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ORIGINAL RESEARCH PAPER

EATING DISORDERS AND DISORDERED EATING BEHAVIORS IN FEMALE TRACK AND FIELD ATHLETES

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Abstract

Eating disorders (ED) and disordered eating behaviors (DEB) are more prevalent among athletes than in the general population. Female elite athletes participating in sports in which leanness is important are at yet higher risk for developing DEB and ED. The aim of this study is ***to*** *determine the prevalence and the reasons of ED and DEB in female track and field athletes in Latvia. The participants are 18 – 41 year old female track and field athletes in Latvia having been the candidates of the Latvian National team in track and field at least for one season during the years 2015 – 2017. The methods used in this study are the scientific literature analysis, a survey: the EDE-Q 6.0, a case study: semi-structured interview and mathematical statistics. Is has been found that some of the participants of this study do present possible DEB. The development of DEB in female track and field athletes in Latvia has been aided by coach related pressure and critical comments regarding athlete's weight, a strict reduction of food intake and athlete's personality traits – perfectionism, overcoming oneself and striving towards an ideal. The results of this study suggest that it is necessary for track and field coaches and athletes to be educated about ED and DEB.*

Key words: *eating disorders disordered eating behaviors, track and field, and female athlete triad.*

Introduction

Eating disorders (ED) and disordered eating behaviors (DEB) in athletes is a widely researched topic in the field of sports science, and it has been found that ED and DEB have a greater prevalence among athletes than in the general population: in Norway the prevalence of ED and DEB among the elite athletes is 13.5% while in the general population it is 4.6%

(Sundgot-Borgen & Torstveit, 2004). Especially prone to the risk of developing ED and DEB are female elite athletes doing sports that put an emphasis on having a lean body (Currie, 2010; Smolak, Muren & Ruble, 2000; Sundgot-Borgen & Torstveit, 2004; Arthur-Cameselle & Quatromoni, 2011).

Female track and field athletes, particularly middle and long distance runners, sprinters and jumpers, are in risk of developing ED and DEB because they are required to have little amount of body fat (Hirsch et al., 2016), and athletes often experience pressure to lose weight (Coker-Cranney & Reel, 2015).

The data concerning the prevalence of ED and DEB in female track and field athletes varies. It has been found that the prevalence of DEB among the USA college level female track and field athletes is 25% (Black et al., 2004). Another research suggests that more than a half of college level female track and field athletes have DEB (Robbeson, Havemann-Nel & Wright, 2013).

ED and DEB can halt the female athlete's sports career due to the psychological and physical consequences of either of the conditions and cause health problems (Currie, 2010). One such condition affecting female athletes is the female athlete triad caused by insufficient energy intake, leading to irregular menstruation or amenorrhea and decrease of bone density or osteoporosis. Although it is possible the insufficient energy intake is not due to athlete's decision to restrict the food intake, for example, when the athlete is tired after practice and does not feel hungry, however, the most common cause of the female athlete triad is DEB (The Female Athlete Triad Coalition, 2010). Female athlete triad's possible effects on health are stress fractures, decreased ability to produce bone tissue, to maintain muscle mass, replace damaged tissue and recover from injury (Nazem & Ackerman, 2012). In track and field, 75% of female endurance runners are in risk of developing female athlete triad (Torstveit & Sundgot-Borgen, 2005).

It is important for coaches and athletes to be informed about ED and DEB symptoms and effects on health, because the development of ED is best arrested during the early stages (Currie, 2010) and the coach is in a position where she or he can both help to eliminate and to aid the development of ED (Coker-Cranney & Reel, 2015).

Across the globe, the problem of the high prevalence of ED and DEB among female athletes has attracted the attention of sports scientists, however, in Latvia the problem is not widely discussed nor in the academic research, neither in the track and field community. This study is a beginning of a conversation among the athletes, researchers and track and field coaches. The goal of this study is to determine the prevalence and the reasons of ED and DEB in female track and field athletes in Latvia.

Material and Methods

The subject of the study is 18 – 41 year old female track and field athletes in Latvia having been the candidates of the Latvian National team in track and field at least for one season during the years 2015 - 2017. There were 23 participants, constituting 30.6% of the athletes that met the criteria for this study. Their average age was 25.3 years.

The methods used in this study are the scientific literature analysis, a survey: the EDE-Q 6.0 (Fairburn & Beglin, 2008), a case study: semi-structured interview and mathematical statistics. The EDE-Q 6.0 yields 2 types of data: the level of the four psychological aspects of ED: *restraint of eating, eating concern, shape concern and weight concern* and the frequency of ED related behaviors.

Results

The results of this study imply that some of the psychological aspects of ED among the female track and field athletes in Latvia are common, however, the overall score is low – 1.13 points in a scale from 0 to 6.0 representing no psychological symptoms of ED and 6 representing severe symptoms of ED. The highest score among the subscales has been reported in *Shape concern* – 1.38 points, with the SD 1.58. The lowest score is in the subscale *Eating concern* – 0.65.

10 participants have a higher score than the average 1.13, one participant, a sprinter, has a higher score than the average for the clinical population – 4.45 points (Aardoom, 2012), this points to a high ED risk and it is recommended to seek help of a medical professional. The second highest score is 2.41 points to a long distance runner. The other participants' scores do not reach 2 points.

The behavior associated with ED is binge eating, self-induced vomiting, laxative misuse, excessive exercise (with the intent to reduce body weight) and dietary restraint (going 8 or more hours without eating in order to lose weight). The EDE-Q provides data of the frequency of each of the behaviors by assessing the number of episodes during the last 28 days. The behavior is estimated as „regular occurrence" if the participant has had 4 or more episodes during the last 28 days and as „any occurrence" if the participant has had at least one episode during the last 28 days (Darcy et al., 2013).

The reported frequency of ED behaviors is considerably high: 43.5% of the participants have had at least one binge eating episode and 34.8% have exercised excessively in order to lose weight during the last 4 weeks (see Fig. 1).

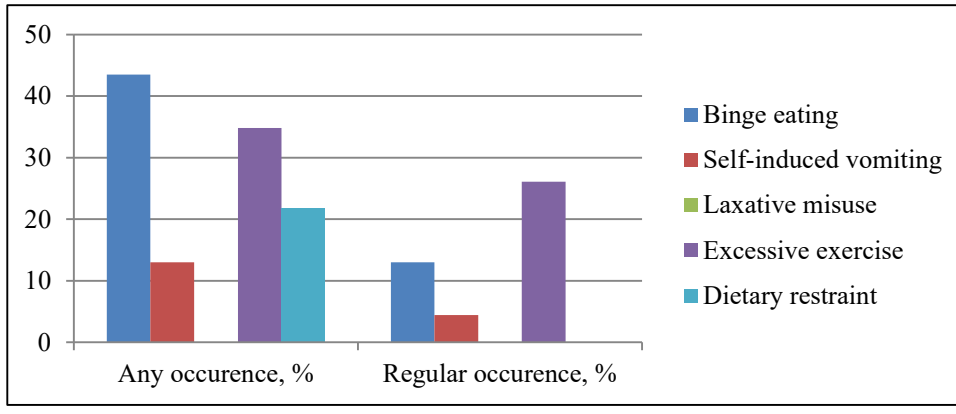

Figure 1. EDE-Q results of the frequency of the behavior associated with ED

13% of the participants show behavior associated with bulimia – self-induced vomiting and one participant has regular vomiting episodes. Laxative misuse is absent. Dietary restraint is absent as a regular occurrence, but 21.7% have experienced 1 to 4 episodes during the last 4 weeks.

The highest frequency of ED behavior is reported by a long distance runner who has reported 5 episodes of binge eating and 15 episodes of self-induced vomiting during the past 28 days. The data suggests a high probability of developing bulimia.

The findings suggest that the participants in this study have reported a low level of psychological aspects of ED; however, the reported frequency of ED related behavior suggests the track and field population is in risk of developing ED and steps towards education and screening should be taken.

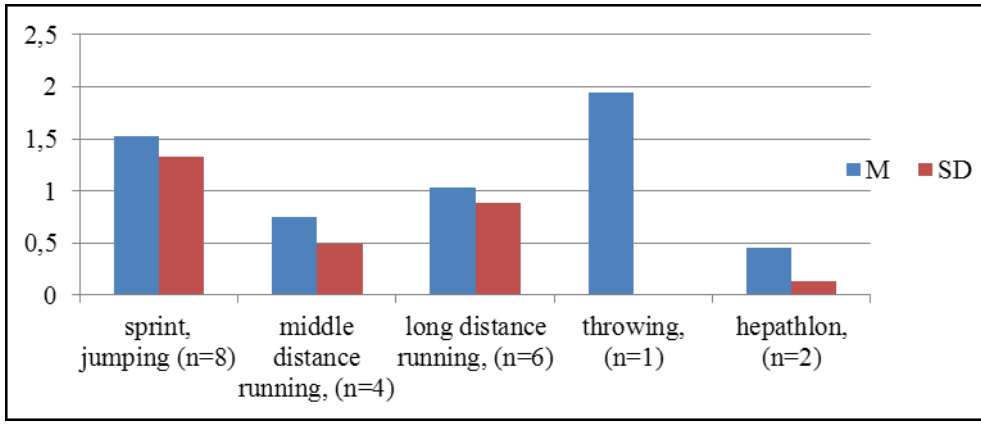

Figure 2. EDE-Q results of the psychological aspects of ED among the participants competing in different events

The results imply that the highest level of ED psychological aspects is among the athletes participating in throwing disciplines (see Fig. 2). However, there was an only one participant representing throwing, therefore this data cannot be applied to the event as a whole. Athletes participating in sprinting and jumping events reported a higher level of ED psychological aspects than the rest (1.52), however, the SD is also the highest – 1.33 indicating the vast differences among the athletes participating in these events.

The highest frequency of ED related behaviors have been reported by long distance runners and sprinters and jumpers (Fig. 3 and 4).

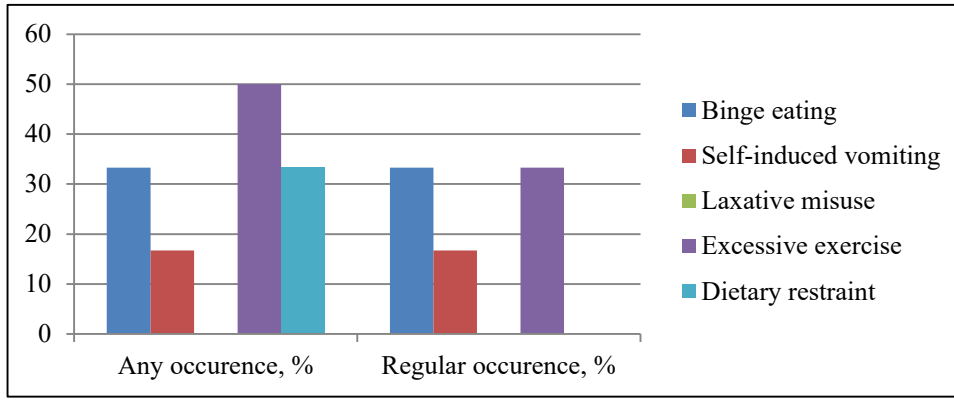

Figure 3. EDE-Q results of the behavior associated with ED among long distance runners

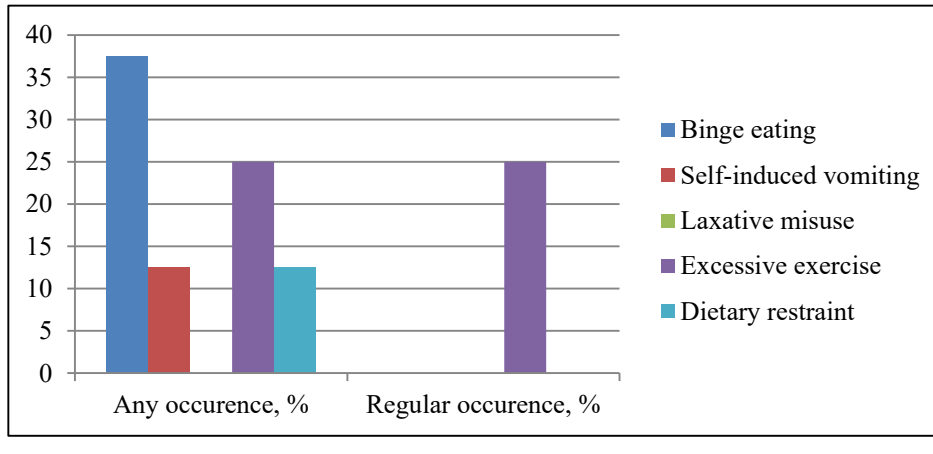

Figure 4. EDE-Q results of the behavior associated with ED sprinters and jumpers

While both groups have reported occurrence of all but one of the ED behaviors, the main difference is in the frequency of the behaviors. Long distance runners have reported regular occurrence of binge eating, self-

induced vomiting and excessive exercise (see Fig. 3) while sprinters and jumpers have only reported frequent excessive exercising (see Fig. 4).

