. Orienteering consists of map or compass navigation activities and develops thinking and space orientation.

After going through several books, published papers and websites we drawn the following **conclusions**:

- There is an inversely proportional link between the level of relationship skills and the manifestation of anti-social behaviors;
- Adventure education was credited with the development of interpersonal and intrapersonal skills;
- Children and young people are happy to participate in adventure and adventure education programs;
- Because of the benefits they bring, many schools choose to implement adventure education programs;
- Typically, adventure education programs implemented in schools are included in the physical education curriculum.
- Initiatives are frequently found in adventure education programs, and along with suspended rope elements, they form the basis of urban programs.

- Though it has long been suggested that a longer program has more powerful effects on development, adventure education programs often last for only a week or a few weeks with a program of several hours each.
- The adolescence start-up period is appropriate for adventure education.
- To achieve a successful adventure education program, some important principles must be respected.

In **Chapter 4** we present the methodological approach of the paper, going through context, purpose, objectives, tasks, stages, methods, activities and testing instruments.

The context was stated at the beginning of the thesis and has been updated based on the conclusions drawn from the literature.

The purpose of the research is to verify whether participation in an adventure education program implemented during physical education lessons leads to the interpersonal, intrapersonal, and motor development of the participants.

In order to achieve this goal, several objectives have been outlined, including choosing the activities, selecting the test methods and instruments, verifying in practice the instruments, building of a program based on the results, and ultimately the determination of its effectiveness.

To achieve the objectives, work tasks have also been established, organized in several stages: study of literature, preparation of resources, pilot studies, main experiment, data analysis and writing the thesis.

The research methods used were: study of the specialized and interdisciplinary literature, the conversation method, the practical method, the observation method, the method of measurements by samples and tests, the experimental method, the statistical-mathematical method.

**Subchapter 4.6** describes the tools used in the research. The tools have been chosen considering the information available, their use in other studies, their usefulness, the quality of construction, and how well they match with the set objectives.

- Communicative Adaptability Scale - measures the ability to perceive interpersonal relationships and adaptation to interaction goals and behaviors;
- Prosocial Personality Battery - measures the tendency of an individual to think about the rights and well-being of others, to feel empathy and care for others, and behave in a manner that benefits others;
- Conflict Resolution - Measures two skills related to this issue
- ROPELOC - analyzes actions and behaviors that indicate whether a person is effective in some key life issues;

- Johnson's modified version of the Bass test - measures dynamic balance, but there is reason to believe it is also testing for static balance;
- Balance Board equilibrium test - measures static balance;
- Hand-Grip Dynamometry - measures the maximum isometric strength of the hand with a dynamometer;
- Multi-Stage Fitness Test - also known as Beep Test, it measures cardiovascular endurance.

In **subchapter 4.7** are described the activities chosen to be part of our adventure education program. *Specific games* generally have the role of relaxing the participants and activating them, with children always ready to play. *Initiatives* are key elements in the development of social skills. These activities are tasks to be solved with the help of all the members in the group. Initiatives can be static, so in the selection process we had this in mind and looked for more dynamic variations. *The rope elements* have an important role in the development of strength, but their adaptation in the form of initiatives has increased their importance in interpersonal development. *Orientation activities* have the advantage of being easily introduced into a physical education program because orienteering is already accepted and included in the optional curriculum. For orienteering, a variety of activities have been used to enable the students to apply map navigation skills as well as spatial orientation.

### **Chapters 5 and 6 describe the pilot studies.**

The 1st study, in **Chapter 5** follows the *Analysis of the effects of an extra physical education lesson based on games and initiatives done with middle school students.*

#### **5.1. Purpose and objectives of the study**

Through this pilot study, we **aim** to verify practically a number of important organizational aspects in order to prepare the final experiment, such as test tools, methods and means of work. For this purpose, the following **objectives** were outlined:

- Verify in practice the selected games and initiatives;
- Verify that these activities are appropriate for secondary school students;
- Test the Communicative Adaptability Scale, Prosocial Personality Battery and Conflict Resolution Scale in practice;
- Verify in practice the Johnson modified version of the Bass Dynamic Balance Test and Static Balance Test on the Balance Disk;
- Try out the various facilitation methods used in adventure education.

**5.2. Hypotheses.** For this study we have formulated the following assumptions:

- a) By implementing initiatives and adventure games during physical education lessons, we will improve the interpersonal skills of middle school students;
- b) Adventure activities in the games and initiatives category have positive effects on the development of dynamic balance in gymnasium students.

**5.3. Subjects.** The study was conducted on a group of 35 children aged 10-12 years, pupils in grades 5 and 6 of a private school divided into two groups evenly distributed in terms of age, gender and class are part of it.

#### **5.4. Methods and test tools**

Study participants were asked to complete the translated version of the self-evaluation form of the Communicative Adaptability, Prosocial Personality Battery and Conflict Resolution Scales. In order to evaluate their equilibrium changes, they were tested with Johnson's modified Bass test and static equilibrium balance test.

#### **5.5. Running the study**

For the study, the experimental group had 1 adventure weekly lesson for 10 weeks between November and January. This was allocated as an additional lesson of physical education. The activity consisted of games specific to this form of education and initiatives. The activities were chosen so as to physically engage the participants, be able to be held in the available sports hall, and to put as much emphasis on group work or pairs work as possible. The control group had an extra hour of traditional physical education.

#### **5.6. Presentation and interpretation of data**

##### **5.6.1. Data obtained through self-evaluation questionnaires**

The results obtained from the tests were statistically analyzed using the SPSS 2.0 program.

On the scale Communicative Adaptability all 5 dimensions increased for the experimental group with between 0.43 - 2.06 points depending on the subscale. However, only the Appropriate Disclosure dimension had a significant increase for the experimental group ( $M=2.06$ ,  $p = .011$ ), the other dimensions registering small increases, with no statistical significance. The control group also registered increases on three dimensions but did not have statistically significant results.

The mean decrease of the control group scores for Wit made it possible to have a significant difference between the two groups for this subscale ( $MD = 2.62$ ,  $t = 2.25$ ,  $p = .032$ ,  $df = 28$ ), despite the fact that the experimental group did not have a significant increase in scores compared to the initial test.

For Conflict Resolution Scale, the mean of the experimental group scores increased by 1.81 points, while the mean of the control group dropped by 0.61. A more detailed analysis

revealed that the increase of 1.81 is largely due to a single case, without which the mean difference is only  $MD = 0.86$ . Unfortunately, the statistical analysis showed that the results obtained are not significant for the experimental group for none of the scales.

For the Prosocial Personality Battery, the mean had small increases on certain scales but also decreases on others, between the two moments. The best mean gain was for Perspective Taking, which rose by 0.87 points. The changes were analyzed with both the t-dependent and the Wilcoxon tests and the results were insignificant.

### **5.6.2. Data obtained from the equilibrium tests**

In the case of the balance tests, initial testing revealed that there were no scores recorded in the 60-100 range for the balance board test and at the same time 8 of the 28 subjects were able to get the maximum score in this test at the initial stage. The balance board test recorded significant decreases for the experimental group due to 3 cases.

In the modified Bass test, the t dependent test showed that there was gain for the means of both experimental and control groups, but both were insignificant.

The correlation test done based on the initial scores did not indicate a significant correlation between the two balance tests nor between the static balance component of Bass test and the balance board test.

### **5.7. Discussions in connection with the data**

The data show that there are positive changes for the mean of the experimental group for a large part of the dimensions measured by the self-evaluation questionnaires, albeit insignificant compared to the initial test and small compared to the control group.

In terms of equilibrium evolution, there is some contradiction between the two tests. The balance board test scores decreased while the modified Bass test scores indicate improvement for the experimental group. The data from both tests shows that the experimental group has not improved its balance compared with the control group, on the contrary, they indicate an increase in the balance of the control group, which may be caused by some activities conducive to the development of this motorship in the physical education lessons offered as an alternative to this module.

### **5.8. Conclusions of the pilot study 1**

From the data we can conclude that the program was not able to lead to personal development or improvement of balance, and there are reasons why the adventure education module done with these students was not effective. Aspects that may have influenced the quality of the program are its length, the number of hours of activity, the activities chosen, but could also be the methods used, and here we specifically think of the facilitation techniques used. We

cannot ignore the fact that specialists recommend removing the participants from the familiar environment as one of the essential components of an effective adventure education program.

The results obtained for the modified Bass test show that choice of activities for this module was not good for the development of balance, and a better selection or adaptation of the activities would be useful in order to develop this fitness component for all the members of the group. The results obtained in the static balance test on the balance board do not give us enough confidence to draw conclusions from them.

Even if the program was effective, the small number of participants in this experiment limited the power of the results.

The 2nd study, in **Chapter 6** follows *The Effects of an Initiative-Based Learning Unit on High School Students*

### **6.1. Purpose and objectives of the study**

Through this pilot study, we **aim** to verify practically a number of important organizational aspects in order to prepare the final experiment, such as test tools, methods and means of work. For this purpose, the following **objectives** were outlined:

- Verify in practice the selected games and initiatives;
- Verify that these activities are appropriate for high school students;
- Test the ROPELOC questionnaires and the Communicative Adaptability Scale in practice while measuring the effects produced by the program;
- Verify in practice the Johnson modified version of the Bass Dynamic Balance Test and Static Balance Test on the Balance Disk;
- Try out the various facilitation methods used in adventure education .

**6.2. Hypotheses.** For this study we have formulated the following assumptions:

- a) By implementing initiatives and adventure games during physical education lessons, we will improve the interpersonal and intrapersonal skills of high school students;
- b) Adventure activities in the category of initiatives have positive effects on the development of balance in high school students.

**6.3. Subjects.** The study participants are a group of students in grades 9 and 10 from a private school. Students were divided into two groups according to their choice for the physical education lesson. Although the initial testing was attended by 40 students, unfortunately only a limited number of them participated in the study until the end.



#### **6.4. Methods and test tools**

For this study, we applied 2 self-evaluation questionnaires, the Communicative Adaptability Scale and the ROPELOC questionnaire, both in the original form, and 2 balance tests, namely Johnson's modified Bass test and the balance board test for static balance.

#### **6.5. Running the study**

For the study, the experimental group had, during November-January, physical education lessons based on initiatives and games specific to adventure education. Students had a session each week of 1 hour and 40 minutes. For the same period, students in the control group had a choice between table tennis and fitness, using their own body.

#### **6.6. Presentation and analysis of data**

##### **6.6.1. Data obtained from the balance tests**

At the initial test, 27.8% of the students managed to exceed 30 seconds of equilibrium on the balance board and obtain the maximum score for this test. By comparison, in the Bass's modified test, none of the participants achieved a full score. Further analysis showed that although they had the same maximum score, the initial Bass test scores had a variation of 210, while the scores obtained at the balance board had a variation of 1194.