The findings in comparing different track and field events in terms of the psychological and behavioral aspects of ED suggest that long distance runners and sprinters and jumpers are most at risk for developing ED. Also, more data is needed to evaluate female throwers.

In order to gain information about the sports related causes of ED and DEB among the study participants, two participants were interviewed. Participant A1 is a long distance runner who has binge eating episodes. A1 has been practicing for 7 years, she trains 6 days a week, 1 – 2 times a day. Her current weight is 54kg and height – 165cm. Her body mass index (BMI) is 19.8. Participant A2 is a sprinter, she has participated in track and field for 5 years and currently trains occasionally, her personal records were set in years 2013 – 2015. While still in competitive track and field, her body weight was 64kg and her height – 172cm. A2 has had DEB she described as severe.

Asked to describe the problematic eating behaviors, A1 tells of DEB: *„My biggest problem is overeating when I am tired or stressed, when I feel bad. I know I should not eat that much, but it is hard to stop. I don't think about the overeating episodes during my everyday life, because I don't have them often, but when I do, I feel horrible afterwards."*A2 tells about her binge eating experience: *„Currently for more than 2 years I don't have any problems with eating, but I had binge eating disorder, although not medically diagnosed, for about four years from the age of 16 until I was 20."* A1 tells the overeating episodes started when she was in her last year in University: *„I experienced a great amount of stress due to the decisions I had to make about where I am going to study next, what kind of profession am I going to choose. Also, I was scared to not graduate as I had spent a month in a training camp. Overeating soothed me in a way. Now, however, I don't need that kind of consolation anymore, but the behavior is still present."* A2 tells how she has always enjoyed eating and since she was a teenager, she has always eaten a bit too much. However, the beginning of binge eating was after a period of strict control over the amount of food she ate: „*I did not have anorexia, but I only ate when I was very hungry. I lost a lot of weight and it was the only time in my track and field career when I felt physically fit as an athlete. During that period I thought I have found a new way to eat, I was very proud of myself. However, in few months I began having unmanageable overeating episodes. I couldn't stop eating until I was completely full."*

Asked about her body image, A1 tells: „*Some days I like my body but most of the time I am not satisfied because I have the image of the ideal runner's body in my mind. I want to be thinner."* A2 responds: „*Now when I*

am not competing anymore, I don't concentrate on my body that much. I am more or less satisfied with how I look."

When asked if they had ever skipped menstruation, both athletes said they have. For A1 the longest period had been 5 months before and during the summer season. She had not taken any medication or seen a doctor, A1 claims menstruation „simply returned in October". She denies eating less than appropriate. A2 has had several periods of amenorrhea during adolescence, the longest period being a year. Her coach suggested she sees a doctor, who gave her iron supplements, but A2 doesn't remember when menstruation returned. A2 has had amenorrhea because of a low energy intake.

Both athletes have followed a dietary plan or guidelines in order to lose weight during their sports career. A1 has not had a strict dietary plan and she does not report behavior typical to DEB. A2 tells: „*I have tried using L-carnitine, stopped eating sweets and unhealthy food. However, I experienced the biggest impact during the period of 4 months when I ate very little amount of food. I had tried fasting for 2.5 days and that experience somehow convinced me I could live without food. It sounds illogical, but at that time I almost believed it was true. I started experiencing anxiety, I couldn't sleep, I woke up at 5 in the morning and couldn't go back to sleep."*

Asked if her coach has ever suggested restricting her food intake in order to lose weight, A1 tells her coach has told her and her team mate they should lose weight and eat less sweets. A2 denies her coach has given her instructions about food intake, however, she is convinced her coach had an opinion that she should lose weight and that it would have a positive effect on her results.

When asked if her coach has ever commented her body or weight, A1 responds: „*I don't remember how exactly he said it, but I know he thought it would be good if I lost 3-4 kg. I myself think so too."* A2 tells: *„I remember my coach saying that I should lose weight if I want to have better results. I have experienced being criticized about my weight by another coach. It was very painful, because I respected him."* Both athletes agree that their training partners, especially boys, have often made comments about girl athletes' bodies, commenting different body parts, calling girls fat. A1 has only heard comments about other female athletes while A2 has experienced negative comments about her body from her teammates and a sports medicine doctor.

When asked about having an ideal in sports, A1 responds: „*I do. I think it is a kind of a compilation of elite runners, but the ideal includes not only running, this ideal „her" is also a good person, she is intelligent and is not separated from the rest of the world."* A2 describes her past ideal:

„When I was competing I used to see the ideal me that I never was but always wanted to be: I had very good results, and an athletic body: a lot thinner and more muscular than I was in reality, with the „six pack". I strived towards my ideal, my results were more important to me than school, I was frequently in training camps." Asked if they have high standards for themselves, A1 tells: „*No, because I really believe one can accomplish anything she wishes and works for."*A2 tells: *„I used to do have unreachable goals. When I look back now, I see how we all used to look at elite athletes and believe it could be us while in reality only few can reach that level. I don't think I could be among them."* Both athletes admit they see themselves as perfectionists; A1 applies her perfectionism in running while A2 sees herself as a perfectionist in her everyday life apart from sports. They also admit to having made sacrifices in order to excel in sports, however both athletes see it as a part of the training process and do not regret having missed parties, social gatherings and other activities because what sports has given them is much more rewarding. Asked if she has continued training or competing in spite of physical pain or psychological fatigue, A1 responds: „*Yes, often. Long distance running as such implies dealing with pain, either it is lactate in your muscles or pain in your liver, but at one point during the distance it gets hard. I think a person who cannot run through pain cannot be a runner."* A2 tells of a different kind of fatigue: *„For me it was difficult to do both sports and school, I didn't get enough sleep for long periods, my body wanted to stay at home and sleep, but I went to the stadium, came back home, studied, didn't get enough sleep and so on. My goals were really important to me and therefore I could overcome myself."*

The interviews show that both athletes have experienced comments about their or other female athlete's body. Also, both athletes have tried to reduce weight by means of food restriction; however, A2 used more severe methods than A1. When addressing their personality traits, both athletes described themselves as perfectionists being able to overcome pain while reaching towards their goals and ideals.

Discussion

The findings of this study suggest there is a need for education and ED screening among the female track and field athletes in Latvia. The information gathered from the interviews show that there is a culture of criticism towards the female athlete's body and it needs to be addressed.

EDE-Q results of the psychological aspects of ED in this study have been compared to the results of the USA college level female athletes (Darcy et al., 2013) and the results of women with diagnosed eating disorders (Aardoom, 2012). It has been found that female track and field

athletes in Latvia have a lower level of the psychological aspects associated with ED (1.13) than female student athletes in the USA (1.39) and the clinical ED population (4.02). However, SD in this study is the highest – 1.39, among the US athletes it is 1.16 and the clinical population – 1.28. This implies that among the participants in this study, there is a greater variation of the levels of ED severity than in the other two studies.

The participants of this study have reported a considerably higher frequency of the behavior associated with ED than the student athletes from the USA and a lower level of frequency than the clinical population. 17.5% of the US college level female athletes have reported any occurrence of binge eating, 64% of the clinical populations have and 43.5% of the participants of this study have. Regular occurrence of binge eating among the US participants is experienced by 13.5%, in clinical population by 51.7% and in Latvia by 13%. In this study, 13% of the participants have experienced self-induced vomiting (4.4% regularly) while in the US 1.3% have had an episode and 0.9% have had frequent episodes during the last 4 weeks and in the clinical population – 54.6% and 46,6% respectively. Also, the participants of this study have reported a considerably more frequent use of exercise as means to lose weight: 34.8% have had any occurrence while 26.1% have had regular occurrence, in the US – 9.3% and 8.8% and in the clinical population – 44.9% and 42.5% respectively.

The data suggests that the psychological aspects associated with ED are less prevalent in the participants of this study than it is in the US college level female athletes and in female patients diagnosed with ED. However, the behavior associated with ED is of a greater frequency in track and field athletes in Latvia than in the US athletes. Nevertheless, more research is needed to be done in the field of ED and DEB among female track and field athletes in Latvia in order to draw meaningful conclusions about the severity of the problem and the causes of ED and DEB in athletes.

Conclusions

Female track and field athletes in Latvia have reported a low prevalence of psychological aspects of eating disorders, but a high frequency of disordered eating behaviors.

The highest score in psychological aspects of eating disorders among the track and field events is in sprint and jumping events: 1.52 points in EDE-Q. However, the highest score in behavior associated with eating disorders is in long distance runners: 33.3% have regular binge eating episodes, 16.7% regularly induce vomiting and 33.3% regularly exercise excessively in order to lose weight.

The interview analysis suggest that the sports specific causes of eating disorders and disordered eating behaviors among female track and

field athletes in Latvia are coach related pressure and critical comments regarding athlete's weight, a strict reduction of food intake and athlete's personality traits – perfectionism, overcoming oneself and striving towards an ideal.

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ORIGINAL RESEARCH PAPER

A COMPARATIVE STUDY IN BALTIC COUNTRIES ON PHYSICAL EDUCATION TEACHERS' ATTITUDE TOWARD TEACHING STUDENTS WITH SEVERE INTELLECTUAL DISABILITIES

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Abstract

This study explored factors impacting the physical education (PE) teachers' attitude from the three Baltic countries toward teaching the student with severe intellectual disabilities (SID). Participants were 128 PE teachers from special schools in Latvia, Lithuania, and Estonia. The Survey of Physical Education Teachers' Attitude Toward Teaching Students with SID including nine subscales was used in this study. Results revealed significant differences in responses of PE teachers across the three countries in all subscales. The analyses of results in relation to gender revealed that there were no significant differences across subscales, except for the limiting factor subscale. Younger PE teachers with less teaching experience had stronger belief in opinion of persons supporting teaching of students with SID in PE than older colleagues. Also, PE teachers under 30 years of age believed that parents of other classmates and persons with limited experience, will not support teaching of children with SID in PE.

Keywords: special education, severe intellectual disability, physical education teachers

Introduction

According the European Agency of Special Education (2004) the four core values relating to teaching and learning have been identified as the basis for the work of all teachers. These core values are associated with the three components of teacher competence (1) attitudes, (2) knowledge and (3) skills. A certain attitude or belief demands specific knowledge or level of understanding and then skills in order to implement this knowledge in a practical situation (European Agency of Special Education, 2004). Regarding physical education (PE) teacher competencies the European Federation in Adapted Physical Activity has developed the European Standards in Adapted Physical Activity (EUSAPA, 2010) listing fourteen competencies that PE teachers should demonstrate when working with students with special education needs (SEN), for example, adapt school curriculum in PE to meet the individual needs of all students with SEN, manage students' behavior to assure the most appropriate and safe learning for ALL students in PE, evaluate learning progress of student with SEN in relation to his/her IEP goals etc. Despite European and international legislation obligating states and schools to provide equal access for all students, opportunities for physical activity are limited for children and youth with disabilities. Several studies reported that children with disabilities are less likely to participate in physical activity than their healthy peers (Maher, Williams, Olds, & Lane, 2007; Neter et al., 2011; Philpott, Houghton, & Luke, 2010; Rimmer, 2008; Zwier et al., 2010). Also, they engage in very little school-based physical activity, less healthy after-school activity, and more sedentary amusements (Rimmer & Rowland, 2007). The patterns of inactivity in childhood track to higher rates of inactivity, obesity, and other health problems in adulthood.