The t-dependent test showed that there were significant differences between the initial and the final test at the modified Bass test, but for both the experimental group and the control group, moreover, the results show a higher mean increase in the balance score for the control but not a significant higher one compared to the experimental group.

For the static balance measured at the balance board, the Wilcoxon test showed that there were no significant differences between the initial and the final testing for any of the groups, and on average the scores decreased for both groups.

A comparison of the two equilibrium tests with the Pearson correlation test showed that there is a small but significant correlation between the scores of the two tests at the initial test ( $r = .38$ ,  $p = .026$ ), but the correlation becomes insignificant at the final testing.

##### **6.6.2. Data obtained through self-evaluation questionnaires**

Differences between Communicative Adaptability scores at baseline and end of experiment could only be calculated for a limited number of cases and gave insignificant scores for the experimental group. Moreover, statistics showed an average decrease in scores for the experimental group and weaker results for each scale compared to the control group.

As with the Communicative Adaptability Scale, the number of data pairs for the ROPELOC questionnaire was only 7 for the control group and 11 for the experimental group. The data obtained showed that 12 of the 14 scales of the ROPELOC questionnaire recorded decreases in the average of the experimental group scores compared to the original, but not significant, test.

Analyzing the difference in scores (T2-T1) from each scale and those of the ROPE aggregate score we identified 2 cases from the experimental group that had a negative influence on the statistical data.

### **6.7. Discussions**

The large number of students who did not complete the questionnaires at the end of the experiment, that is 50% for the experimental group and 70.8% for the control group, makes it difficult to interpret the statistical results obtained because it is very easy for a single subject to strongly influence the mean of differences. Of course, we also have to accept the idea that the choice of activities or the quality of the facilitation could be responsible for the negative results obtained.

Analysis of the balance tests shows that although the initial test indicated a correlation between the, the balance board failed to capture the differences between T1 and T2 times. This may be due to the large number of subjects who scored a maximum in the initial test (27.8%) and who could not improve their score anymore. Also, the large negative differences between T2 and T1 cannot represent a decrease in balance, but rather a lack of concentration on the part of the pupils in final testing.

Significant increases in scores from Bass's modified test, obtained by both groups, tell us that the adventure program was as effective in developing balance as the alternative physical education lesson, but the small number of subjects of the study makes it impossible to generalize the results.

### **6.8. Conclusions of the pilot study 2**

Overall, it is difficult to draw a conclusion on the two hypotheses, and for future studies a better retention of subjects is needed.

Effects on balance can be accepted, but with reservations due to the small number of subjects from which the data could be harvested. Adventure education seems to have a positive effect on the development of dynamic balance in the same way that other sports activities help to develop this motoring quality. But the balance disk test does not give confidence.

În **Chapter 7** we present our final conclusions from the pilot studies:

- The effects of the adventure specific activities on the development of balance are not clear;
- In this school, middleschoolers are better for the adventure education program;
- The program must be longer, maybe the whole year;
- we need a larger number of subjects in order to increase the statistical power;
- The blance board test is not a suitable one.

•  
Ideas extracted from pilot studies:

- we identified strength and kinesiology as possible aspects to test for in the main study;
- we need to select the proper activities or adapt them in order to get better results.

The two studies allowed us to test several facilitation methods and techniques to ensure learning and transfer. "The analysis of the experience", although very good with high school students, has often consumed a long time, a problem in the context of 50-minute physical education lessons that we are trying to make as dynamic as possible. "Deciphering the experience" by the teacher or "isomorphic framing of the experience" proved to be more effective, allowing for a freedom of thought but also a faster extraction of the conclusions, however "direct loading" or "indirect loading" were much more useful when students were willing to give up frustration or when the activity was pressed for time. Incorrect implementation sometimes of facilitation methods or their inappropriate choice are important issues that could have affected the results of the pilot studies.

In **Chapter 8** we present the methodology of the main study

### **8.1. Purpose, objectives and tasks of the main study**

**Purpose:** to check whether participation in an adventure education program implemented during physical education lessons leads to the development of participants from an interpersonal, intrapersonal, and motor point of view.

**Objectives:**

- To build an adventure program based on the information provided in the literature and based on the observations made during the pilot studies, which can be implemented during the physical education lessons;
- To determine the effectiveness of the adventure education program in terms of interpersonal, intrapersonal and motor development.

**The tasks** that contributed to reaching the objectives are:

- Select, and adapt if necessary, the activities to be included in the program;
- Organize the activities in the adventure program;
- Select the assessment methods and tools to be used in the experiment;
- Formulate working hypotheses;
- Establish the experimental and control groups;
- Initial testing of subjects;
- Apply the adventure education program;
- Final testing of subjects;

- Centralization, processing and interpretation of data;
- Determine program effectiveness and draft conclusions.

## **8.2. Main study hypotheses**

- a) Participation in the adventure education program created will improve the interpersonal skills of students;
- b) Participation in the adventure education program created will improve the intrapersonal skills of students;
- c) The adventure education program created will have positive effects on the development of participants' dynamic balance;
- d) The adventure education program created will have positive effects on the development of the maximal strength of the participants at the level of the arms;
- e) The adventure education program created will have positive effects on the development of cardiovascular resistance of the participants.

## **8.3. Subjects**

The studies were conducted with the help of a group of 58 children aged 10-12 years, pupils in 4 middleschool classes in a private school. Both experimental and control groups were made up of a fifth and a sixth grade, the distribution of classes was done at random. As a result of this process, there were 29 students in each group, equally distributed from a gender perspective.

## **8.4. Tools and test methods used in the main study**

### **8.4.1. For intrapersonal and interpersonal development**

The selection of the ROPELOC questionnaire for the final experiment was made taking into account the ease of application in the pilot study, the measured dimensions, the number of items, the ease of understanding the language by the target age group and also after a detailed analysis of the literature which supports the instrument.

### **8.4.2. For motor abilities**

As a result of the results of the pilot studies, it was decided to keep for the final experiment only the modified Bass test, which had promising results. For muscular strength we decided to test the arm strength using hand-grip dynamometry. The decision to include in the implemented adventure program orienteering as well led to the introduction of cardiovascular endurance among the motor abilities that should be tested at the end of the program. The test selection was done based on the literature that considers the Multi-Stage Fitness Test as correct in generating VO<sub>2</sub>max values, and can be applied to larger groups of subjects.

## 8.5. The adventure education program implemented

**Table 19.** *Outline of the adventure program implemented in the experiment*

Week (month)	Activities / Experiences
1- 7 (sept-oct)	Navigation activities: drawing a map, orientation games in pairs, activities that involved placing or finding posts using a map or following instructions, large or small group navigation;
8-23 (noi-mar)	Specific games, that require working in pairs or teams; initiatives;
24-27 (mar-apr)	Low rope elements organised as initiatives
28-29 (mai)	Specific games, that require working in pairs or teams; initiatives;
30-36 (mai-iun)	Navigation activities: navigation in small group or pairs on a route with 5-8 posts; roundtrip navigation with 1-2 posts; marking posts in the field and on the map; proper orienteering in pairs
37 (iun)	City navigation in small groups

The built adventure education program is still using games and initiatives, but we considered the feedback from the pilot studies and some activities used then were no longer included. The structure of the program is in **Table 19**.

## 8.6. Organization and deployment of the experiment

### 8.6.1. Test protocol

The *ROPELOC* questionnaire was applied at the beginning of the school year and at the end of it, using the *ROPELOC* self-assessment form, translated into Romanian. Before the forms were filled in, the participants were given instructions and, in the end, the papers were checked to identify and correct any mistakes.

Testing forearm force by *dynamometry* was done at the beginning of the program and at the end of April. Testing was done using a digital dynamometer, with the handle set based on pretests. The testing was done in a standing position with the arms by the side of the body, and the pupils had three attempts from which the best result was recorded. Testing was done for both arms.

Balance testing was done at the beginning of the program and at the end of the program. *Johnson's modified version of the Bass test* was applied inside the gym, the route being marked according to the test methodology with adhesive tape. Before the test, the rules were explained and time to practice was allocated. During testing, as instructed by Johnson and Leach (1968, apud Safrit & T.M. Wood, 1995), where there were route mistakes, students were asked to return to the last position and continue on the right track. Testing was filmed for scoring accuracy.

Testing of cardiovascular resistance was done at the beginning and at the end of the program. *The Multi-Stage Fitness Test* was applied on the open-air sport court. The distance of 20 meters was measured with a roulette and marked with colored cones at both ends. To play audible signals to inform students about the transition from one level to another, we used an iPad and a free app available on Appstore. Students were tested in groups, in lessons, and in order to avoid any mistakes, two people took care of registering the internship and the level reached by each. Students who failed to get to the line of time were informed of this to try to recover in the next round.

### **8.6.2. Running the experiment**

Navigation activities were done in the park near the school, some activities took place in the school yard, but most of the games and initiatives took place in the gym. This room has a useful size of 15 m x 7 m and a height of only 3 m, so we believe that any activity that can be carried out here will be implemented in another school.

Each adventure session was preceded or followed by a discussion designed to help students process information and help transfer the skills from that activity to other real-world contexts. Facilitating methods were chosen according to the activity performed in the lesson, but generally we selected facilitating methods that made the students reflect and analyze the experience under guidance, or the build of a story around the activity to facilitate transfer of skills. *Direct front loading* was only used when students were getting stuck and were willing to give up, and whenever there was a lack of time, we ended up *interpreting the experience* for them.

For the experiment, the experimental group had one lesson per week of adventure education throughout the school year, and the control group also had an additional physical education lesson, only that the pupils attended typical educational activities physics.

## **Chapter 9 Presentation and interpretation of data**

Group comparisons were performed with the independent t test or the Mann-Whitney U test, as appropriate, and those between T1 and T2 times using the t dependent or Wilcoxon test. The normality of distributions has been verified with Shapiro-Wilk, based on asymmetry and histograms, and extreme values were identified based on boxplot graphs.

### 9.1. Data obtained by completing the ROPELOC self-evaluation questionnaire.

For each subset of the ROPELOC test a score was calculated using the arithmetic mean of the 3 items that were part of the subscale (Neill, 2008a). Also, a total ROPE score was calculated, using for this the arithmetic mean of all the items in the 12 subscales that make up this part of the questionnaire. and a sROPE variable by summing all items, according to Johnson's (2012) model.

After mating the data and eliminating suspected cases of incorrect completion of the questionnaire, 54 pairs of data were obtained, of which 29 in the control group and 25 in the experimental group.

There were no significant differences between the groups at the initial testing except for the Internal Locus of Control scale ( $p = .032$ ).

**Table 30.** Results of dependent t test, for the experimental group, for all ROPELOC scales

Scale		Paired differences					t	df	p
		Mean	SD	SEM	95% CI				
					LL	UL			
Pair 1	ROPE	.43778	.76495	.15299	.12202	.75353	2.861	24	.009
Pair 2	EL	-.41333	2.24078	.44816	-1.33828	.51162	-.922	24	.366
Pair 3	IL	.50667	1.22141	.24428	.00249	1.01084	2.074	24	.049
Pair 4	AI	.42667	.99778	.19956	.01481	.83853	2.138	24	.043
Pair 5	CT	.78667	1.40396	.28079	.20714	1.36619	2.802	24	.010
Pair 6	LA	.69333	1.49357	.29871	.07682	1.30985	2.321	24	.029
Pair 7	OT	.60000	1.25462	.25092	.08212	1.11788	2.391	24	.025
Pair 8	QS	.40000	1.25093	.25019	-.11636	.91636	1.599	24	.123
Pair 9	SC	.40000	1.25831	.25166	-.11940	.91940	1.589	24	.125
Pair 10	SF	.30667	.90738	.18148	-.06788	.68121	1.690	24	.104
Pair 11	SE	.74667	1.24454	.24891	.23294	1.26039	3.000	24	.006
Pair 12	SM	.48000	1.50948	.30190	-.14308	1.10308	1.590	24	.125
Pair 13	TE	-.14667	1.34399	.26880	-.70144	.40810	-.546	24	.590
Pair 14	CH	.34667	1.29986	.25997	-.18989	.88322	1.333	24	.195
Pair 15	OE	.30667	1.36056	.27211	-.25494	.86828	1.127	24	.271

Note: SD – standard deviation, SEM – standard error of the mean, CI – confidence interval, LL – lower limit, UL – upper limit, df – degree of freedom, p-statistical significance. ROPE = effectiveness aggregate score; EL=External Locus of Control; IL=Internal Locus of Control; AI=Active Involvement; CT=Cooperative Teamwork; LA=Leadership Ability; OT= Open Thinking; QS= Quality Seeking; SC=Self-Confidence; SF=Self-Efficacy; SM=Stress Management; TE= Time Efficiency; CH=Cooping with Change; OE=Overall Effectiveness. Significant results are highlighted in gray.

As can be seen in **Table 30**, the analysis of differences between final and baseline testing showed significant results at  $p < .05$  for the experimental group for Internal Locus of Control (IL) scales, Active Involvement (AI), Cooperative Teamwork (CT), Leadership Ability (LA), Open

Thinking (OT) and Social Effectiveness (SE), but also for the total ROPE score. No significant results were obtained for the control group.

In order to see the significance of these results, for the experimental group, for each test, we also calculated the effect size, using Cohen's index, and we identified medium to high effect sizes for the aggregate score ( $d = .57$ ), Cooperative Teamwork ( $d = .56$ ) and Social Effectiveness ( $d = .60$ ) and medium or medium to small effect sizes for the rest. Only the External Locus of Control, Time Efficiency and Overall Effectiveness had small effects.

A more in-depth analysis of the  $t$  test results found that it was influenced by extreme values on the Internal Locus of Control, Active Involvement, and Leadership Ability scales.

**Table 38.** Independent  $t$  test results for gain scores of every scale

Scale	Equality of variance (Levene)		t-test for the equality of means						
	F	p	t	df	p	MD	SE of difference	95% CI	
								LL	UL
ROPE	1.129	.293	2.331	51	.024	.55667	.23881	.07724	1.03609
AI	.081	.778	1.761	51	.084	.52190	.29645	-.07324	1.11705
CT	.075	.786	2.627	51	.011	.97714	.37193	.23046	1.72383
LA	.697	.408	2.849	51	.006	1.14571	.40212	.33843	1.95300
SC	.968	.330	1.727	51	.090	.65000	.37648	-.10582	1.40582
SM	.079	.779	1.029	51	.308	.46810	.45502	-.44539	1.38158
TE	.070	.792	.022	51	.983	.00810	.36758	-.72986	.74605
CH	1.937	.170	1.388	51	.171	.57286	.41281	-.25589	1.40160
OE	.954	.333	.820	51	.416	.28286	.34503	-.40982	.97554
IL	2.716	.105	1.046	51	.300	.30429	.29088	-.27967	.88824
SF	7.866	.007	1.526	45.44	.134	.50905	.33350	-.16247	1.18057
EL	6.376	.015	-1.743	42.45	.089	-.93714	.53773	-2.02199	.14770

Note: df – degree of freedom, p–statistical significance, MD= mean difference; SE= standard error; CI – confidence interval, LL – lower limit, UL – upper limit. ROPE = effectiveness aggregate score; EL=External Locus of Control; IL=Internal Locus of Control; AI=Active Involvement; CT=Cooperative Teamwork; LA=Leadership Ability; OT= Open Thinking; QS= Quality Seeking; SC=Self-Confidence; SF=Self-Efficacy; SM=Stress Management; TE= Time Efficiency; CH=Cooping with Change; OE=Overall Effectiveness. Significant results are highlighted in gray.

By comparing the final scores of the scales, we found that there are no significant differences between groups at  $p < .05$ , even if the experimental group scores are somewhat higher, and the effect sizes are calculated as small and small to medium. For scales with non-normal distributions, the Mann-Whitney U test was used, but also here the results were nonsignificant and the magnitudes of the effects were small and very small.

There is a whole discussion between people involved in statistics about the use of gain scores, the differences between the two moments of testing, in order to compare the groups. Opinions are divided, and there are both pros and cons of using these gain scores, but I have



decided that their use could provide useful information on the effects of the program, all the more so as the groups are small.

The independent *t* test applied to the distribution scores of the two groups calculated significant differences for Cooperative Teamwork, Leadership Ability, and aggregate overall score as shown in **Table 38**. For Open Thinking ( $p = .033$ ,  $p < .05$ ) and Social Effectiveness subscales ( $p = .022$ ,  $p < .05$ ), significant results were obtained, but the abnormal distribution of control group gain scores required the use of the Mann-Whitney U test. The statistical significance was confirmed for the other scales with Mann-Whitney, and the only scale that needs to be analyzed is Active Involvement ( $p = .046$ ,  $p < .05$ ), which here appears to be significant.

**Table 39** shows that the magnitude of the effect is medium to high for the aggregate score ( $ES = 0.64$ ), and for subscales we have a large to medium effect size for Leadership Ability (LA) and Cooperative Teamwork (CT).

The effect size for Open Thinking ( $ES = .29$ ) and Social Effectiveness ( $ES = .32$ ) for the U test was calculated as being medium.

**Table 39.** *Effect sizes for the difference of gain scores of the two groups*

Scale	Cohen's <i>d</i>	Size effect after Cohen (1988)
Agregate effectiveness score	0.64	Medium to large
External Locus of Control	0.49	Medium to small
Internal Locus of Control	0.29	Small to medium
Active Involvement	0.48	Medium to small
Cooperative Teamwork	0.72	Large to medium
Leadership Ability	0.78	Large to medium
Self Confidence	0.47	Medium to small
Self-Efficacy	0.41	Medium to small
Stres Management	0.28	Small to medium
Time Efficiency	0.01	Very small
Cooping wih Change	0.38	Medium to small
Overall Effectiveness	0.23	Small

*Note:* Medium to large effects have been highlighted in gray.

## 9.2. Data obtained by applying Johnson's modified Bass test for balance

For statistical data processing, for the Bass modified test we calculated a dynamic balance score (BASS) according to Johnson and Leach's initial indications as well as a static balance score by summing the seconds spent in equilibrium on each marker (stBASS). We also counted the correct footprints, made by the subjects, building a third variable (STEP5)

For Johnson's Bass test, we obtained 53 pairs of data, equally divided between the two groups (26 control group, 27 experimental group).

No significant differences were found between the groups at baseline, but the control group had the mean values higher than the experimental group for all scores.

Significant differences were found between initial and final testing for the experimental group for both dynamic and static balance scores, as can be seen in **Table 49**. If the extreme values were not removed, the score would have been higher both for the Bass score ( $M = 17,574$ ) and the static balance ( $M = 10,945$ ).

**Table 49.** *Dependent t test for T2-T1 difference of all Bass test scores*

Group	Scor	Paired differences					t	df	p
		Mean	SD	SEM	95% CI				
					LL	UL			
GC	Number of correct steps	-.308	2.797	.548	-1.437	.822	-.561	25	.580
	Bass scor	1.038	17.326	3.398	-5.960	8.037	.306	25	.762
	Static balance	2.577	7.951	1.559	-.634	5.788	1.653	25	.111
GE	Bass scor	15.462	15.754	3.090	9.098	21.825	5.004	25	.000
	Static balance	10.846	9.698	1.902	6.929	14.763	5.703	25	.000

*Notă:* SD – standard deviation, SEM – standard error of the mean, CI – confidence interval, LL – lower limit, UL – upper limit, df – degree of freedom, p-statistical significance. GE – experimental group, GC – control group. Significant results are highlighted in gray.

The magnitude of the effect from the initial test was calculated at  $d = 0.98$  for the dynamic balance score and  $d = 1.11$  for static balance, both being considered as large effects ( $d > 0.80$ ) as recommended by Cohen (1988). Inclusion in calculations of the case with extreme values leads to a decrease in effect size by only about 0.01.

For the correct number of steps, Wilcoxon stated that there is a significant increase ( $p = .021$ ) between the initial and final test, and the effect size was calculated at  $r = 0.31$ , which is considered as the average by the standards set by Cohen (1988). The control group did not have significant increases.

Comparing the final scores of both groups have achieved significant results for both dynamic balance ( $MD = 12.654$ ,  $T = 2.469$ ,  $p < .017$ ) and for the number of steps ( $MD = 1.423$ ,  $t = 2.343$ ,  $p < .217$ ). The magnitude of the effect was calculated as medium to high ( $d = .67$ ) for the dynamic balance, and small ( $d = .30$ ) for the number of correct steps. For the U test, for static equilibrium differences, the effect size was calculated at  $r = 0.25$ , considered to be medium to low.

Comparison of gain scores showed that the experimental group had significantly higher increases for both static equilibrium ( $MD = 8.269$ ,  $t = 3.362$ ,  $p = .001$ ,  $df = 50$ ) and dynamic ( $MD = 14.423$ ,  $t = , p = .003$ ,  $df = 50$ ). Increases in the number of correct steps were not significantly different from those of the control group. The magnitude of the test effect  $t$  for the

two scales was calculated at  $ES = .87$  for dynamic balance gain and  $ES = .93$  for static balance gain.