In many countries across Europe the education of students with SEN is arranged through special classes or special schools that is segregated provision. For example, post-soviet countries such as Latvia, Lithuania and Estonia still follows the two track education model: 1) special and 2) inclusive education. In Latvia, the total number of special schools for 2013/2014 was 61, out of which 20 are for children with intellectual disabilities (Latvian Ministry of Education and Science, 2014), in Lithuania and Estonia it was 49 and 39, respectively (Ministry of Education and Research, Estonia, 2016; Ministry of Education, Lithuania, 2016). While the law on education in these countries states that every child has the right to be educated in a school of their parents' choice, in reality not all mainstream

schools can provide all necessary supports and learning environment to meet needs of children with special education needs, particularly those with severe and multiple disabilities. For example, in Estonia the proportion of children with SEN is about 18% while 4% of them are receiving education in special schools. While number of students with special education needs in general education increases the number of special education schools remains about the same or even increasing, particularly for students with intellectual disabilities (ID). For example, according data from the Department of Statistics in Lithuania under the Ministry of Education (2016) the number of students with ID in special schools was 1395 on 2012/2013 and 1650 on 2014/2015. Also, students with ID represent the largest group in special education programs across Baltic countries.

Several authors exploring professional challenges and obstacles in special education, have revealed that PE teachers indicated students with ID as the group that pose the greatest challenge in their classes (Hodge & Jansma, 2000; Hutzler 2003). The knowledge and experience of PE teachers is essential on how to adapt instructions, tasks, equipment, and environmental conditions that influences their attitude about teaching students with severe disabilities (Hutzler, Zach & Gafni, 2005). Also, the severity of the disability that PE teachers are required to accommodate within PE sessions is inversely associated with their attitude towards teaching process. It has been widely reported that there are large achievement gaps in skills and abilities of students with severe disabilities and students with mild and/ or no disabilities (Browder, Wood, Thompson & Ribufffo, 2014; Avramidis & Norwich, 2002).

Particularly, students with severe to profound sensory and cognitive disabilities were considered to have relatively low chance of being successfully included (Cameron & Cook, 2013). To maximize learning, instructions must be student-centered and designed with each student's present levels of performance, strengths and needs, progress potential, learning styles, and interests (Lawrence-Brown, 2004; Levy, 2008; McTighe & Brown, 2005; Rock, Gregg, Ellis, & Gable, 2008).

Theory of Planned Behavior

Theory of planned behavior (TPB) (Ajzen, 1991) indicates that intention can be used to predict behavior. Intention is influenced by attitude toward the behavior, subjective norm (social pressures), and perceived behavioral control. These factors, in turn, are influenced by behavioral beliefs, normative beliefs, and control beliefs. Attitudes are an evaluative summary of the accessible beliefs related to the consequences of behavior. The TPB has been used successfully in adapted physical education (APE) research exploring pre-service PE teachers' attitude toward teaching

students with disability or/and special education needs (SEN) in general PE class in Cyprus (Fournidou, Kudlacek, & Evagellinou, 2011), Czech (Kudlacek et al., 2002), Autralia (Pedersen, Cooley, & Hernandez, 2014) and very limited with in-service teachers attitudes toward students with particular disabilities, for example, intellectual disabilities (Ozer et al., 2013). Despite inclusive education trends across Europe, in many Eastern European countries like Latvia, Estonia and Lithuania students with special education needs attend special education settings in these countries. Also, these countries have similarities in terms of philosophies, policies and history of education system. To our knowledge assessment of the TPB variables related to PE teachers' associations with outcomes of the teaching students with severe intellectual disability (SID) in PE class at the special education setting has not been studied. The current study explored factors impacting attitude such as the gender, age and teaching experience of PE teachers from the three Baltic countries (Latvia, Lithuania and Estonia) toward teaching students with SID in the special education environment. The attitude was defined as a "person's degree of favorableness or un-favorableness with respect to a psychological object" or "evaluation of an object, concept, or behavior along a dimension of favor or disfavor, good or bad, like or dislike" (Ajzen & Fishbein, 2000, p. 1).

Material and Method

Participants

Participants were 128 PE teachers from Latvia (LV), Lithuania (LT) and Estonia (EE) (n=44, n=40 and n=44, respectively) representing 91.5% of the all PE teachers working in special education system in the three countries. Of the participants 69 (54.3%) were females and 58 (45.7%) males. 82 (64.5%) teachers had higher education degree in sport science or sport pedagogy. The mean of years teachers have been teaching PE varied among the three countries, LV – 15.2 (±8.80) years, LT – 15.8 (±7.42) years, and EE – 16.1 (± 6.96) years. Regarding the years they have been teaching in special education schools also varied across countries (11.3 (±5.93) for LV, 6.2 (±6.81) for LT, and 5.3 (±7.48) for EE). Almost all teachers (98%) indicated they have participated in the in-service teacher training on topics related to severe intellectual disability. All participants provided informed consent in accordance with the Human Ethics Committee procedures from the three universities implementing this study.

Instrument

Development of the survey Physical Education Teachers' Attitude Towards Teaching Students with Severe Intellectual Disability (PETAT-SSID) (Strazdina & Klavina, 2013) was done during Pilot Study on 2012

based on the Theory of planned behavior (TPB) (Ajzen & Fishbein, 1980; Fishbein & Ajzen, 1975). According to the TPB (Ajzen, 1991), attitudes toward a specific behavior (teaching students with SID in physical education) are determined by PE teachers' evaluations of the possible consequences of the behavior. Intention is influenced by attitude toward the behavior, subjective norm (social pressures), and perceived behavioral control.

Pilot study

The pilot study was done during 2012 in Latvia to provide content validity evidence of the instrument assessing the factors that influence PE teachers' attitude toward teaching students with severe intellectual disabilities in the special education school environment. Development of the instrument was guided by the Theory of Planned Behavior (TPB) (Ajzen, 1991) including three levels of attitude components: (1) behavioral beliefs, (2) normative beliefs, and (3) control beliefs. Participants were 26 PE teachers (13 female, 13 males) from special schools including students with SID and 12 national and international experts in adapted physical education (Latvia, Lithuania, Spain, United States, Czech Republic). The experts reviewed and assessed the content validity of the belief statements. The questionnaire contained nine questions about teaching students with SID demonstrating behavioral beliefs, normative beliefs, and control beliefs. The pilot study data collection procedure obtained 114 behavioral belief responses, 116 subjective norm responses, and 134 control belief responses. Three trained experts independently classified all responses that were similar into separate groups. Expert meetings, chaired by the first researcher, were used to reach consensus in regard to categorization of the beliefs and the naming of the categories. As recommended by Ajzen (2000), the belief categories that included top 75% of all beliefs were chosen to be included in the final survey. In addition, the current study explored the construct validity by administering the PETAT-SSID to 128 PE teachers from special schools.

The PETAT-SSID including two sub-scales began with detailed descriptions on the purpose of the survey and how to complete the survey. This was followed by the vignette of a student with an SID that was developed and validated during pilot study:

Peter has severe intellectual impairments, his skills and abilities are significantly lower than for other classmates. Also, Peter has significantly lower adaptation abilities. Peter has limited communication skills, and he struggles to follow the teacher's instructions. He needs continuous teacher's assistance and has difficulty to orient him in the environment, and is easily distracted. Peter also has physical restrictions (e.g., using wheelchair or

crawls to move around). Sometimes Peter lies down on the floor to show he is tired or does not want to participate. PE teacher needs more time to work with Peter while other students do not receive enough attention from the teacher. However, Peter likes to participate in PE together with his classmates.

The main part of the questionnaire was constructed in a way to include statements related to behavioural beliefs (15 statements), normative beliefs (13 statements), and control beliefs (15 statements). The 7-point Likert scale was used for all items of the survey: 1 being the lowest and 7 the highest score. The second part of the survey included 18 questions on teachers' gender, age, teaching experience, education, and professional development (e.g., participation and presentation in conferences, seminars etc.). The final version of the survey was translated from Latvian to Lithuanian and Estonian by help of professional translators. The questionnaires for use with the Estonian and Lithuanian samples were developed using standardised back-translation procedures by three independent bi-lingual translators (Brislin 1986). The back-translation procedure was repeated iteratively until the original and back-translated English versions of the questionnaires were virtually identical.

Data Collection

The questionnaire was distributed and collected by the graduate students (one PhD student and two master students) during Special Olympic events, in-service teacher seminars and in special schools. According the number of special schools for students with intellectual disability, surveys were distributed to 98-100% of such education setting across the three countries. Before completing the survey participants were informed about the purpose of this research. The teachers' participation was voluntary and all responses were anonymous for unbiased study outcomes.

Data Analyses

Statistical analyses included the use of SPSS 20 with calculation of the descriptive statistics. LISREL version 8.8 was used to test construct validity of PETAT-SSID. CFA model was evaluated by using multiple goodness-of-fit indexes: comparative fit index (CFI), the non-normed fit index (NNFI), normed fit index (NFI), and the root mean square error of approximation (RMSEA). A cut-off value greater than .90 for CFI, NNFI and NFI (Hoyle & Panter, 1995), and a cut-off value less than or equal to .08 for the RMSEA indicated adequate model fit (Hu & Bentler, 1999). Reliability for each subscale was examined by Cronbach alpha. ANOVA procedures were applied to determine if differences existed among PE teachers' in attitudes across the three Baltic countries in relation to gender, age and teaching experience. Three subgroups were made addressing the

teachers' age: (1) up to 31 year; (2) 31- 50 years, and (3) 51 years and more. Also, the three subgroups were made addressing the teaching experience of respondents: (1) up to 5 years; (2) 6 to 15 years, and (3) 16 and more years. Kruskal-Wallis test was used to evaluate differences by gender, age and teaching experience variables because the data were not normally distributed. The level of significance was set at 0.05.

Results

Validity Analysis

This section describes the results of the data analysis performed to determine the construct validity of PETAT-SSID followed the described and published the content validity of this instrument in previous pilot study (Strazdina & Klavina, 2013). The sample of 128 participants was used to conduct the CFA. The number of items in the three TPB components was 15 for behavior beliefs, 13 for subjective norm and 15 for control beliefs divided across the nine subscales (Figure 1).

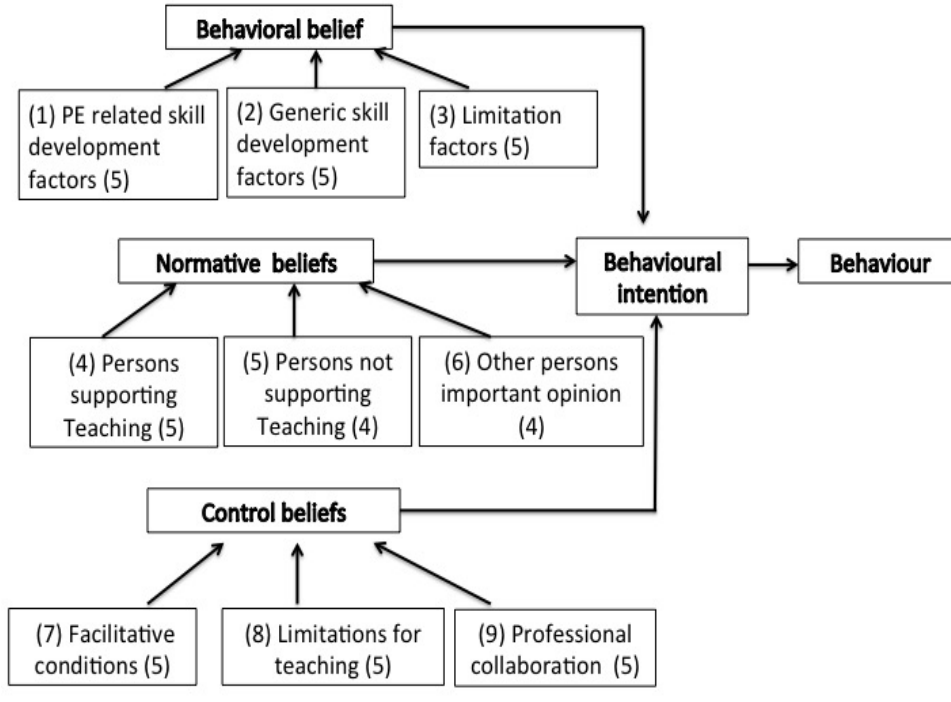

Figure 1. Diagram of the Theory of Planned Behavior (Ajzen, 1991) with the nine subscales from the PETAT-SSID

Analyses of the skewness and kurtosis values for the individual items revealed that not all data were normally distributed and therefore the polychoric correlations and the asymptotic covariance matrices were used by CFA. The factor loadings and standard error from the CFA are presented in Table 1. The fit indexes of the performed CFA were χ^2= 1455,95/df 824, NNFI = .92, CFI = 0.93 and RMSEA = .064 (CV 058-.069) were on acceptable level. Reliability of each TPB construct in the final questionnaire was calculated using Cronbach alpha procedures, and all subscales were found to have acceptable internal consistency (alpha >0.6) based on guidelines provided by Francis et al (2004).