### 9.3. Data obtained from the measurement of forearm strength by dynamometry

**Table 58.** Strength comparison between T2 and T1 for every group

Group	Paired differences						t	df	p	
	Mean	SD	SEM	95% CI						
				LL	UL					
GC	1	average	1.10000	2.25471	.42610	.22572	1.97428	2.582	27	.016
	2	left	.97500	2.31811	.43808	.07613	1.87387	2.226	27	.035
	3	right	1.22500	2.51048	.47444	.25154	2.1984	2.582	27	.016
GE	1	average	1.26071	1.86951	.35330	.53579	1.98563	3.568	27	.001
	2	left	.71786	2.45433	.46383	-.23383	1.66955	1.548	27	.133
	3	right	1.80357	2.02548	.38278	1.01817	2.58897	4.712	27	.000

Notă: GE – experimental group, GC – control group. SD – standard deviation, SEM – standard error of the mean, CI – confidence interval, LL – lower limit, UL – upper limit, df – degree of freedom, p-statistical significance. Significant results are highlighted in gray.

To statistically process the data, in addition to the measurements recorded for each arm, marked with FORDR for the right hand and FORST for the left hand, an average of them was also recorded with the FORTA variable. The dynamometry test generated 56 pairs of data, 28 pairs for each group. There are no significant differences between the groups at baseline.

**Table 59.** Comparison between end scores for strength

Strength	Equality of variance (Levene)		t-test for the equality of means						
	F	p	t	df	p	MD	SE	95% CI	
								LL	UL
right	2.682	.107	1.118	54	.269	1.39821	1.25061	-1.10911	3.90554
left	1.133	.292	1.129	54	.264	1.29464	1.14647	-1.00389	3.59317
average	2.118	.151	1.159	54	.251	1.34643	1.16145	-.98213	3.67499

Notă: MD – diferența între medii, SE= standard error, CI – confidence interval, LL – lower limit, UL – upper limit, df – degree of freedom, p-statistical significance. There are no significant results.

Data analysis shows that there are significant differences between initial and final testing in both groups, as shown in **Table 58**

There are no significant results between the final scores of the two groups, but the magnitude of the effect is calculated at  $ES = 0.30$  in favor of the experimental group for each variable. The scores are in **Table 59**. The gain scores are not significant, but the magnitude of the effect remains almost the same for the right hand ( $ES = .25$ ). For the other two sizes, the magnitude of the effect becomes very small.

#### **9.4. Data obtained from the MAST test of cardiovascular endurance**

For the Multi-Stage Fitness Test, the level obtained by each participant has been converted to a number of completed laps to allow for easier data processing. After completing the test steps, we were able to get 52 pairs of data to analyze statistically, 25 in the experimental group and 27 in the control group. The statistical analysis showed that the groups are not significantly different at baseline testing.

The mean lap times in excess of the initial test is  $M = 4.640$  for the experimental group whereas the control group has an average decrease in the number of lap times with  $M = -1.444$ . Also, for the experimental group, the confidence interval of 95% for the real media only takes positive values between the confidence limits [0.628, 8.652].

Test t showed that the difference between final and baseline testing was significant for the experimental group ( $M = 4.640$ ,  $t = 2.387$ ,  $df = 24$ ,  $p < .025$ ), but not for the control group. The magnitude of the effect for this progress, given by Cohen's index, is medium ( $d = 0.48$ ).

There are no significant differences between the final group scores ( $MD = 5.197$ ,  $t = 1.485$ ,  $p = .144$ ,  $df = 50$ ). The magnitude of the effect is calculated as medium-low ( $d = 0.31$ ). In gain scores, however, the t test showed a significant difference in the number of shifts in the experimental group ( $MD = 6.084$ ,  $t = 2.726$ ,  $p = .009$ ,  $df = 50$ ) versus the control group. It should be noted, however, that the result is also due to a decrease in the number of shifts performed by the control group. The effect size for this statistical calculation is  $ES = 0.76$ .

### **Chapter 10 Discussions, Conclusions and Recommendations**

#### **10.1. Discussions after analyzing the results obtained with the ROPELOC questionnaire**

The statistical analysis of the scale and subscale scores of the ROPELOC questionnaire provided mixed results on the influence our adventure program had on developing pupils' in-person and interpersonal skills.

##### **10.1.1. Aggregate score of Effectiveness**

This score is obtained from the arithmetic mean of all 12 subscales (no Locus Control scales and control score). The significant increase in the aggregate effectiveness score (ROPE) compared to baseline testing ( $M = 0.437$ ,  $t = 2.861$ ,  $p = .009$ ,  $df = 24$ ) the students in the experimental group developed in terms of inter and intrapersonal skills better than those in the control group. Interestingly, however, although significantly higher values were recorded and the difference in the gain score ( $MD = .556$ ,  $t = 2.331$ ,  $p = .024$ ,  $df = 51$ ) versus the control group, final score analysis does not show a significantly higher for the experimental group. Apparently, the students participating in the study have improved their personal and interpersonal skills, and

overall they have done so much better than colleagues in the control group, but this change was not enough to make it statistically noticeable in this group students in the post-experimental period.

The result is in line with adventure education studies that argue the potential of these activities to develop such skills and abilities as a whole. The data show that the change experienced by the experimental group compared to the initial test showed a medium to large effect ( $d = 0.57$ ) and the comparative trend towards the control group showed a similar effect on the difference in gain between groups ( $d = 0.64$ ). These results are very good if we take the data from the literature. Neill (2008a) obtained an average effect size of  $ES = 0.47$ ; Bowen and Neill (2013) calculated an average of medium to small effect size ( $ES = 0.37$ ); Hattie et al. (1997) calculated an average the effect size, compared to the initial test, of  $ES = 0.34$ . Of course, in all of these studies the number of subjects was considerably higher.

### **10.1.2. Effect sizes as a whole**

In their meta-analysis, which included only studies using applicative paths and rope routes, Gillis and Speelman (2008) obtained an average of  $ES = 0.43$ , but against the end results of the control group, where we only obtained a small effect of  $ES = 0.20$  on the ROPE aggregate score. A similar analysis by Bunting and Donley (2002, apud Bowen & Neill, 2013) obtained an even greater magnitude of the effect ( $ES = 0.55$ ) but using only 15 studies with rope courses.

For the camping programs, Marsh P.E (1999, apud Bowen & Neill, 2013) found an average effect size of only 0.25, but if they only personal development programs were taken into account, the magnitude of the effect increased to  $ES = 0.41$  (Neill, nd). The average of the magnitudes of the effect sizes of meta-analyzes by 2012 showed an  $ES = 0.39$  (Bowen & Neill, 2013).

The magnitude of the effect obtained compared to the initial test ( $d = 0.57$ ) and the gain scores ( $d = 0.64$ ) in our study seem to match the mean values calculated in meta-analyzes for adventure development programs.

### **10.1.3. Studies with ROPELOC**

If we analyze the results on subscales, we note that although there were increases in the score against initial testing on almost all subscales, only 6 such subscales were significant. For subscales where significant results were recorded, the magnitude of the effect was calculated as medium and medium to low for Internal Locus of Control ( $ES = 0.41$ ), Active Involvement ( $ES = 0.43$ ), Leadership Ability ( $ES = 0.46$ ), and Open Thinking ( $ES = 0.48$ ) and as a medium to high for Cooperative Teamwork ( $ES = 0.56$ ) and Social Effectiveness ( $ES = 0.60$ ). The effect size for the other scales was calculated as low or low to medium. By comparison, a study by Greffrath, et al. (2011), which used the ROPELOC instrument and analyzed the effects of two

programs, achieved similar effects for Open Thinking (ES = 0.51), Social Effectiveness (ES = 0.58) and Active Involvement (ES = 0.42) and even smaller for Internal Locus of Control (ES = 0.20) and Leadership Ability (ES = 0.38). Cooperative Teamwork (ES = 0.70) is the only one that has had values slightly higher than our experiment. All effects sizes were calculated relative to the initial test. Bowen and Neill (2015) used a tool developed from ROPELOC but using similar or identical constructs and made a study on the effects of a rehabilitation program through expeditions. They achieved effects between 0.02 (Self-Awareness) and 0.30 (Communication Skills), with an average of ES = 0.17 effects over initial testing. For comparison, the Active Involvement scale had ES = 0.20, for Locus Control ES = 0.19, for Cooperation ES = 0.21, all of these sizes being considered small. At the same scales, our study obtained average effects relative to initial testing.

Comparing the two groups we noticed that there are no significant differences between the final scores of the two groups, but four scales recorded significant differences in favor of the experimental group for gain scores, namely Cooperative Teamwork, Leadership Ability, Social Effectiveness and Open Thinking. It is important to point out that 3 of the subscales that have had significant differences are the ones that measure social skills, which we were also aiming to develop through this program. For the differences between the experimental and the control group in terms of gain scores, the magnitude of the effect was calculated as large to medium for Cooperative Teamwork ( $d = 0.72$ ) and Leadership Ability ( $d = 0.78$ ) and medium for Open Thinking ( $r = 0.29$ ) and Social Effectiveness ( $r = 0.32$ ). All other scales have small and medium to small effects. The magnitude of the effect was calculated with the appropriate formula for each case. Compared to the end results of the control group, the identified effects are small and very small, only 2 of which have small to medium effects (Leadership Ability, Self-Efficacy).

#### **10.1.4. Social Effectiveness, Cooperative Teamwork, Leadership Ability**

As a standard for Social Skills, Bowen and Neill (2013) adventure therapy programs have calculated an average effect size of 0.44 (151 effects). Hattie et al. (1997) calculated an average effect size for social competencies of 74 effects and obtained ES = 0.43. Both are calculated in relation to the initial test. The result obtained in our program (ES = 0.60) is all the more important because it is considerably higher than these benchmarks.

The only average effect size calculated for Cooperation was found in Hattie et al. (1997) and is ES = 0.34 (24 effects). Our size at 0.56 (pre-post) is considerably higher, thus underlining the importance of the results obtained, and is also supported by the magnitude of the effect size between gain scores (ES = 0.72). A study by Harun and Salamuddin (2010) on the effects of a program of activities in kind has produced significant results in developing the cooperative skills of participants in the experimental group versus those in the control group and the magnitude of

the effect has been calculated at  $ES = 0.34$ . If we compare the magnitude of the end-result effect, our study has also had a small effect.

In the meta-analysis of Hattie et al (1997) for leadership skills, an effect size of 0.38 out of 222 effects was calculated, and the magnitude of effect size for leadership in adventure therapy programs was calculated at 0.35 out of 25 effects, both pre-post. Significant results and the size of 0.46 obtained pre-post in our study suggest a greater effect than the average adventure programs. Comparing the progress of the two groups during the experiment, significant differences were found in favor of the experimental group and a large effect to average ( $ES = 0.78$ ) was calculated for the difference between the gain scores, but only a small-medium effect for the final results. Both support the program's effectiveness. For comparison, a study on the effects of an education program in nature by Harun and Salamuddin (2010) significantly improved the participants' leadership qualities compared to the experimental group, achieving an  $ES = 0.60$  effect size.

Significant results obtained only at certain scales are not surprising. In general, adventure education programs have to be directed to a specific objective at the expense of others because otherwise they risk not providing the context conducive to making more serious changes.

#### **10.1.5. Open Thinking**

Of the scales for personal skills and beliefs, only Open Thinking has obtained significant differences ( $M = 0.600$ ,  $t = 2.391$ ,  $p = .025$ ,  $df = 24$ ) for the experimental group between the initial and the final test. The magnitude of the pre-post effect was calculated as mean ( $d = 0.48$ ). Comparing the gain scores we found that there was a significantly higher increase between the initial and final testing for the experimental group, and this difference resulted in a medium effect size and between groups as well ( $r = 0.29$  for the U test).

#### **10.1.6. Self Confidence, Self-Efficacy**

The Self Confidence scale had an average increase of 0.400 ( $p = .125$ ) for the experimental group, but it was not large enough to be statistically significant at  $df = 24$  and  $p < .05$ . The effect size for pre-post effect is small to medium ( $ES = 0.32$ ), but corresponds to the mean  $ES = 0.33$  calculated by Hattie et al. (1997) for confidence in 55 effects. Comparing the gain with the control group, although they are somewhat better, they remain insignificant ( $t = 1.727$ ,  $p = .090$ ) but the effect size becomes medium ( $ES = 0.47$ ). By comparison, in an experiment conducted on 671 students participating in education programs in nature, Harun and Salamuddin (2010) achieved significant results from the self-confidence control group and a similar effect magnitude of 0.42. We can conclude that the lack of statistical significance of the results of our study may be due to the small number of subjects. Final test scores show the complete lack of a difference between the two groups.

The average increase in the score obtained on the Self-Efficacy scale is not sufficient to produce significant results for the experimental group, but the  $ES = 0.34$  effect is small to medium. Although still insignificant in between group analysis, the effect size retains a low to medium value for both gain scores ( $ES=0.41$ ) and the end scores ( $ES = 0.33$ ). The magnitude of the pre-post effect corresponds to the mean of 0.31 (36 effects) calculated by Hattie et al. (1997) for adventure programs, or 0.34 (42 effects) calculated by Bowen & Neill (2013) for adventure therapy programs.

#### **10.1.7. Stress Management**

Stress Management also had an average increase of 0.480, but they were not large enough to be statistically significant at  $df = 24$  and  $p < .05$ . Effect size was calculated at  $ES = 0.32$  (pre-post for the experimental group) and  $ES = 0.28$  (between gain scores) and considered small to medium in both cases. For final scores, Stress Management appears to be better developed on average in the control group. In their meta-analysis on rope-based studies, Gillis and Speelman (2008) calculated the mean effect size for self-efficacy at 0.48 (34 effects in 7 studies), averaging only small to medium for the effects calculated in this study for this size.

#### **10.1.8. Time Efficiency, Coping with Change, Quality Seeking**

The organizational skills represented here by the Time Efficiency, Coping with Change, and Quality Seeking subscales did not have any major increases in score for the two tests. On the contrary, the Time Efficiency score even slightly decreased at the end of the program, but also observed in the control group. The effects observed on these subscales are small or small to medium and tend to decrease if we analyze differences between groups.

The magnitude of the effect calculated in relation to the difference in increases of the two groups for Time Efficiency ( $ES = 0.01$ ) indicates the absence of any progress of the experimental group compared to the control group, but the statistical analysis indicates an average decrease in the score of this scale both both initial testing and the control group in relation to the final results. The meta-analysis of Hattie et al. (1997) shows that some programs, which measured time management, achieved on average an  $ES = 0.46$  effect (36 effects) for pre-post development.

For Coping with Change, the magnitude of the pre-post effect is 0.27 and reaches 0.24 in the final test data analysis, indicating a small to medium effect in both situations, but increases to 0.38 when comparing the increases of the two groups. Unlike our study, the study by Harun and Salamuddin (2010) on a group of 671 students participating in education programs in kind had significant results on the Resilience scale and a mean to sea effect size ( $ES = 0.61$ ) versus the control group. The ability to cope with change has often been identified in adventure therapy programs. A magnitude of the effect of the ability to cope with changes in adventure therapy



study and was calculated by Bowen and Neill (2013) at  $ES = 0.37$  based on 13 effects from 8 trials.

#### **10.1.9. Overall Effectiveness, Active Involvement**

Overall Effectiveness has little effect in both comparisons and the results are insignificant.

Active Involve Scale has achieved conflicting results. The t test for dependent variables obtained significant results for this subscale ( $p = .043$ ) for 24 degrees of freedom, and the observed effect was considered to be medium to low ( $ES = 0.43$ ). However, in a later test in which the three values considered as extreme were removed, it was found that they had a major influence on the average, and by eliminating them, the result became insignificant at 21 degrees of freedom. Non-parametric analysis confirmed that the difference between the initial and the final testing was not significant, but compared to the control group U test, a significant difference was obtained ( $p = .046$ ,  $p < .05$ ). These results indicate that there is a change of attitude for the experimental group in terms of active involvement, but it does not manifest itself to all members of the group with the same intensity. Significant results in comparison with the control group are also caused by a decrease in attitudes of students in this group towards this aspect, which we can not explain in our study.

#### **10.1.10. Locus of control**

Hattie et al. (1997) gave a control value of 0.30 (considered small to medium), calculated on the basis of 18 pre-post effects, a magnitude identical to that calculated by Cason and Gillis (1994) based on 13 effects. Hans (2000) calculated an average  $ES = 0.38$  based on 30 adventure programming effects. Our research has obtained a small effect size for the external locus ( $ES = 0.18$ ) and medium to small for the internal locus ( $ES = .41$ ), calculated pre-post, the effect value for the internal locus being very close to the averages calculated in the meta-analyses. However, in the meta-analysis done on adventure therapy, Bowen and Neill (2013) calculated an average effect size of  $ES = 0.52$  using 45 effects. For the gain scores difference the effect sizes remain the same.

Although there were significant increases for Internal Locus of Control in the experimental group, the results were not also significant for the External Locus of Control. It is important to note that the External Locus of Control is the only scale in this tool where a drop in value is a positive thing. A more detailed analysis of the results on the Internal Locus of Control scale showed that eliminating the case identified as extreme has made the result no longer significant. For the External Locus of Control, the effect size is calculated as medium to low ( $ES = 0.49$ ) versus the control group, but these results are also due to an almost significant increase in External Locus of Control at control group ( $M = 0.524$ ,  $t = 1.763$ ,  $p = .089$ ,  $df = 27$ ) compared to the initial tests, an increase that we can not explain in our study.

We consider it important to point out that 6 of the subscales that did not achieve statistically significant results have magnitudes of the effect close to average values and as such the program's effect on these issues is not to be neglected. Taking into account the results obtained, it is possible that the small number of subjects did not have enough power to achieve significant results in identifying these mean and small effects.

## **10.2. Discussions after analyzing the results of the fitness tests**

### **10.2.1. The results of Bass's modified test for dynamic balance**

The statistical analysis of dynamic balance scores and other derived scores, measured in the initial stage, showed that the two groups are similar in terms of balance performance. Even more, the control group had a higher average for both the Bass total score, the static balance score and the number of correct steps.

Final testing showed that the experimental group had a significant improvement in Bass total scores ( $p < .05$ ) compared to baseline testing, and this improvement was driven by both an increase in the number of correct steps but even more because of increase static balance scores. The effect size calculated for the difference between the two test moments is large, with  $d = 0.98$  for dynamic equilibrium and  $d = 1.11$  for static equilibrium and  $r = 0.31$  for the number of correct steps representing a mean value. The latter size is calculated from Wilcoxon's nonparametric test.

Moreover, comparing the final tests of the two groups, we found that at the end of the program the experimental group had a significantly better dynamic balance than the control group as tested with the modified Bass test. Significant differences existed between the two groups also for the number of corrected steps, but not for the static balance, suggesting that dynamic balance improvements are largely due to better coordination at the time of travel. The magnitudes of the effects are somewhat lower than compared to the initial test, but we still have an medium effect for static equilibrium and medium to high for dynamic balance. By comparing the gain scores of the two groups we found significant differences again, but this time with a large effect size.

These results allow us to think that our adventure program has had an important role in developing the static and dynamic balance as measured by the modified Bass test. We can say that the program has created good conditions for the development of balance in both its forms, and this is seen in the results.

### **10.2.2. The results of forearm strength testing by hand-grip dynamometry**

The statistical analysis of the dynamometer scores showed that the students in the experimental group managed to achieve significant progress between initial and final testing, but only for the right hand ( $M = 1.803$ ,  $p = .0001$ ) and average ( $M = 1.267$ ,  $p = .002$ ), both at 27

degrees of freedom. This is not necessarily surprising in the context in which most students are right-handed but raises questions about the development involved in participating in such activities. The effect size for strength development for the experimental group oscillated between small for the left-hand, medium-low for average and high for the right hand.

The control group also had significant results on the differences between initial and final testing, with meanings varying between .016 and .035. Although the experimental group had a slightly higher increase for the right arm and on average, the difference in group gain was not statistically significant. Concerning the final scores, there are no significant differences between the two groups, and the magnitude of the effect obtained is small to medium. There were no significant differences between gain scores and the effect size is small and very small this time.

These results lead us to two possibilities: either our program had only a minor effect on the development of force, and all progress is due to the work carried out at the other hours; either the additional sports activity of the control group has had a benefit on strength similar to our adventure program. Given that the physical education lessons from the pre-final testing period consisted of artistic gymnastics and fitness circuits, and the supplemental physical education lesson of the control group was used for similar activities in addition to the normal lessons, both variants are possible, and we need to take this into account.

### **10.2.3. Results of cardiovascular resistance with the Multi-stage Fitness Test**

After the final test, we found that the experimental group students had an average of about 4 laps more than the initial testing, the difference being considered significant ( $p = .025$ ). The magnitude of the effect was calculated as mean ( $d = 0.48$ ), but by comparing the group scores at the final test, we observed that there was a small-medium effect ( $d = 0.31$ ) against the control group. In gain scores, the difference in group increases was significant ( $p = .009$ ) and the effect size was large ( $ES = .76$ ). Care must be taken, however, because this is also due to the decrease in the number of laps for the control group by about 1 or 2 for each member of the group.

The results support the idea that the activities developed helped to develop the cardiovascular resistance for the experimental group, and although no analyzes were made in this respect, based on the observations made at the time, we can say that this development is due to orienteering activities. The nature of the initiatives and the suspended elements, as well as the reduced dimensions of the sports halls where they have taken place, make the cardiovascular development unlikely due to them.