Table 1

Standardized factor loadings and standard error from the confirmatory factor analysis of the PETAT-SSID

	Factor loading	SE
Behavioral Beliefs		
1- Factors of PE related skill development		
1) improve their communication skills	.73	.054
2) improve interactions and social inclusion among age appropriate students	.76	.038
3) provide them positive emotions	.59	.062
4) help them to learn new movement skills	.61.	.060
5) improve their health and physical skills	.62	.054
2- Factors of General skill development in PE		
1) improve collaboration skills	.51	.071
2) improve self care skills	.44	.080
3) help to learn about his/her body	.58	.079
4) help to socialize with other students	.92	.047
5) learn the rules of sport games	.58	.063
3- Limitation factors		
1) Limited teachers' education background in adapted PE	.76	.053
2) Large variety of developmental level in students with SID	.80	.038
3) Inappropriate teaching materials	.76	.047
4) Lack of assistive devices	.60	.066
5) Lack of teachers' practical teaching experience	.77	.041
Normative Beliefs		
4- Persons supporting teaching		
1) Health professionals (PT, OT, family doctors)	.53	.077
2) Other experienced colleagues	.47	.066
3) School administration	.68	.057
4) Sport organizations for persons with disabilities	.76	.054
5) Society	.48	.081
5- Persons not supporting teaching		
1) Parents of other students	.53	.081
2) Persons who have not experience with persons having SID	.46	.083

Table 1 countiniation

	Factor loading	SE
3) Teachers with limited experience with students having SID	.72	.073
4) Teachers having several students with SID in their class	.66	.074
6- Other persons' important opinion		
1) Colleagues	.82	.038
2) Colleagues with experience in other special schools	.69	.058
3) Colleagues with experience in special school administration	.84	.041
4) Specialists from the Ministry of Education	.39	.078
Control Beliefs		
7- Facilitative conditions		
1) Special (adapted equipment)	.68	.060
2) Possibility to work with the student with SID 1:1	.84	.046
3) Experienced teacher assistant	.76	.055
4) Special equipment	.78	.058
5) Appropriate facilities	.71	.053
8- Limitations for teaching		
1) Lack of access to the gym	.59	.067
2) Lack of teacher professional knowledge	.65	.059
3) Not appropriate equipment	.33	.084
4) Several students using assistive devices in PE class	.54	.074
5) Lack of teacher assistant	.76	.048
9- Professional collaboration		
1) Collaboration with parents	.64	.070
2) Support of school administration	.83	.045
3) Collaboration with experienced colleagues	.85	.039
4) In-service teacher training	.73	.068
5) Good communication with colleagues	.79	.055

Analysis on PETAT-SSID subscales

Next, results were analysed to describe the differences in outcomes on the nine PETAT-SSID subscales across the three countries. The Levene test for homogeneity showed unequal variances of the constructs and therefore the multiple comparisons with the Tamhane post-hoc test were used to determine differences by country. The results are presented in Table

Table 2

Means and standard deviations of the PETAT-SSID subscales across the TPB constructs by country

	All countries	Latvia[a] (n=44)	Lithuania[b] (n=40)	Estonia[c] (n=44)
Behavioral Beliefs				
1) Factors of PE related skill development	5.57±1.03	5.681.08	5.83±.73 [c]	5.22±1.15 [b]
2) Factors of generic skill development in PE	5.61±1.09	5.97±1.01 [b]	4.79±.91 [a,c]	6.00±.89 [b]
3) Limitation factors	4.99 ±1.29	4.13±1.35 [b,c]	5.52±.1.00 [a]	5.38±1.01 [a]
Normative Beliefs				
4) Persons supporting teaching	5.40 ±.96	6.09±.74 [b,c]	4.95±.79 [c]	5.12±.91 [a]
5) Persons not supporting teaching	4.79 ±1.28	5.23±1.46 [c]	4.64±1.03 [c]	4.50±1.19 [a]
6) Other persons' important opinion	5.39 ±1.19	5.64±1.33	5.29±1.01 [c]	5.26±1.18
Control Beliefs				
7) Facilitative conditions	6.51 ±.61	6.89±.21 [b]	5.95±.59 [a,c]	6.69±.49 [a,b]
8) Limitations for teaching	6.02 ±.86	6.53±.55 [b,c]	5.40±.83[a,c]	6.07±.79 [a,b]
9) Professional collaboration	6.54 ±.59	6.76±.33 [c]	6.08±.72	6.74±.44 [a]

Note. Significantly different ($p < 0.05$) from the respective value: [a] – in Latvia, [b] – in Lithuania, [c] – in Estonia.

Behavioral Belief is the TPB component that is used to impact attitude toward one's behavior (i.e., teaching students with SID in the PE class). Answers on the behavioral belief statements provide information underlying the construct of attitudes. However, post-hoc tests indicated significant differences in the first subscale of the PETAT-SSID related to factors of PE skill development between LV and EE teachers' responses ($p < .05$). Furthermore, the second subscale of the PETAT-SSID including factors of generic skills (e.g., collaboration skills, communication skills etc.) development in PE presented significant differences across the three Baltic countries. For example, PE teachers from special schools in EE (mean score 6.00 ± .89) had stronger belief in that participation of students with SID, like Peter, in PE class will improve their communication skills and self care skills, while responses of LT teachers had significantly inferior scores in this subscale (mean score 4.79 ± .91, $p< .05$). The third subscale of the PETAT-SSID illustrating limiting factors for participation of students with SID, like Peter, in the PE presented significantly lower scores in LT

responses indicating that Lithuanian teachers did not find the limiting teaching factors as meaningful as teachers from LV and EE.

Normative Belief is the TPB component that is used to determine subjective norm meaning the perceived social pressure or other persons' opinion about the behavior. The beliefs about having control over the behavior may be motivational factors underlying the behavior of teaching students with SID in the PE. The post-hoc test for the fourth subscale of the PETAT-SSID indicated that LV teachers had significantly stronger belief than LT and EE teachers (mean scores 6.09, 4.95 and 5.12, respectively, $p < .05$) in opinion of other professionals that would support teaching of students with SID in PE class (e.g., physiotherapists, occupational therapists, family doctors, school administration and representatives of sport organizations for disabled) and colleagues with experience. Regarding the fifth scale of the PETAT-SSID, as previously, LV teachers had significantly higher mean score than EE and LT respondents (5.23, 4.64 and 4.50, respectively, $p< .05$) showing that LV teachers had stronger belief in that parents of other students as well as teachers having several students with SID in their class would not support teaching the student, like Peter, in the PE. Also, LV and EE teachers had significantly stronger belief than LT teachers that colleagues with limited working experience with students with SID will not support participation of students with SID in their PE class. Furthermore, the mean scores of the sixth scale of the PETAT-SSID indicated that LT teachers had significantly stronger belief than EE teachers (5.29 and 5.26, respectively, $p< .05$) in opinion of classroom teachers and colleagues including those with experience in administration of special school.

Control Belief is the TPB component that is used to determine perceived behavioral control or the perception of the degree to which the person has control over the given behavior.

The post-hoc test outcomes presented that PE teachers had common belief only on ninth sub-scale of the PETAT-SSID indicating the belief in professional collaboration as contributing factor to teach students with SID in PE ($p> .05$). The outcome results for the seventh and eight subscale of the PETAT-SSID presented significant difference in responses across the Baltic countries. For example, regarding beliefs in conditions that make easier to teach students like Peter in the PE class, LV and EE had significantly stronger belief than LT teachers that factors such as special (adapted) equipment, possibility individually work with students like Peter (1:1), experienced teacher assistant, special equipment and appropriate facilities will contribute teaching students with SID in their PE class ($p< .05$). Furthermore, the eight subscale on statements regarding conditions that

might make teaching of students with SID difficult in PE sessions, LV and EE had significantly stronger belief than LT teachers ($p < .05$).

Results on gender, age and teaching experience

The study outcomes on gender, age and teaching experience were analysed for the sample of special education PE teachers from the three Baltic countries (n=128).

Gender. Overall, the analyses of TPB components in relation to gender across the three countries revealed that there were no significant differences in responses between males and females ($p > .05$), except for the fifth subscale of the PETAT-SSID (Table 3). Female PE teachers had significantly less believe in the statement that other individuals, for example, parents of other classmates, persons with limited experience with children having SID, will not support teaching students with SID in the PE ($p < .05$).

Table 3

Range and difference of means for the PETAT-SSID subscales in responses of PE teachers in Baltic countries across gender, age and professional experience (n=128)

	Gender M-F	Age (> 30 years 31-50 years < 50 years)	Professional experience (> 5 years 6-15 years < 15 years)
Sub- scales			
1) Factors of PE related skill development	5.49 – 5.68	5.52 – 5.63*	5.50 – 5.63
2) Factors of generic skill development in PE	5.66 – 5.59	5.05 – 5.81*	5.53 – 5.73
3) Limitation factors	5.07 – 4.90	4.89 – 5.20	4.87 – 5.12
4) Persons supporting teaching	5.23 – 5.61	5.16 – 5.59*	5.26 – 5.70*
5) Persons not supporting teaching	4.91 – 4.65*	4.14 – 5.07*	4.02 – 5.06*
6) Other persons' important opinion	5.31 – 5.48	5.29 – 5.71	5.31 – 5.69
7) Facilitative conditions	6.46 – 6.57	6.47 – 6.57	5.38 – 6.64
8) Limitations for teaching	6.04 – 6.00	5.90 – 6.09	5.92 – 6.13
9) Professional collaboration	6.55 – 6.52	6.43 – 6.61	6.45 – 6.62

* post-hoc analyses revealing significant difference ($p < .05$)

Age. Analyses of results in relation to the three age groups (>30 years, 31 – 50 years and <50 years) revealed significant differences in mean results of the first subscale of the PETAT-SSID. PE teachers of age from 31 – 50 years more significantly believed that students with SID, like Peter,

will improve PE specific skills (e.g., physical fitness, manipulative and locomotor skills etc.) and generic skills (e.g., communication, collaboration etc.) than younger and older colleagues ($p < .05$). Furthermore, younger teachers (till 30 years of age) had more significant belief than older colleagues that persons supporting teaching of students with SID in PE (e.g., health professionals, experienced colleagues). Also, this group of PE teachers more significantly believed that other persons, for example, parents of other classmates, persons having limited experience with children having SID will not support teaching students with SID in the PE.

Teaching experience. Analyses of results according the teaching experience were in line with findings described above. Young PE teachers with teaching experience till 5 years had more significant belief in opinion of persons supporting teaching of students with SID in PE (e.g., health professionals, older colleagues). Also, these teachers more significantly believed that other persons, for example, parents of other classmates, persons with limited experience with children having SID, will not support teaching students with SID in the PE.

Discussion

The present theory-based study contributes to the literature of special education, particularly physical education provided in special education settings for students with severe intellectual disability. Such an investigation helps education professionals understand the potential motivators and challenges for teaching the student with SID. Majority of research regarding teachers' attitude toward teaching students with disabilities has explored such variables as gender, age, years of teaching experience, contact with disabled persons and other personality characteristics that might impact upon teacher professional motivation to work in a special education setting. Particularly, severity and type of disability have proven to be a challenge as many associated factors indicated as obstacles (Kniveton, 2004; Ozer et al., 2013). Experts have emphasized the importance of teaching students with severe cognitive impairment or SID generic skills like communication, social skills (Browder & Spooner, 2011; Snell & Brown, 2011), self-management and choice making (i.e., Collins, 2007; Ryndak & Alper, 2003). Regarding TPB theory, this study was in agreement with experts' opinion showing PE teachers believe in that teaching of the student like Peter in PE will improve his/her generic skills (e.g., communication and collaboration skills, interactions with other students etc.) movement abilities and will provide positive emotions. Furthermore, opinion and support of other professionals has been presented to be influential in promoting positive teacher attitudes toward teaching students with severe disabilities.