It is important to note that the final testing took place in June, the first one in September, so that the average decrease in the number of shifts performed by the control group can be caused both by a regression of the group members from the point of view of cardiovascular resistance

and a change in weather conditions over initial testing. In both cases, however, these causes should also have an impact on the experimental group.

### **10.3. Conclusions and considerations based on the results obtained**

#### **10.3.1. Conclusions based on the results obtained with ROPELOC**

Taking into account the results obtained as a result of the study, we can say that the adventure education program applied has brought pupils benefits in terms of interpersonal development and even intrapersonal development, but in order to obtain lasting effects, more continuity is needed. The students in the experimental group experienced an overall development if it is to take into account the significant differences in the score from the initial testing and the significant increase of the ROPELOC score compared to that of the control group, but even under these conditions the experimental group did not become significantly more developed in terms of the dimensions measured by this questionnaire. The magnitude of the calculated effect suggests a high importance of this program in terms of the changes it generates, even if the results seen after one year of the program are more modest.

Overall, compared to initial testing, this program appears to have a greater impact than adventure programs in general and even higher than adventure education programs used in other studies. Also, the impact of the program seems to be much higher than that of in-kind education programs. However, the small number of participants in the study compared to the number of subjects collected by the meta-analyzes requires caution in generalizing the findings.

Relative to the control group, although the difference in gain shows a more than average effect of the program, from the point of view of the final impact, the reported effects are small, suggesting subtle changes of the subjects in the experimental group compared to those in the control group. This impact is seen as being below that of other studies, especially if we are talking about those based on applicative paths or ropes, but they are in line with the expectations of specialists in programs with adolescents, since the effects of programs on them tend to be small on average. Although many research showing data from the experimental group versus the control group use the final test scores, there are researchers who claim that they have difficulty capturing the differences due to the fact that they assume perfect group equality in the initial testing phase, which is most often relative, and recommends the use of gain scores. In meta-analyzes, the preference for final scores can also be explained by the desire to include as many studies as possible, which would be limited if an initial test was required. In our research, the average benefit of the control group in the initial testing suggests that gain scores are more relevant to measuring the effect of the program.

Although the program seems to have contributed to the overall development of the participants, development was not a uniform one, with interpersonal issues benefiting much

more than the intrapersonal ones from it. The ROPELOC questionnaire identified an important improvement for Social Effectiveness, Cooperative Teamwork and Leadership Ability versus initial testing as well as the control group, dimensions that are relevant to intrapersonal relationships. The results support the positive effects of the program on the relationship skills and thus the achievement of the goal underlying its creation.

The fact that increases for Cooperative Teamwork, Leadership Ability, Social Effectiveness and Open Thinking are significantly higher for the experimental group allows us to say that the results of our study are not accidental and that such a program can be replicated with the same beneficial effects on pupils. Moreover, considering that the magnitude of the effect has been calculated as high to average for these subscales, we could say that such a program deserves the effort to be implemented in Romanian schools as it promises to strongly support the development of students in these points view.

Compared with other programs, we notice that the effects of our program are similar or even greater for these intrapersonal issues, which amplifies the importance of the results obtained. Numbers show that our program based on initiatives and specific games is more useful in social development than most adventure programs based on mixed activities or expeditions and as such could at least serve as a model for other initiatives of this kind.

In the analysis of the other scales, even if the results were generally insignificant at  $p < .05$ , there were higher improvements of the scores for the experimental group than for the control group, and for some of them, such as Active Involvement, Self Confidence, Self-Efficacy, Stress Management and Open Thinking, effect sizes were calculated as medium or small to medium. The effects of these scales are comparable to the average of studies that have pursued such goals, however, for Stress Management programs based on high rope courses have shown stronger effects. Identifying such effects on personal abilities that have not been set as primary goals indicates that our program can play a much greater role in student development than initially assumed, and could play a good part in making the decision to implement this forms of education in Romanian schools. The lack of significant results can be attributed to the reduced number of subjects.

There are also aspects such as organizational skills, where the observed effects are small and even negligible, but such an aspect is normal given that directing the educational process towards certain objectives involves prioritizing them to the detriment of others. On average, adventure education programs, especially adventure therapy, have achieved better results than our Time Management, Adaptation to Change, and Quality Tracking program.

One aspect that needs to be considered in the analysis of this study is the average decrease of control group scores for many of the measured subscales. Although we can assume that such a

decline is due to internal factors, such as a clearer understanding of the concepts measured by the questionnaire, or external, such as other programs run in school, which have also affected the experimental group, let us think there are factors that could only affect the control group. For this reason, the comparative results between the groups should be analyzed together with the comparative results between the initial and final testing of the groups. Fortunately, this does not substantially alter the results of the study.

At the same time, however, it should not be forgotten that the ROPELOC questionnaire is a self-evaluation with Likert items. Such questionnaires encounter two types of problems when used. Given that it is a self-evaluation, study participants tend to give more positive feedback, especially on initial testing, and Likert questionnaires are exposed to the "ceiling" or "flooring" effect. In our study, these combined issues may have affected the results in terms of showing more modest differences than they actually existed.

### **10.3.2. Conclusions and considerations based on the fitness components test results**

Gehris, Myers and Whitaker (2012) conducted a study to see the physical density of physical education lessons conducted with adventure activities. The study was conducted on 11-14 year old students and found that they perform moderate or intense activities on an average of 28.3% of time. They also found that if games and initiatives are made, the percentage is only 13.7%. This aspect should be considered when analyzing the driving results of this study. In spite of our effort, the format of initiatives and low suspended elements implies a lower density of lesson. As such, we must adapt our expectations and tolerate weaker outcomes in the context of the benefits this kind of activity can bring to the social and personal side.

The physical tests applied to the students showed that the activities in which the experimental group participated developed the dynamic and static equilibrium, and had strong positive effects on the development of cardiovascular resistance. In both cases, the students in the experimental group had on average a significantly higher improvement of these two driving qualities compared to the control group, and given that their physical education program was the same, we can only make these improvements remembering our adventure program. Even if the results of the force test returned unclear results about the effect of the adventure program on this motricity, we can say that the adventure activities included in the program find their place and usefulness in the physical education and sports curriculum. Introducing these activities, either as individual elements or as part of an independent learning unit, would contribute to the physical development of students and the enrichment of their luggage.

The medium to large size of the effects observed for the balance and cardiovascular resistance differences between the two groups allow us to go even further and assert that sporting orientation should be considered as an alternative to traditional methods of resistance

development cardiovascular, and suspended rope initiatives and elements as an alternative to equilibrium development methods. Of course, in order to be able to verify this idea, there is a need for other studies in which the control group participates in a dedicated program to develop cardiovascular resistance or balance by traditional methods while the experimental group is involved in the adventure activities mentioned.

In terms of strength, because the control group had a similar evolution, we can not assert with certainty that the adventure program had a defining role in its development in the flexor muscles of the forearms. However, due to the differences between the two groups, even if small, we can assume that our program also has some positive influences from this point of view and thus does not harm the development of this fitness component, or at least not for the tested muscle group.

#### **10.4. Final conclusions**

At the beginning of this experiment, we issued 5 hypotheses, about the effects we expected to be recorded in subjects as a result of participating in the adventure program in physical education lessons, namely:

- a) By implementing the adventure program, we will achieve an improvement in participants' interpersonal skills;
- b) By implementing the adventure program, we will achieve an improvement in the participants' intrapersonal skills;
- c) The created adventure program will have an effect on the development of participants' balance;
- d) The created adventure program will have effects on the development of the participants' strength;
- e) The created adventure program will have effects on the development of the cardiovascular endurance of the participants.

The results obtained in the experiment showed that there were indeed positive effects on the development of the interpersonal skills of the subjects, data showing significant positive differences between the experimental and control groups for Cooperative Teamwork, Leadership Ability and Social Effectiveness. At the same time on the rest of the scales, the results obtained, although in favor of the experimental group, were not significant showing that such a program does not guarantee positive results despite the evidence from the literature.

The results of this experiment support the idea of literature from the rest of the world in the sense of the positive benefits that an adventure education program can have on the participants and motivate the use of this form of education with children, and implicitly its introduction into school. The lack of significant results on all measured scales should not discourage, but on the

contrary it should encourage more specialists to organize studies to find the ideal program that will bring maximum benefit to students. In the end, the program applied in this experiment is just a vision of how adventure education should be implemented in school, and includes only some of the activities that can be implemented in this form of education or the means that can be used in this direction. Selecting other activities, other implementation methods, or even reorganizing the entire program, could bring more important results in the development of all the skills and abilities analyzed.

The results of tests on motor skills bring new, unobtrusive information in the literature about the valences of adventure activities, and argue for the introduction of these activities as an integral part of the school curriculum of physical education and sport. Of course, if we look at school curricula from schools in countries such as the UK, Australia, or the United States of America, we will notice that adventure activities are already a well-integrated component of physical education curricula, but their presence is not necessarily justified with articles and studies. The results of our study bring little scientific support in this direction, but we have to understand that these motor abilities for which we have found positive results represent only a small part of the abilities that pupils could improve as a result of participating in adventure activities .

Based on the research we have argued that adventure education is a form of education that can make a strong contribution to the development of student learning habits and can help prevent antisocial attitudes in the future. Due to the qualities of adventure education and its proven benefits, we believe it is important that as many children as possible have access to this form of education for as long as possible to make the most of its valences. Given that the school environment is one of the main responsibility for child education, and literature shows that the future behaviors of young people are largely determined here, we believe it is our duty to do our utmost to implement this form of education , in one form or another, in all schools.

Taking into account the potential for motor development through this form of education, we believe that implementing adventure education as an integral part of physical education and sports curricula is not only appropriate but also useful for the physical development of students. It could complement other learning units, or it could very easily constitute an independent learning unit. The adventure activities used in the experiment can help the teachers get started as they need limited resources and can be a 1st step in the building of their own program, and why not programs tailored to their working conditions.

For the future, I recommend a larger, more statistical study to allow a better generalization of the results, but also a more detailed analysis of the effects of adventure activities on fitness components, both overall and comparative with their well-established activities. One of the issues



that I think deserves more attention in a future study of the effects of adventure education is the development of coordination and proprioception.

### **Selective bibliography**

- American Camp Association (2005). *Directions: Youth development outcomes of the camp experience*. Accesat în martie 2015 la adresa [https://www.acacamps.org/sites/default/files/resource\\_library/report-directions-youth-development-outcomes.pdf](https://www.acacamps.org/sites/default/files/resource_library/report-directions-youth-development-outcomes.pdf)
- American Institutes for Research (2005). *Effects of outdoor education programs for children in California* (Raport către Departamentul de Educație din California) Accesat în martie 2015 la adresa [https://www.air.org/sites/default/files/downloads/report/Outdoorschoolsreport\\_0.pdf](https://www.air.org/sites/default/files/downloads/report/Outdoorschoolsreport_0.pdf)
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. New York, NY: W H Freeman/Times Books/ Henry Holt & Co.
- Berry, M., & Hodgson, C (Eds.)(2011). *Adventure education: An introduction*. London: Routledge.
- Bisson, C. (1998). *Sequencing Adventure Activities: A New Perspective*. Lucrare prezentată în cadrul celei de-a 26-a ediții Annual Conference of the Association for Experiential Education, Lake Tahoe, CA. Disponibilă în baza de date ERIC (ED425904)
- Bohannon, R.W. (1998). Hand-grip dynamometry provides a valid indication of upper extremity strength impairment in home care patients. *Journal of Hand Therapy*, 11(4), 258-260. DOI: 10.1016/S0894-1130(98)80021-5
- Bowen D.J. & Neill J.T. (2013). A meta-analysis of adventure therapy outcomes and moderators. *The Open Psychology Journal*, 6, 28-53. DOI: 10.2174/1874350120130802001
- Cason D. & Gillis H.L. (1994). A meta-analysis of outdoor adventure programming with adolescents. *The Journal of Experiential Education*, 17(1), 40-47. DOI: 10.1177/105382599401700109
- Cohen, J. (1988). *Statistical power analysis for the behavioral sciences (2nd ed.)*. New York, NY: Routledge.
- Conley, L., Caldarella, P. & Young, E. (2007). Evaluation of a ropes course experience for at-risk secondary school students. *Journal of Experiential Education*, 30(1), 21-35. DOI: 10.1177/105382590703000103
- Council of Europe (1983). *Testing physical fitness. EUROFIT Experimental battery - provisional handbook*. Strasbourg: The Council. Republicată pe internet de Bitworks Engineering în martie 2011. Accesată la adresa [41](https://bitworks-</a></p></div><div data-bbox=)

engineering.co.uk/linked/eurofit%20provisional%20handbook%20leger%20beep%20test%201983.pdf

- Csaba, L.S.(2006). *Sa invatam orientarea. Manual de orientare in teren, completat cu exercitii si teste pe compact disc*. Cluj Napoca: Risoprint.
- Dewey, J. (1997). *Experience & education* (3rd ed.). New York, NY: First Touchstone Edition.
- Duran, R.L. (1992). Communicative adaptability: A review of conceptualization and measurement. *Communication Quarterly*, 40(3), 253-268. DOI: 10.1080/01463379209369840
- Ewert, A.W. & Sibthorp, J.(2014). *Outdoor Adventure Education. Foundations, Theory and Research*. Champaign, IL: Human Kinetics.
- Furman, N.N. (2011). *The effects of a treatment curriculum on the learning transfer of prosocial behavior in adventure education* (Teză de doctorat). Disponibilă în baza de date ProQuest (UMI No. 3450512).
- Gehris, J., Myers, E. & Whitaker, R. (2012). Physical activity levels during adventure-physical education lessons. *European Physical Education Review*, 18(2), 245-257. DOI: 10.1177/1356336X12440365
- Gillis, H. L., & Speelman, E. (2008). Are challenge (ropes) courses an effective tool? A meta-analysis. *Journal of Experiential Education*, 31, 111-135. DOI: 10.1177/105382590803100202
- Goldenberg, M., McAvoy, L. & Klenosky, D.B. (2005). Outcomes from the components of a Outward Bound experience. *The Journal of Experiential Education*, 28(2), 123-146. DOI: 10.1177/105382590502800206
- Goldenberg, M.A., Klenosky, D.B., O'Leary, J.T. & Templin, T.J. (2000). A means-end investigation of ropes course experiences. *Journal of Leisure Research*, 32(2), 208-224. DOI: 10.1080/00222216.2000.11949914
- Gray, T. & Patterson, J. (1994) Effective research into experiential education: A critical resource in its own right. *Experiential Education: A critical resource for the 21st century. Proceedings of the 22nd International Conference, of the Association for Experiential Education Conference* (pp. 138-145). Austin, TX. Disponibilă în baza de date ERIC (ED377012).
- Gresham, F.M., Cook, C.R. & Crews, S.D. (2004). Social skills training for children and youth with emotional and behavioral disorders: Validity considerations and future directions. *Behavioral Disorders*, 30(1), 32-46. DOI: 10.1177/019874290403000101

- Hammes, R. (2007). Orienteering with adventure education: new games for the 21st century. *Strategies: A Journal for Physical and Sport Educators*, 20(5), 7-13. DOI: 10.1080/08924562.2007.10590733
- Hans, T.A. (2000). A meta-analysis of the effects of adventure programming on locus of control. *Journal of Contemporary Psychotherapy*, 30(1), 33-60. DOI: 10.1023/A:1003649031834
- Haras, K., Bunting, C.J. & Witt, P.A. (2005). Linking outcomes with ropes course program design and delivery. *Journal of Park and Recreation Administration*, 23(2), 36-63. Disponibilă la adresa <https://js.sagamorepub.com/jpra/article/view/1435/1402>
- Hattie, J., Marsh, H.W., Neill, J.T. & Richards, G.E. (1997). Adventure education and outward bound: Out-of-class experiences that make a lasting difference. *Review of Educational Research*, 67(1), 43-87. DOI: 10.2307/1170619
- Hirsch, J. (1992). *Conceptions of outdoor education that underlie outdoor education programs at English speaking Canadian universities* (Teză de doctorat, University of British Columbia). DOI: 10.14288/1.0054946
- Johnson, J.W. (2012). *The effect of high school outdoor-based adventure leadership programs in independent schools on personal effectiveness and locus of control* (Lucrare de dizertație, Prescott College). Disponibilă în baza de date ProQuest (UMI 1510668).
- Kellert, S.R. (1998). *A national study of outdoor wilderness experience*. Yale University, School of Forestry and Environmental Studies. Disponibilă în baza de date ERIC (ED444784).
- Larkin, R.P. & Grogger, P.K. (1975). Map and compass skills for the elementary school. *Instructional activities series IA/E-9*. Oak Park, IL: National Council for Geographic Education. Disponibilă în baza de date ERIC (ED138529).
- Leger, L. & Gadoury, C. (1989). Validity of the 20m shuttle run test with 1 minute stages to predict  $VO_{2max}$  in adults. *Canadian Journal of Sport Science*, 14(1), 21-26. Disponibilă la adresa [https://www.researchgate.net/publication/20232477\\_VValidity\\_of\\_the\\_20\\_m\\_shuttle\\_run\\_test\\_with\\_1\\_min\\_stages\\_to\\_predict\\_VO2max\\_in\\_adults\\_Can\\_J\\_Spoort\\_Sci\\_14\\_1\\_21-26\\_1989](https://www.researchgate.net/publication/20232477_VValidity_of_the_20_m_shuttle_run_test_with_1_min_stages_to_predict_VO2max_in_adults_Can_J_Spoort_Sci_14_1_21-26_1989)
- Lonigro, A., Laghi, F., Baiocco, R. & Baumgartner, E. (2014). Mind reading skills and empathy: Evidence for nice and nasty ToM behaviours in school-aged children. *Journal of Child & Family Studies*, 23(3), 581-590. DOI: 10.1007/s10826-013-9722-5
- Lubans, D.R., Plotnikoff, R.C. & Lubans, N.J. (2012). Review: A systematic review of the impact of physical activity programmes on social and emotional well-being in at-risk youth. *Child and Adolescent Mental Health*, 17(1), 2-13. DOI: 10.1111/j.1475-3588.2011.00623.x

- Martin, A.J. (2001). *Towards the next generation of experiential education programmes: A case study of Outward Bound* (Teză de doctorat, Massey University, Palmerston North, New Zealand). Disponibilă la adresa <https://mro.massey.ac.nz/handle/10179/4035>
- Matsudo, V.K.R., Matsudo, S.M., de Rezende, L.F.M. & Raso, V. (2015). Handgrip strength as a predictor of physical fitness in children and adolescents. *Revista Brasileira de Cineantropometria e Desempenho Humano*, 17(1), 1-10. DOI: 10.5007/1980-0037.2015v17n1p1
- McKenzie, M. (2000). How are adventure education program outcomes achieved?: A review of the literature. *Australian Journal of Outdoor Education*, 5(1), 19-28. DOI: 10.1007/BF03400637
- McKenzie, M. (2003). Beyond "The Outward Bound Process": Rethinking student learning. *The Journal of Experiential Education*, 26(1), 8-23. DOI: 10.1177/105382590302600104
- Miles, J.C., & Priest, S. (Eds.)(1999) *Adventure Programming*, State College, PA: Venture Publishing.
- Mink, A. & O'Steen, B. (2003). Reaching beyond the choir: Taking experiential education down from the mountain and into the public school. *The Journal of Experiential Education*, 25(3), 355. DOI: 10.1177/105382590302500320
- Moote, G.T., Jr. & Wodarski, J.S. (1997). The acquisition of life skills through adventure-based activities and programs: a review of the literature. *Adolescence*, 32(125), 143-168. Disponibilă în bazade date ERIC (EJ553504).
- Moscovici, S. (1998). *Psihologia socială a relațiilor cu celălalt*. Moșu, C. (trad.). Iași: Polirom (variantă originală publicată în 1994).
- Neill, J.T. (2002, Ianuarie). Meta-analytic research on the outcomes of outdoor education. *The 6th Biennial Coalition for Education in the Outdoors Research Symposium*. Bradford Woods, IN. Disponibilă la adresa <http://wilderdom.com/pdf/Neill2002OEMeta-analysesCEO.pdf>
- Neill, J.T. (2007). *History of outdoor education*. Accesat în data de 10 mai 2014 la adresa: <http://www.wilderdom.com/History.html>
- Neill, J.T. (2008a). *Enhancing Life Effectiveness: The Impacts of Outdoor Education Programs. Volumul 1* (Teză de doctorat, University of Western Sydney). Disponibilă la adresa <http://wilderdom.com/phd2/Neill2008EnhancingLifeEffectivenessTheImpactsOfOutdoorEducationPrograms.pdf>
- Neill, J.T. (2008b). *What is outdoor education? Definition (Definitions)*. Accesat la 5 august 2014 la adresa: <http://www.wilderdom.com/definitions/definitions.html>