The one factor that consistently been found to be associated with more positive attitude is the availability and professional support (i.e., consultancy level or on-site) at the teaching situation (Blanton & Yvette, 2011; Boyle, 2012). Also, in earlier studies, for example, by Janney et al (1995) respondents indicated importance of the support and acknowledgment from the relevant authorities (e.g., school administration, municipality school department). Furthermore, Fox and Ysseldyke (1997) found that a lack of administrative leadership was reason for poor teaching strategies to address the needs of students with disabilities. Furthermore, in this study PE teachers from Latvia and Estonia believed that facilitative teaching conditions like access to special (adapted) equipment, possibility individually work with students like Peter (1:1), experienced teacher assistant, special equipment and appropriate facilities will contribute teaching students with SID in their PE class. Also, PE teachers across the three Baltic countries significantly valued the professional collaboration. While teachers believed that teaching students with SID in PE sessions has positive outcomes on the student's academic, social and behavior outcomes, they also indicated multiple limiting conditions in teaching process. For example, for PE teachers from EE and LV significant limitation factors were lack of access to the gym, teachers' professional knowledge, assistive devices and a teacher's assistant. The study outcomes in special education have found that special educators had significant positive attitude change after their in-service training (Arvamidis et al., 2000, Odom, 2013). Furthermore, factors that has reliable effect on more positive attitudes is appropriate environmental support (e.g., teaching resources, IT equipment, accessible physical environment etc.) and human resources (e.g., assistant teachers, paraprofessionals etc.) (MacFarlane & Woolfson, 2012; Odom, 2013). Several authors from adapted physical education field have found that lack of professional training, limited access to adapted equipment and inappropriate school curriculum has been shown to be directly linked to burnout in physical education (Fejing et al, 2005; Lieberman, Houston-Wilson, & Kozub, 2002).

With regard to *gender*, *age and teaching experience* the majority of research noted that female teachers had more positive attitude than male teachers toward teaching students with disabilities (Alghazo & Naggar Gaad, 2004; Boyle, Topping & Jindal – Snape, 2012; Opdal, Wormæs, & Habayeb, 2001), also concerning inclusion and teaching of students with disabilities in PE (Hodge & Jansma, 2000; Hutzler et al., 2005). In current study female and males PE teachers did not present significant differences in responses. Only few studies have presented statistical difference between genders demonstrating that male teachers had a greater affinity towards

accepting guided professional support and advice from other colleagues or/and school administration (Fournidou, Kudlacek, & Evagellinou, 2011), while other previous studies using TPB approach lacks gender comparisons. Regarding to *age* this research revealed that younger teachers are favorable toward teaching students with SID than their older colleagues. These findings are in line with the recent findings by Ozer (2013) revealing that younger and less experienced PE teachers in Turkey were more favorable toward teaching students with intellectual disabilities in their classes. *Teaching experience* is another teacher-related variable cited by several studies as having influence on teachers' attitudes toward teaching students with severe disabilities. The current research was in partial agreement with other authors, for example, Alghazo and Naggar Gaad (2004) indicating that teachers with one to five years of experience held significant more supportive attitudes towards including and teaching students with disabilities. Furthermore, our study found that as teachers gained teaching experience, they became less accepting believe in positive PE related outcomes for students with SID. These data support the concerns of APE professionals about challenge and a multifaceted endeavor when addressing needs of students with profound disabilities in PE class (Block, Klavina, & Flint, 2007; Klavina & Block, 2008).

Limitations of the Study

The information obtained was limited because of number of special education schools for students with intellectual disabilities in the three Baltic countries. Also, because of the large variability in behavioral and physical potential of students with SID, it is possible that teachers' responses do not correspond to their actual behavior in their PE class in each individual situation. The interpretation of the results has limited range, because measurable positive academic outcomes of students with SID in PE class were not assessed. Also, there was no observation of teachers' and students with SID behaviors interactions. Therefore, it is possible that teachers' beliefs might not correspond to the actual situation in the gym and answers from this survey are biased. Such observations would probably contribute to comprehensive evaluation of the teaching process of students with SID.

Future Implications

While various studies have been exploring PE teachers' attitudes toward teaching students with disabilities in inclusive education, there are limited to none studies done on factors presenting PE teachers' professional beliefs and attitude toward teaching students with severe and profound disabilities. Previous studies in special education found that very small percentage of teachers (1% - 6%) believed that children with intellectual

disabilities should be integrated in the general education classes (Browder & Spooner, 2011). Future studies should examine additional factors, which influence the formation of attitude and professional beliefs of PE teachers toward teaching students with severe disabilities. Longitudinal studies should be focused on the exploring of PE teachers' motivation and its relation for professional improvement opportunities. Also, other cross country studies should consider the impact of special education programs for students with severe disabilities in forming attitudes and beliefs of PE teachers.

Conclusions

This study attempted to address the gender, age and teaching experience differences presented within the special physical education area across the three Baltic countries. The evidence indicates that students with severe intellectual disabilities require special services and individual approach. While the existence of a European legal framework on equality of opportunities and non-discrimination, implementing 'education for all' is only at its very beginning and the real efficiency of the results is difficult to measure. This study was in line with reports presented by European and other countries that the supports needed by disabled students are not always allocated with sufficient human support time or do not allow for high quality education, especially for those with more severe impairments. This type of studies carries the potential of deepening our understanding of the complexity of teaching process when discussing inclusive education approach for students with more severe disabilities.

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ORIGINAL RESEARCH PAPER

THE APPLICATION OF CROSS-COUNTRY SKIING TECHNIQUE AND THE CONNECTIONS OF ROUTE CHOICE IN SKI ORIENTEERING
(14-16 years old orienteers)

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Abstract

The quality of the surface of a ski course that is specially prepared on the day of the race and the accurate and precise location of a ski route on the map has dominant impact on the orienteers' choice of speed and technique used during the race (Bliznevskaja, 2004, 2006; Kvåle, 2010; Sipalä, 2014). During the research the following correlations between the ski-orienteering technique and the route choice were identified among 14 – 16 years old orienteers. Speed and time spent affect the time used for reading the map, the route choice, errors made, as well as in general. Route choice analyses among SV14 – 16 years old orienteers revelaed that only one member of the group for all stages of the course had made a 100% optimal route choice. Most participants did it only in 70-80% of cases and mainly in the short and lightweight stages of the distance. Aim of the study: to identify correlations between the ski technique application and the route choice in ski orienteering.

Key words: *ski orienteering, ski orienteering technique and tactics, optimal route choice*

Introduction

Ski orienteering is a fast, dynamic, and interesting sport from both an orienteering and a ski perspective (Kvåle, 2010, p.3). Ski orienteering is a sport, in which athletes try to ski and visit a certain number of checkpoints placed in an area in a certain order with the help of a map and a compass in the shortest possible time. The technical orienteering preparedness should be predominant over the ski reparedness. In recent years, ski orienteering race results show that an outstanding athlete in this sport knows how to effectively apply the technically-tactical orienteering techniques in any situation, as well as a very fast, agile, and masterful skier.

The ski technique of ski orienteering is significantly different from the cross-country ski technique, as each race takes place in a new area, where the narrow, wide, and very wide skiing tracks are specially prepared according to the terrain of the area, vegetation, snow and weather conditions. It is undeniable that, in order to improve orienteers' ski technique skills, the research conducted in cross-country technique improvement, point to the effectiveness that should also be taken into account in orienteers' preparation. Both the adaption of step cycle length in a variable terrain and to various movement speeds (Nilsson, Tveit, Eikrehagen, 2002) and the skier's strategic techniques, the significance of explosive strength and highly developed motricity are of special importance (Lindinger, Stöggl, Müller, Holmberg, 2008).

An orienteer enters the track for the first time immediately after the start signal. By skiing in unknown tracks, during the race athletes mainly apply the classical steps in the narrow ski tracks, skating steps - in the wide ones. Moreover, it is done without changing the equipment, as well as in distance, depending on the situation, independently transitions the steps from classical steps to skating steps and vice versa in different variations (Bliznevskaja, 2006, p.47; Казанцев, 2010, с.31).

General orienteering and skiing skills and abilities are not enough for the preparation of new orienteers to later successfully participate in ski orienteering races. The training process must include special exercises for the improvement of ski orienteering technically-tactical methods related to movement – skiing and the orienteer's cognitive abilities – route choice and decision-making (Seiler, 1989, 1996; Voronov, 2002). During races, it was observed that the less experienced orienteers apply techniques that they are able to perform the best, so they often choose the routes where they can apply the specific ("for them the most convenient") steps instead of choosing the shortest, most optimal route variant between the checkpoints (Bliznevskaja, Bliznevskij, 2008,p. 316).

Material and methods

The study or the race observation was carried out during the "Estonian SKIO Weekend" ski orienteering sprint race on January 9, 2016. The study included 19 orienteers aged 14 to 16. During the study the following was applied: 1) surveillance to determine the influencing factors of the ski orienteering race performance for an orienteer of the M14 age group; 2) surveying to determine the dominant skimovement types in different ski tracks for orienteers aged 14 to 16 (19 participants). 3) Analysis of the orienteering race result protocols to determine the orienteers' route choice in the courses of the race distance in MW14 – 16 age groups. During the study, qualitative data were obtained on both race tracks, parameters characterizing their quality and compliance in the map and the orienteers' race performance – ski orienteering technique application and its connection to the route choice as well as other influencing factors.

Results

1. By analysing athletes' technically-tactical performances, it was concluded that three types of ski tracks had been prepared for the race, which in the orienteering map are depicted as follows:

1) the very wide tracks, which amounted to 10% of the tracks depicted in the map (Fig. 1).

The tracks were prepared with snow retracks and they were of good quality – well rammed, hard, also icy in some places, but flat and without natural obstacles. The quality of the track surface was similar on level ground, terrain, open and semi-open places. Overall, it allowed the athletes to maintain steady skiing and to develop a good movement speed. In the everyday life, the mentioned tracks are used for cross-country skiing training and the race process organization, with the difference that cross-country skiers move in a set direction, while orienteers move in different, freely selected directions during the race. A trail of classical steps was prepared in the outer side of the track. The track layout gave the athletes an opportunity to apply both skating steps and classical ski steps.

A B

Figure 1. The very wide ski track on level ground (A) and terrain (B) in the ski orienteering race map and the area

From a safety perspective, the downhill areas and turns of the track were sufficiently wide, well visible and the skiers could freely overtake each other and perform safe counter-skiing. During the race, the track quality did not change.

2) the wide tracks amounted to 60% of the skiing tracks depicted in the map (Fig. 2), which had been prepared specifically for the race with a snowmobile, repeatedly ramming the snow a few days before the race and shortly before the start on the race day. Depending on the location and the technical possibilities to prepare the track, their width was on the average from 1.8 to 3m:

- the tracks, which were prepared in forest or rural roads, cross ride areas were mainly 2 to 3m wide on level ground and gave an opportunity to move fast enough. The track quality did not differ in the forest, in an open or semi-open area and they are intended for skating step application, as well as it was possible to overtake and safely counter-ski on these tracks. As for the surface quality, the tracks were less flat, softer and there was a difference between the surface in the middle of the track and on the outer sides. Natural obstacles were not observed on the tracks.

A B

Figure 2. The wide ski track on level ground (A) and terrain (B) in the ski orienteering race map and the area

- the tracks, which were prepared in open areas, were of higher quality and harder in comparison to the tracks in the forest. When overtaking or counter-skiing, it was safer to choose the classical or skate ski steps. The tracks in the terrain had a lower quality surface. They were distinctly softer, less flat with soil bumps and with natural obstacles (grass, fallen leaves and twigs). During the race, the track quality changed, because the soil ground vegetation was further removed due to athletes' movements. In some places, distinct snow ramparts were observed on the outer sides of

the track. In comparison to the very wide track, these tracks were a lot softer, uneven, as well as distinctly narrower, with harder visible and sharper turns, which in turn made it necessary to apply a more often ski step change and step transitions, which affected the speed.

3) ▬▬▬▬▬▬ the narrow tracks amounted to 20% of all the tracks depicted on the map (Fig. 3).