- Newhouse, G.C.(2002). *Effects of adventure education utilizing a portable climbing wall activity on children's self-efficacy* (Teză de doctorat, University of New Mexico, Albuquerque, New Mexico). Disponibilă în baza de date ProQuest (UMI No. 3041974).
- Norton, C.L., Tucker, A., Russell, K.C., Bettmann, J.E., Gass, M.A., Gillis, H.L. & Behrens, E. (2014). Adventure therapy with youth. *Journal of Experiential Education*, 37(1), 46-59. DOI: 10.1177/1053825913518895
- Olds, T., Tomkinson, G., Leger, L. & Cazorla, G. (2006). Worldwide variation in the performance of children and adolescents: An analysis of 109 studies of the 20-m shuttle run test in 37 countries. *Journal of Sports Sciences*, 24(10), 1025-1038. DOI: 10.1080/02640410500432193
- Paisley, K., Furman, N., Sibthorp, J. & Gookin, J. (2008). Student learning in outdoor education: A case study from the National Outdoor Leadership School. *Journal of Experiential Education*, 30(3), 201-222. DOI: 10.1177/105382590703000302
- Pallant, J. (2007). *SPSS Survival Manual. A step by step guide to data analysis using SPSS for Windows*. (3rd ed), Berkshire, England, Open University Press.
- Panicucci, J. (cu Hunt, L.F., Kohut, A., Rheingold, A. & Stratton, N.) (2002). *Adventure curriculum for physical education: middle school*. Beverly, MA: Project Adventure.
- Penner, L. A., Dovidio, J. F., Piliavin, J. A. & Schroeder, D. A. (2005). Prosocial behavior: Multilevel perspectives. *Annual Review of Psychology*, 56, 365-392. DOI: 10.1146/annurev.psych.56.091103.070141
- Penner, L.A., Fritzsche, B.A., Craiger, J.P. & Freifeld, T.S. (1995). Measuring the prosocial personality. În J.Butcher & C.D. Spielberger (Eds.) *Advances in personality assessment*, 10, (pp 147-164), Hillsdale, NJ: LEA.
- Pickett, B. & Polley, S.(2001). Investigating the history of outdoor education in South Australia. *Australian Journal of Outdoor Education*, 5(2), pp 49-53. DOI: 10.1007/BF03400734
- Popa, M. (2008) *Statistică pentru psihologie: teorie și aplicații SPSS*. Iași: Ed. Polirom.
- Priest, S.(1986). *Outdoor leadership preparation in five nations* (Teză de doctorat, University of Oregon). Disponibilă la adresa <http://simonpriest.altervista.org/DOWNLOADS/Dissertation.pdf>
- Priest, S. (1998). Physical challenge and the development of trust in corporate adventure training. *Journal of Experiential Education*, 21(1), 31-34. DOI: 10.1177/105382599802100107
- Quinn, M. M., Jannasch-Pennell, A. & Rutherford, R.B., Jr. (1995). Using peers as social skills training agents for students with antisocial behavior: A cooperative learning approach.

- Preventing School Failure: Alternative Education for Children and Youth*, 39(4), 26-31.  
DOI: 10.1080/1045988X.1995.9944639
- Education: Theory and Applications* (pp. 141-159). Champaign, IL: Human Kinetics.
- Richards, A. (2013). The genesis of Outward Bound. *e & l – erleben und lernen*, 3&4, 27-30.  
Disponibilă la adresa: [https://e-und-l.de/downloads/el\\_3-4\\_13\\_genesis\\_ob.pdf](https://e-und-l.de/downloads/el_3-4_13_genesis_ob.pdf)
- Richards, G.E., Ellis, L & Neill, J.T. (2002, august, 6-8). *The ROPELOC: Review of Personal Effectiveness and Locus of Control: A comprehensive instrument for reviewing life effectiveness*. Lucrare prezentată la Self-Concept Research: Driving International Research Agendas, Sydney, Australia. Disponibilă la adresa <http://www.wilderdom.com/tools/leq/RichardsEllisNeill2002ROPELOC.pdf>
- Rickinson, M., Dillon, J., Teamey, K., Morris, M., Choi, M.Y., Sanders, D. & Benefield, P. (2004). *A review of research on outdoor learning*. Shrewsbury, UK: National Foundation for Educational Research and King's College London. Disponibilă la adresa [https://www.academia.edu/288162/A\\_Review\\_of\\_Research\\_on\\_Outdoor\\_Learning](https://www.academia.edu/288162/A_Review_of_Research_on_Outdoor_Learning)
- Ringer, M. & Gillis, H.L. (1995). Managing psychological depth in adventure programming. *The Journal of Experiential Education*, 18(1), 41-51. DOI: 10.1177/105382599501800109
- Roberts, H.C., Denison, H.J., Martin, H.J., Patel, H.P., Syddall, H., Cooper, C. & Sayer, A.A. (2011). A review of the measurement of grip strength in clinical and epidemiological studies: towards a standardised approach. *Age and Aging*, 40(4), 423-429. DOI: 10.1093/ageing/afr051
- Rohnke, K. (1984). *Silver bullets. A guide to initiative problems, adventure games, stunts and trust activities*. Dubuque, IA: Kendall-Hunt Publishing.
- Rohnke, K. (1989). *Cowstails and cobras II. A guide to games, initiatives, rope courses & adventure curriculum*. Dubuque, IA: Kendall-Hunt Publishing.
- Rohnke, K. & Butler, S. (1995). *Quicksilver. Adventure games, initiative problems, trust activities and a guide to effective leadership*. Dubuque, IA: Kendall-Hunt Publishing.
- Safrit, M.J. & Wood, T.M. (1995). *Introduction to measurement in physical education and exercise science* (3rd ed.). Philadelphia, PA : Mosby.
- Samson, J.E., Ojanen, T. & Hollo, A. (2012). Social goals and youth aggression: Meta-analysis of prosocial and antisocial goals. *Social Development*, 21(4), 645-666. DOI: 10.1111/j.1467-9507.2012.00658.x
- Sandford, R.A., Armour, K.M. & Warmington, P.C. (2006). Re-engaging disaffected youth through physical activity programmes. *British Educational Research Journal*, 32, 251–271. DOI: 10.1080/01411920600569164

- Sandford, R.A., Ducombe, R. & Armour, K.M. (2008). The role of physical activity/sport in tackling youth disaffection and anti-social behaviour. *Educational Review* 60(4), pp 419-435. DOI: 10.1080/00131910802393464
- Scrutton, R. & Beames, S. (2015). Measuring the unmeasurable: Upholding rigor in quantitative studies of personal and social development in outdoor adventure education. *Journal of Experiential Education*, 38(1), 8–25. DOI: 10.1177/1053825913514730
- Sibthorp, J. (2000). Measuring weather ...and adventure education: Exploring the instruments of adventure education research. *The Journal of Experiential Education*, 23(2), 99-107. DOI: 10.1177/105382590002300208
- Sibthorp, J. & Arthur-Banning, S. (2004). Developing life effectiveness through adventure education: The roles of participant, expectations, perceptions of empowerment, and learning relevance. *Journal of Experiential Education*, 27(1), pp 32-50. DOI: 10.1177/105382590402700104
- Sibthorp, J., Bialeschki, M.D., Morgan, C. & Browne, L. (2013). Validating, norming and utility of a youth outcomes battery for recreation programs and camps. *Journal of Leisure Research*, 45(4): 514-536. DOI: 10.18666/jlr-2013-v45-i4-3897
- Sibthorp, J., Paisley, K. & Gookin, J. (2007). Exploring participant development through adventure-based programming: a model from National Outdoor Leadership School. *Leisure Sciences*, 29, 1-18. DOI: 10.1080/01490400600851346
- Smith, C.A., Strand, S.E. & Bunting, C.J. (2002). The influence of challenge course participation on moral and ethical reasoning. *The Journal of Experiential Education*, 25(2), 278-280. DOI: 10.1177/105382590202500205
- Solomon, D., Battistich, V. & Watson, M. (1993, martie). *A longitudinal investigation of the effects of a school intervention program on children's social development*. Lucrare prezentată la Biennial Meeting of the Society for Research in Child Development, New Orleans, LA. Disponibilă în baza de date ERIC (ED360043).
- Stremba, B. & Bisson, C.A. (Eds.)(2009). *Teaching Adventure Education Theory. Best Practices*. Champaign, IL: Human Kinetics.
- Prouty, D., Panicucci, J. & Collinson, R. (Eds.)(2007). *Adventure Education: Theory and Applications*. Champaign, IL: Human Kinetics.
- Tomchuck, D. (2011). *Companion guide to measurement and evaluation for kinesiology*. Sudbury, MA: Jones & Barlett Learning.
- Tomkinson, G.R. Leger, L.A., Olds, T.S. & Cazorla, G. (2003). Secular trends in the performance of children and adolescents (1989-2000). An analysis of 55 studies of the 20

- m Shuttle Run Test in 11 countries. *Sports Medicine*, 33(4), 285-300. DOI: 10.2165/00007256-200333040-00003
- Tsigilis, N., Zachopoulou, E. & Mavridis, Th. (2001). Evaluation of the specificity of selected dynamic balance tests. *Perceptual and Motor Skills*, 92, 827-833. DOI: 10.2466/pms.2001.92.3.827
- Walsh, J. & Aubry, P. (2007). Behavior management through adventure. *Reclaiming Children and Youth*, 16(1), 36-39.
- Walsh, V. & Golins, G. (1976). *The exploration of the Outward Bound process*. Denver, CO: Colorado Outward Bound Publications. Disponibilă la adresa <http://www.wilderdom.com/pdf/Walsh&Golins1976ExplorationOBProcess.pdf>
- West, S.T. & Crompton, J.L. (2001). A review of the impact of adventure programs on at-risk youth. *Journal of Park and Recreation Administration*, 19, 113–140. Disponibilă la adresa [https://www.researchgate.net/publication/240626969\\_A\\_review\\_of\\_the\\_impact\\_of\\_adventure\\_programs\\_on\\_at-risk\\_youth](https://www.researchgate.net/publication/240626969_A_review_of_the_impact_of_adventure_programs_on_at-risk_youth)
- Widmer, M.A., Duerden, M.D. & Taniguchi, S.T. (2014). Increasing and generalising self-efficacy: The effects of adventure recreation on the academic efficacy of early adolescents. *Journal of Leisure Research*, 46(2), 165-183. DOI: 10.1080/00222216.2014.11950318
- Wind, A.E., Takken, T., Helders, P.J.M. & Engelbert, R.H.H. (2009). Is grip strength a predictor for total muscle strength in healthy children, adolescents, and young adults? *European Journal of Pediatrics*, 169(3), 281-287. DOI: 10.1007/s00431-009-1010-4
- Witman, J.P. (1995). Characteristics of adventure programs valued by adolescents in treatment. *Alternatives to Incarceration: Prevention or Treatment. Monograph on Youth in the 1990's*, 4, 127-135. Disponibilă în baza de date ERIC (ED384469).
- Yerkes, R.M. & Dodson, J.D. (1908). The relation of strength of stimulus to rapidity of habit formation. *Journal of Comparative Neurology & Psychology*, 18(5), 459-482. DOI: 10.1002/cne.920180503
- <https://www.topendsports.com/testing/tests/>