A B

Figure 3. The narrow ski track on level ground (A) and terrain (B) in the ski orienteering race map ▬▬▬▬▬▬ and the area

The narrow tracks were prepared with a snowmobile by entering and ramming a trail 2 – 3 times before the race. The track width was from 0.8 to 1.2m, with distinct snow ramparts along the sides, which contributed to both a poorer visibility and a distinctly slower speed on level ground and terrain.

The quality of the narrow tracks after the snow coverage was determined by the specific place of the area:

- in the area of the path and firebreak network the prepared tracks were harder, smoother, and straighter. They corresponded to the path branching profile on the map. The tracks had less natural obstacles;
- in open areas, the tracks were characterized by better and thicker snow surface quality. They were harder in comparison to those prepared in the forest. The tracks were relatively narrower. When preparing the track and bypassing trees, bushes, and stumps, in some places the tracks obtained a zig-zag shape with sharp short turns, which were not depicted on the map.

The narrow tracks are more suitable for classical skisteps and only in a few places it is possible to apply skate steps. Overtaking and counter skiing is difficult in such tracks, especially in the terrain. In comparison to the wide or very wide tracks, the narrow tracks were of significantly lower quality. These tracks were narrower and slower. There were a lot of fast turns with poor visibility. During the race, the track quality changed and

they became even softer, as well as wider as the participants were trying to apply skate steps.

Factors influencing the route choice according to surveillance:

1) the skitrack crossroad prepared in the area did not correspond to the depiction on the race map (Fig. 4). In the map, the marked "T" junction to the left was followed by two track branches to the right, while a perpendicular junction was prepared in the area. The track, which joins the junction from the south, was prepared more than 5m to the left. This case is a mistake made by the organizers in track preparation. When skiing into the track junction, the race participant became confused and a mistake was made.

Figure 4. The non-compliance of the specially prepared ski orienteering track to its depiction in the race map

2) In four cases, it was found that wide tracks were prepared in the area, while in the map they were depicted as narrow tracks (see Fig. 5).

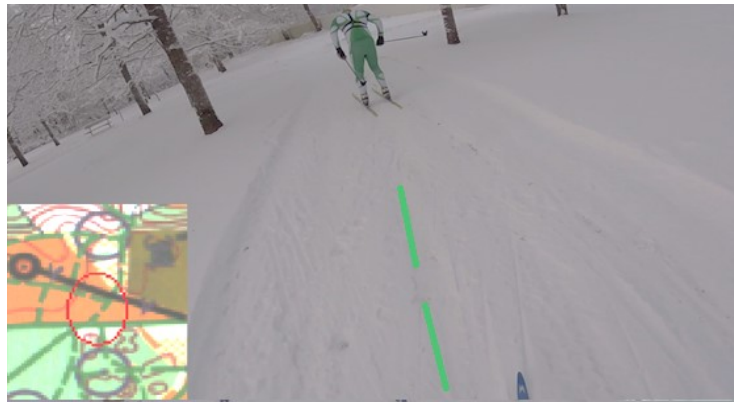

Figure 5. Non-compliance of ski tracks – the map shows a narrow track, while a wide track has been prepared in the area

When an orienteer makes a decision on the route choice in a course, they take into account the information provided by the race map. If the map depicts a narrow track, the participant, whilst reading the map, imagines and allows the possibility that this track will be narrow, with a low-quality track surface – less flat, softer and with natural obstacles. The athlete assumes that the skiing speed will be slower in this track, rather than in the wide track. Without seeing the skiing track in the area, the participant makes a different route choice on the map, which may be longer, but leads through the wide tracks, which theoretically should develop a faster speed.

3) In two cases an error was found when a narrow track was prepared in the area, although it was depicted as a wide track on the race map (see Fig. 6). Also in these cases, according to the information on the race map, the athlete believes that it will be wide, qualitative and with fast skiing.

Fig. 6. **Ski track non-compliance – the map depicts a wide track, while a narrow skiing track has been prepared in the area**

4) Participants of the race shortened the distance in several places through "cutting the corners", making a new trail in the area. 90^0 track junctions were most often shortened by creating a new trail in a 45^0 angle against this junction (see Fig. 7). Making a new trail shortens the distance, but the speed and the time spent in such a course does not always decrease, because it should be noted that by doing it, the speed will be slower than through the specially prepared tracks.

Figure 7. Race track shortening at a junction

5)Track quality deterioration, especially in narrow skiing tracks, which were characterized by a small snow cover (5 – 10cm) already before the race. During the race, the soil ground vegetation (grass, leaves) was uncovered almost completely in these tracks, they were made wider and trampled down (Fig. 8).

Figure 8. A short track during the race

Undoubtably the advantage belongs to those participants, who start the race first, while the last ones have to ski on less qualitative, softer and slower tracks. Changes in track quality are affected by the load of the specific course, so the number of participants. Tracks, through which representatives of several age groups are skiing, are becoming less qualitative and, thus, movements through them are significantly slower.

6) Athletes' race performance is significantly affected by various side and unforeseen factors, such as other athletes' and the athlete's own

7) falls, uncoordinated actions in overtaking, counter skiing. Often spectators and passers-by are moving and paddling the prepared skiing tracks.

By analysing the video material, the finish protocol and by measuring the covered distance, the results indicate that the observed participant in the M14 group did a 3243m long distance (direct distance on the map 2650m), of which 1409m or 43.45% the participant was skiing on the wide tracks (21 out of 70 registered cases), 1233m or 38.02% – on the narrow skiing tracks (39 out of 70 registered cases) and 601m or 18.53% – on the very wide tracks (10 out of 70 registered cases).

In the finish protocol of the race it is visible that the observed participant did the entire distance in 15:58min with an average speed of 5:54 min/km. The average speed in short (up to 150m), medium (200 – 300m) and long (from 300m) courses of the distance were 5:34min/km, 6:37min/km and 5:34min/km, respectively.

The fastest skiing was in the very wide skiing tracks, where the average skiing speed was 4:46km/min. The slowest skiing was in the narrow tracks, where the average speed was 6:45min/km. In turn, in the wide tracks the average speed was 5:4min/km.

The participants' average skiing speed in courses was respectively: on level ground – 5:55min/km, on uphill slopes – 7:46min/km, on downhill slopes – 4:49min/km. These indicators were dependent on the specifics of the tracks, application of the ski technique and the technical performance of movement types in the respective courses.

The analyses of the observed participants' race operation-ski technique application was carried out by analysing the skiing type application in the very wide, wide and narrow tracks in the video material. The technical execution of the movement types was characterized, analysing the cyclical movements of the front ends of the skis and the expansion angle and the recoil with poles. Factors that affected the technical execution of skiing movement types in the courses of the distance were identified.

Characterization of the technical performance of the ski orienteering movement types:

1) *In the wide ski track:*

1) *V1 skate* as a movement type was applied the most often on both the level ground and the terrain. It was used by 19 out of 153 registered cases or in 12.42%.

The technical performance: on level ground and downhill slopes in a movement forward oriented glide with a pronounced weight shift from one ski to the other, the expansion of the front ends of the skis – 70^0, a simultaneous recoil with poles in the symmetric variant, but a full recoil is

not executed, the upper body is lightly tilted forward. During downhill slopes and the moments when reading the map, a transition to a skate without pushing off with poles with arm swings; in uphill slopes – in a movement forward to the sides oriented glide, which was shorter, and in a wider ski expansion (more than 70^0), a pronounced weight shift from one ski to the other, a simultaneous recoil with the poles in the asymmetrical variant, when the left arm was more directed to the front and the right hand was closer to the body. During the uphill slopes transitions to a diagonal V-skate or a V2 alternate skate were observed.

2) *skate without pushing off with poles with arm swings* in an average expansion was applied when resting during downhill slopes and on level ground. During the moments when the map was read, it was used in 8 out of the 153 registered cases or in 5.22%.

The technical performance: on level ground in a movement towards the side oriented glide with a pronounced weight shift from one ski to the other, expansion of the front ends of the skis of more than 70^0, performed a strong recoil with the ski, the upper body was maintained in a vertical position. During downhill slopes – a forward oriented long glide with a pronounced weight shift from one ski to the other, the expansion of the front ends of the skis – 70^0, the upper body bent forward.

3) *V2 skate* was applied after leaving the start corridor and sometimes during uphill slopes. It was used in 5 out of the 153 registered cases or in 3.27%.

The technical performance: on level ground in a movement directed to the side a glide without a pronounced weight shift from one ski to the other, the expansion of the front ends of the skis – 70^0, performed a strong recoil with both the ski and a simultaneous recoil with the poles, the upper body was slightly inclined forwards. In the uphill slopes – in a movement towards the side directed short glide without a pronounced weight shift from one ski to the other, the expansion of the front ends of the skis was more than 70^0, the upper body was bent forwards, a short and quick performance, a transition to diagonal V-skate or the "herringbone" ascent was observed.

4) *other movement types* – on level ground *V2 alternate skate* (2 out of the 153 registered cases or 1.31%), *double pole stride* (2 out of the 153 registered cases or 1.31%), on uphill slopes *diagonal V-skate* (1 out of the 153 registered cases or 0.65%), *"herringbone" ascent* (1 out of the 153 registered cases or 0.65%), on downhill slopes *stemming* (2 out of the 153 registered cases or 1.31%). These movement types were applied episodically, when overtaking or counter skiing, entering a junction or turning or when checking off at a checkpoint. Thus, it is impossible to

characterize the technical performance, as well as it is impossible to characterize the constant transitions from one step to another.

2) *In the narrow ski track:*

1) V1 skate was most often applied as a skiing type in both level ground and terrain; it was used in 26 out of the 153 registered cases or in 16.99%.

The technical performance: on level ground and downhill slopes – in a movement directed forwards short glide without a pronounced weight shift from one ski to the other, the expansion of the front ends of the skis was narrowed from 30 to 50^0, a simultaneous, short and often performed recoil with the poles in the symmetrical variant. But full recoil was not performed; the upper body mainly retained a vertical state. On downhill slopes and when reading the map, a transition to a double pole stride followed. On uphill slopes – in a movement towards the side more oriented glide, which was shorter, and in a wider ski expansion (more than 50^0), without a pronounced weight shift from one ski to the other, a simultaneous recoil with the poles in an asymmetrical variant, when the left hand was more directed to the front and the right hand was closer to the body, during uphill slopes transitions to a diagonal V-skate or a V2 alternate skate were observed.

2) double pole stride was used as a ski type on both level ground and terrain. During moment when it was impossible to perform a V1 skate, for example, it was used when moving around obstacles, overtaking, counter skiing, visiting a checkpoint, also in cases when a new trail in the snow was made or when pushing up into a small uphill slope (under h=2,5m). It was applied in 26 out of the 153 registered cases or in 16.99% of cases.

The technical performance: on level ground the recoil with the poles was longer, rather than during an uphill slope, where it was short and frequent. A glide on parallel skis depended on the track surface quality, the harder and flatter it was, the faster the glide, whereas if ground vegetation was uncovered on the track, then the glide was relatively slower.

3) V2 alternate skate was performed during courses, where it was impossible to perform V1 skate (15 out of the 153 registered cases or 9.80%), when avoiding obstacles, making a turn, during slalom skiing.

The technical performance: the V2 alternate skate performance was very similar to the V1 skate performance in a narrow ski expansion, but the difference of these steps was observed in the video material. When performing V2 alternate skate, the slide on one ski remained and recoil to the side was made with the other ski. Most often the V2 alternate skate was done with the right leg. The recoil with the poles was short, incomplete, but strong enough.

4) "herringbone" ascent with a running and/or climbing ski in a narrow ski expansion (4 out of the 153 registered cases or 1.31%), it was executed when overcoming steeper uphill slopes.

5) *other movement types* – on level ground *skate without pushing off with poles with arm swings* in a narrow ski expansion. It was applied when resting during downhill slopes and on level ground, during moments when the map was read (2 out of the 153 registered cases or 1.31%), on uphill slopes – *diagonal V-skate* (3 out of the 153 registered cases or 1.96%) in a narrow ski expansion, *diagonal stride* (2 out of the 153 registered cases or 1.31%) with a running step. These movement types were applied episodically hence, it is impossible to characterize the technical performance, as well as it is impossible to characterize the constant transfers from one step to another.

3) *In the very wide ski track:*

1) V1 skate as a ski type was most often applied on both level ground and terrain; it was used in 12 out of the 153 registered cases or in 7.84%.

The technical performance: on level ground and downhill slopes in a movement forwards oriented glide with a pronounced weight shift from one ski to the other, the expansion of the front ends of the skis – 70^0, a simultaneous recoil with the poles in the symmetric variant, a full recoil with the poles, the upper body is slightly bent forward. On downhill slopes and when the map is read a transition to a skate without pushing off with poles with arm swings followed. During uphill slopes – in a movement towards the side oriented glide, which was shorter, and in a wider ski expansion (more than 70^0), a pronounced weight shift from one ski to the other, a simultaneous recoil with the poles in the symmetric, in some places asymmetric variant, when the left hand was directed more forwards and the right hand was closer to the body. On uphill slopes transitions to diagonal V-skate or V2 skate are observed.

2) Skate without pushing off with poles with arm swings in a wide ski expansion was applied on downhill slopes and on level ground, when the map was read. It was used in 4 out of the 153 registered cases or in 2.61%.

The technical performance: on level ground and downhill slopes in a forward oriented movement glide with a pronounced weight shift from one ski to the other, expansion of the front ends of the skis of more than 70^0, performed a strong recoil with the ski, the upper body remained in a vertical state on the plain. On downhill slopes – in a forward oriented movement long glide with a pronounced weight shift from one ski to the other, expansion of the front ends of the skis – 70^0, the upper body bent forwards.

3) V2 skate was applied at the beginning of an uphill slope (2 out of the 153 registered cases or 1.31%).

The technical performance: on uphill slopes towards the side oriented movement a short, fast glide without a pronounced weight shift from one ski to the other. The expansion of the front ends of the skis of more than 70^0, performed a strong recoil with both the ski and a simultaneous recoil with the poles, the upper body slightly bent forwards followed by transitions to V1 skate or diagonal V-skate.

4) other movement types – on uphill slopes *diagonal V-skate* (2 out of the 153 registered cases or 1.31%), *"herringbone" ascent* (1 out of the 153 registered cases or 0.65%). These movement types were applied episodically, on uphill slopes, when a transition from one movement type to another took place. Thus, it is impossible to characterize the technical performance, as well as it is impossible to characterize the transitions made from one step to another.

It was found that the participant manages the skiing types, applies them in appropriate situations during the distance courses, in the narrow tracks the double pole stride (26 registered cases) and the two step double pole (26 registered cases), as well as the latter in the wide tracks (19 registered cases) and the very wide tracks (12 registered cases). However, in some places it can be observed that the technical performance of the skating steps was incomplete. For example, the weight was not shifted, resulting in the glide being short, or did not perform a full recoil with the poles, it shows that the leg strength was used more than the arm strength, in some places there were difficulties to maintain the dynamic balance, which led to falls (2 registered cases). The overall performance of skiing types was affected by the very frequent transitions from one step to another. The video material showed that in the narrow tracks the participant tried to ski in V1 skate, which was followed by V2 alternate skate, then again V1 skate, then double pole stride. Each step was performed with 2 – 4 recoils with the poles or skis. Similarly, in the wide ski tracks when skiing on an uphill slope 3 – 4 steps were carried out one step double pole, then V1 skate, followed by a transition to diagonal V-skate. At the ridge of the mountain the last steps were performed in "herringbone" ascent. Was able to apply the "junction cutting" and "track shortening" (2 registered cases) tactics, making a new trail in the snow, at the same time it can be observed that due to getting influenced from other participants, the speed decreased, the map was re-read (2 registered cases).

By compiling the data obtained via surveillance, it can be concluded that in the observed races in the M14 group distance the best participant

mainly skied through the narrow forest tracks. In the ski orienteering race, from distance skiing types, mostly the following were used:

1) the symmetric and asymmetric versions of V1 skate in a narrow and wide ski expansion (57 registered cases, out of all 148),
2) the double pole stride (28 registered cases, out of all 148),
3) V2 alternate skate (17 registered cases, out of all 148).
4) Other skiing types were episodically observed in the video material depending on the ski track profile, nature of the area and factors that hindered the performance of V1 skate.

2. During the study, in a survey with questionnaire the dominating skiing types were determined in various tracks for orienteers aged 14 to 16.

The result analyses show that:

- *in the very wide tracks on level ground* from the number of registered participants most often the following skiing types are used: V1 skate – 17, V2 skate – 9, skate without pushing off with poles with arm swings - 6, on downhill slopes, low crouch position – 12 and crouch position – 3, on uphill slopes of up to 20^0 steepness V1 skate – 10, V2 skate and diagonal V-skate – 8, and on uphill slopes of over 20^0 steepness diagonal V-skate – 9 and V1 skate – 8 participants.
- *in the wide tracks on level ground* from the number of registered participants most often the following movement types were used: V1 skate - 15 and V2 skate – 8 participants, but on downhill slopes the low crouch position – 11 and crouch position - 8 participants. On uphill slopes with up to 20^0 steepness V1 skate is applied by – 13 and on uphill slopes of over 20^0 steepness V1 skate – 9, but move up the mountain in "herringbone" ascent – 8 participants.
- *in the narrow tracks on level ground* from the number of registered participants the most used was V1 skate – 10 and double pole stride – 9 participants. On downhill slopes the "snow plough" or "half snow plough" stemming – 10 participants, as well as 9 apply the low and/or high crouch position. On uphill slopes of up to 20^0 steepness 11 apply the "herringbone" ascent and 8 – V2 alternate skate, but on uphill slopes of over 20^0 steepness "herringbone" ascent is applied by – 17 participants.
- *in the very narrow tracks on level ground* from the number of registered participants 9 most often apply double pole stride, on downhill slopes 9 apply the high crouch position and 9 – "snow plough" or "half snow plough" stemming. On uphill slopes of up to 20^0 steepness 13 apply the "herringbone" ascent, whereas on uphill slopes of over 20^0 steepness 15 participants apply the "herringbone" ascent, as well as 6 participants remove the skis and run.

- By comparing the survey data of the MW14-16 age group with the ski technique application of a M14 group's orienteers, it can be concluded that the ski technique application is similar, because in both the wide and the narrow skiing tracks the V1 skate is used as the basic step and only on uphill slopes of the narrow tracks MW14 – 16 mark that they apply the "herringbone" ascent more.

The technique application is closely related to the athlete's general and specific physical preparedness. Thus, in the survey result processing analysis the data obtained on orienteers' (aged from 14 to 16) level of general physical preparedness were observed, using the Likert-type response variants (where 1 means very poor, 2 – moderate, 3 – good, 4 – very good, 5 – perfect).

When evaluating their general physical preparedness, 9 participants marked it as good, 7 – as very good and 3 as perfect. 10 participants evaluated the specific physical preparedness for ski orienteering as good, as moderate – 6, but 2 as very good and as very poor - 1 participant. In turn, in their own general endurance self-assessment 11 participants evaluated it as very good, 7 – as good, but 1 participant as perfect. 10 participants evaluated the orienteering special endurance as good, 9 as very well. However, 8 participants have evaluated the skiing special endurance as very good, 6 as good, but 2 as perfect and 2 as moderate, 1 participant evaluates it as very poor.

Analogous to the study, where during the video material analysis the factors influencing the observed participant's race performance were fixed – skiing track specifics, pedestrians, counter skiing, orienteering error etc. During the surveying the factors that affect the skiing speed and time spent in the ski orienteering race distance were determined.

The survey results how that for the MW14-16 age group's orienteers the dominating skiing types for ski orienteering are:

- *in the very wide and wide tracks:* on level ground V1 skate, on downhill slopes - low crouch position, on uphill slopes V1 skate or diagonal V-skate;
- *in the narrow and very narrow tracks:* on level ground apply V1 skate and double pole stride. On downhill slopes – "snow plough" or "half snow plough" stemming, as well as use the low and/or the high crouch position. On uphill slopes - "herringbone" ascent V2 alternate skate, as well as the movement type, when they take off the skis and run.

The obtained results also suggest that the speed and the time spend in the distance is affected by the time of map reading and making a route choice, the orienteering mistakes, and the level of general physical and specific physical preparedness.

The data obtained can also be extended to the orienteers aged 14 to 16. At the same time it is important to keep in mind that, when filling in a survey, the individuals' oftens are not objective in their self-assessment. The data obtained via surveying show the general trend in this age group.

3. The optimal route choice in each stage of the race route between the checkpoints was determined in all MW14 – 16 age groups, carrying out an analysis of the race finish protocol and the marked route choice. The choice of the fastest route during a time interval was considered the optimal route choice. Route choices made by other participants were also determined.

The race distance in the M14 age group included 10 courses. From all 5 participants, the optimal route choice in the 10 courses of the race distance was made as follows 3 participants in 8 courses (80%), 2 participants in 7 courses (70%), 1 participant in 4 courses (40%).

Similarly to the observed participant, others also made mistakes in the first course due to the non-compliance between the orienteering map and the prepared tracks. In the second, third, fourth and sixth course all participants made the optimal route choice. In the fifth course according to the map, all three route choices were similar in terms of the distance, but the width and quality of the tracks differed. However, the route choice in the broad track was the fastest. In the seventh, eighth and ninth course it was possible to make different route choices. The observed participant made the optimal route choice in all these courses the fastest, choosing to ski in the broad tracks.

The race distance in the W14 age group consisted of 8 courses. From all 4 participants, the optimal route choice was made by: 1 participant in 7 courses (88%), 1 participant in 6 courses (75%), 1 participant in 5 courses (63%), 1 participant in one course (13%).

In the first course according to the map, both route choices were similar in terms of the distance.However, the track profiles differed. Hence, those participants who made the choice to ski in the narrow tracks performed these courses slower. In the second course both route choices were similar in terms of the stage length and level of difficulty, here the winner was the one who was more technically prepared to ski in the narrow tracks. In the third course, all participants made the optimal route choice. In the fourth, fifth and sixth course the participants made two route choices, from which the fastest was skiing in the wide skiing tracks and crossing short periods of the narrow track.

The race distance in the M16 age group included 12 courses. From all 5 participants, the optimal route choice in the courses of the race distance

was made by: 2 participants in 10 courses (83%), 1 participant in 9 courses (75%), 1 participant in 8 courses (67%), 1 participant in 7 courses (58%).

In this age group, all participants made the optimal route choice in 6 courses (out of 12). Many route choices appeared in courses where it was possible to choose a longer route variant by skiing in the wide tracks of better quality. However, the results show that in the seventh, eighth and ninth course the winner made the route choice that is going through the narrow skiing tracks. In turn, in the eleventh course, the winner made the longest route choice, yet the optimal choice in the wide track.

The race distance in the W16 age group consisted of 10 courses. From all 4 participants, the optimal route choice in the courses of the race distance was madeas follows: 1 participant in 10 courses (100%), 1 participant in 9 courses (90%), 1 participant in 8 courses (80%), 1 participant in 7 courses (70%).

In six courses, all participants made the optimal route choice, in the seventh and eighth course 1participant selected the longest route choice; however, he skied the easiest variant in the wide track.

The analyses of the optimal route choice in the MW14-16 age group ski orienteering shows that in the specific race only one participant (in the W16 group) made 100% the optimal route choice in all courses. Most participants made the optimal route choice in 70-80% of the cases. It was determined by the stage length and level of difficulty.

The optimal route choice during the whole distance was different in each age group, if evaluating the route choice division in the wide, very wide and narrow tracks. The M14-16 group mostly skied in the narrow tracks, while the W14 – 16 groups – in the wide tracks. Similarly, the new orienteers of the MW14 group made different route choices, and the time spent in the distance and the course time (min) was also comparatively different among the participants unlike in the MW16 age group, where the participants saw the optimal route variant in the map and realized it more often. And time spent in the distance courses between the MW16 participants was more similar or differed only by a few seconds.

Surveying was carried out to determine the factors that affect the decision-making and the route choice for orienteers aged from 14 to 16.

Obtained data, show that in choosing the route in ski orienteering, orienteers aged 14 to 16 take into consideration the following:

-sometimes the shortest route variant, not taking into account their general physical preparedness, the skiing track characterization or the characterization of the area – 9 out of 19 participants;

-almost always the shortest memorized route variant – 10 out of 19p.;

-almost never the shortest harder memorized route variant - 8 out of 19 p.;

-almost always the easiest route variant from skiing perspective – 9 out of 19 p.;

-almost always the easiest route variant from orienteering perspective – 7 out of 19 p.;

-sometimes the optimal route variant, taking into account their general physical preparedness - 8 out of 19 p.;

-sometimes the optimal route variant, taking into consideration the characterization of the track – 8 out of 19 p.;

-sometimes the optimal route variant, taking into account the terrain characterization - 9 out of 19 p.;

-sometimes the optimal route variant, taking into consideration their general physical preparedness and the terrain characterization – 10 out of 19 p.;

-sometimes the optimal route variant, taking into account their general physical preparedness and the characterization of the tracks – 9 out of 19 p.;

-almost always the optimal route variant, taking into consideration the characterization of the skiing tracks and the terrain characterization - 10 out of 19 p.;

-almost always the route variant chosen by other participants - 9 out of 19 p.;

-almost never, sometimes almost always, the route is chosen unintentionally – each answer 5 out of 19 p.

The participants think that the optimal route choice is:

-sometimes, almost always the shortest and fastest – in both cases 5 out of 19 p.;

-sometimes, almost always the shortest and easier memorized – in both cases 7 out of 19 p.;

-almost always the easiest from skiing perspective – 8 out of 19 p.;

-almost always the easiest from orienteering perspective – 12 out of 19 p.;

-almost always the easiest from the general physical preparedness perspective – 9 out of 19 p.

When evaluating the suggested route choice (see Fig. 20) between variants A and B, 18 out of 19 participants selected variant B.

Figure 20. Route choice

Participants stated about variant B:

-this is always the easiest variant – 8 out of 18 p.;

-always is a fast skier on a plain – 9 out of 18 p.;

-is never afraid of high climbs and quick downhill slopes – 8 out of 18 p.; however, if it is possible to choose – chooses to go around the mountain.

The surveying data show that the decision on route choice is almost always determined by the shortest memorized variant, the easiest route variant from a skiing perspective, the optimal variant according to the terrain characterization, as well as the optimal route is chosen, taking into account the track characterization and the terrain characterization. The majority points out that making the decision on route choice is not connected to the general physical preparedness.

In a sense the technical element of ski orienteering – the optimal route choice is not a measurable indicator, because every time in every race there are a lot of external and internal factors that directly or indirectly affect each orienteer's thinking processes and the ability to make a decision on the optimal route choice.

Discussion

The non-compliance between the skiing tracks depicted in the race map and the ones prepared in the area confuses the athlete and it can be said that the route choice is based on "pure luck". When reading a map, the orienteers mainly make the decision on route choice, which leads directly to the wide tracks, and often perform a longer route choice variant on tracks that can be skied better and faster than when taking the shorter route, if it leads to the narrow skiing tracks (Alexandrova, 2011; Kvåle, 2010). However, if this longer route in the area through the wider tracks planned according to the map has to actually be done in the narrow track, and then the participant performs this stage significantly longer than planned.

It is important, especially for young athletes, that the information provided in the map corresponds to the actual situation in the area.

Experienced athletes are better at perceiving the information on the map and are able to better connect it with the area and most often do not make mistakes due to these non-compliances.

In the distance the athletes' route choice and performance is affected by 3 factor groups:

-depiction of the track on the map and non-compliance in the nature;

-application of athletes' tactical techniques during separate courses;

-additional factors (track quality, other participants, viewers (Voronov, 2002; Bliznevskaja, 2006).

Conclusions

During the study the following correlations were determined regarding the application of skiing types and route choice of orienteers aged 14 to 16:

1)The quality of very wide, wide and narrow tracks specially prepared in the ski orienteering race area, their precise depiction on the race map – determines the ski technique application and the ski speed choice in the distance courses. In the wide tracks, the average speed is higher than in the narrow tracks.

2)The best orienteer of the M14 group mostly skied through the forest, in the narrow tracks. During the race distance courses the orienteer mainly applied the symmetric and asymmetric version of V1 skate in the narrow and wide ski extension. Other skiing types were observed episodically and were applied depending on the factors that hindered the performance of V1 skate. The technically-tactical race performance of orienteering as decision-making regarding the route choice was made in 2-3 seconds, reading the map without interrupting the skiing. The map on average was read 2 – 3 times per course, depending on the length of the course and its level of difficulty.

3)The prevailing skiing types of ski orienteering for 14 to 16 year old orienteers are: *in the very wide and wide skiing tracks:* on level ground – V1 skate, on downhill slopes - low crouch position, on uphill slopes – V1 or diagonal V-skate; *in the narrow and very narrow skiing tracks:* on level ground – V1 skate and double pole stride; on downhill slopes – "snow plough" or "half snow plough" stemming, as well as crouch positions are used, on uphill slopes – "herringbone" ascent and V2 alternate skate, as well as the movement type when the orienteer removes the skis and runs. The speed and the time spent in the distance was affected by the time spent on reading the map and making route choices, the orienteering mistakes made and the general and specific physical preparedness.

4)In the MW14-16 age groups, the 100% optimal route choice was made by only one participant (in the W16 group) in all courses of their distance. Majority of participants made the optimal route choice in 70-80% of cases. It was determined by the length of the course, the level of difficulty of the course and the characterization of the track. In this particular race, most of the short and long courses were easily done by orienteering and skiing in the wide tracks, in these courses the orienteers chose the optimal route variant. However, the average courses were more difficult to be done by orienteering and skiing partially through both the narrow and the wide or through the narrow tracks. The optimal route choice throughout the distance differed in each age group, if the route choice division in the wide, very wide and narrow tracks is analysed. M14 – 16 skied mostly in the narrow tracks, W14 – 16 – in the wide tracks. Orienteers of the MW14 age group made different route choices more often and the time spent in the distance and the course times (min) were rather different between themselves rather than in the MW16 age group, where the participants made the optimal route choice more often, futhermore the time spent in the distance courses between the participants was more similar, or differed by only a few seconds. When choosing a route, orienteers aged 14 to 16 almost always choose the shortest, more easily manageable route choice, taking into account the characterization of the terrain, ski tracks and their own physical preparedness. The route choice was also determined by the orienteering mistakes that were made.

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ORIGINAL RESEARCH PAPER

THE POSSIBILITY OF SPORT AS A MEANS FOR RECONCILIATION - TEACHING METHOD OF "RECONCILIATION" IN A JUNIOR HIGH SCHOOL PHYSICAL EDUCATION CLASS

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Abstract

What is sport as a means of reconciliation? This is a very difficult problem. And at the same time, this is also a profound educational subject who is intended to utilize the social function of sport culture positively and effectively. Considering sport as a means of an assumption, presupposes that there exist certain argument disputes or conflicts caused by shortage of common understanding, to be reconciled. How can sport help to solve problems left unsolved in the world of today? This paper examines North and South Korea combined participation in the Pyeongchang Winter Olympic Games 2018 as a big sport event example and as a National Ainu museum establishment in Japan for Tokyo Summer Olympic Games 2020 as an ethnic issue example Furthermore it serves as a case study on possibility of sport as a means for reconciliation from the viewpoint of physical education pedagogy. About the Pyeongchang Games, Asahi Shinbun reported, "(South Korea) President Moon Jae-in hopes the first Winter Games on Korean soil could produce more of these feel-good sparks of seeming reconciliation", "This small squad - or no athletes at all - could make it difficult to create a mood of reconciliation" and "Participation in Pyeongchang could "provide a turning point for the reconciliation between the South and North," Moon said." In Japan, construction of the National Ainu Museum was determined on the occasion of the Tokyo Olympic Games. This is because Japan accepted "The United Nations Declaration on the Rights of Indigenous Peoples" in the United Nations in 2007. This study examined two cases. One is the combined participation of North and South Korea with the Pyeongchang Winter Olympic Games as a globa

(international) issue and the other is the construction of National Ainu Museum as a local (domestic) issue.
The result of the examination is as follows. These two cases suggest a proposal about the "reconciliation" role that sport plays as a means. New version of "The Commentary of the Courses of Study for Junior High School : the volume on Health and Physical Education" (referred to as "The New Commentary") (MEXT, 2017), because its content has been described on "International Charter of Physical Education, Physical Activity and Sport (referred to as "The New Charter") (UNESCO, 2015) .
As a result, it was confirmed that sport plays promising role as a means of "reconciliation". And it was pointed out that there was the necessity of recognizing the function of "reconciliation" that sport has in a physical education class for "international goodwill" and "world peace." Accordingly, it may be said that the role of sport is expected to be one of the possibilities of "reconciliation" of the global and local issues. Learning this role greatly contributes to education called the human being (personality) formation that a physical education class brings up a member of society.
Up till now, the demonstrability of these two cases is not confirmed yet; they are still underway and have not provided the final result. However, the next two points have been made: a role of sport as a means of "reconciliation" and the usefulness of learning the role in a physical education class.

Key Words: *Reconciliation, Physical Education Class, Theory of Sport and Physical Education Korea, Ainu*

Introduction

As a global statement about "reconciliation", the UNESCO formulated and declared "International Charter of Physical Education, Physical Activity and Sport (referred to as "The New Charter")" in the general meeting of 2015. "Recognizing that physical education, physical activity and sport can bring a variety of individual and societal benefits, such as health, social and economic development, youth empowerment, reconciliation and peace," states the preamble of the Charter, article 6. The feature of this sentence lies in picking up the modern and concrete keywords such as "empowerment, reconciliation, peace" about social side concept, in addition to the popular concept of "physical/mental health."

Here described are "Reconciliation" and "peace" in parallel. In other words, "reconciliation" and "peace" are both personal and social benefits that sport can bring (purpose and achievement), and for this purpose it is interpreted that there is one of the roles (functions) of sport as a means/method. Accordingly, this sentence shows the one-way causal relationship of bringing about "sport" →"reconciliation/peace", not that

"sport" itself is not the final goal, ”whereby sport” will be positioned as a means / method for achieving the purpose.

The Course of Study for Junior High School (Health and Physical Education) is now revised in Japan, and new course of study and commentary are available on the homepage of Ministry of Education, Culture, Sport, Science and Technology (MEXT, 2017). Physical education theory unit of this New Commentary, just as The Old Commentary did, shows "international goodwill" and "world peace" which exemplify "global physical spiritual health" of above-mentioned in The New Charter, and global sport festival such as the Olympic Games, there is no change in the wording of the document between The Old and New Commentaries. Also in The New Commentary, direct relation of "sport" → "peace" is the same as The New Charter. However, the word itself "reconciliation" is referred to in nether its Old (MEXT, 2008) nor New Commentary (MEXT, 2017).

This relation would generally be approved of as many people may recognize. However, can "peace" be achieved merely by holding a sport event? Although it is impossible to analyze every past sport event immediately here now, the sport event with “peace” as its object is only Olympic Games; there are currently no reports where “peace” was achieved by a sport event. This is because, when ”sport” is identified with ”peace” as in two examples in addition to Olympics, it is because it must be shown clearly "what" of Sport leads to "reconciliation." Moreover, "What is sport" has already been clarified as an assumption. Even now, the common understanding of the concept of sport has not been made yet in the West, Europe and Japan (MEXT, 2017).

As noted so far, although there is no emotive contradiction in "sport" → "reconciliation / peace" in a causal relation of "phenomena → achievement", but it is difficult directly apply this method, because there are situations where sport does not reconcile conflict. Therefore, we need a different perception of some sort. For this reason, what we have to consider is the usefulness of learning in physical education class in term of the way of thinking of "reconciliation" in sport and the function of "reconciliation" which sport served for.

The concept of "reconciliation" as a social function of sport culture is missing in present Japan. From the viewpoint of Physical Education Pedagogy aiming for better physical education class, this study will examine how this "reconciliation" should be caught in modern society and also consider the concept of "reconciliation" in physical education class which aims to propose teaching material development called learning content in this research.

Methods and Materials

This study is a based on fundamental methods for teaching material development from the viewpoint of physical education pedagogy. For this reason, the viewpoint of education is a basic assumption of the study.

As a procedure, firstly, the concept of "reconciliation" is sorted out and examined. Next, regarding the way of physical education that is required globally in contemporary society, this study examines "The International Charter on Physical Education, Physical Activity and Sport " developed by UNESCO. After this, this study examines the word “reconciliation” in a new version of “The Commentary of The Course of The study for Junior High School: The volume on Health and Physical Education" in Japan (MEXT, 2017). Furthermore, based on these results, two global and local cases triggered by the Olympic Games will be picked up and considered as teaching material development in introducing this concept of "reconciliation" into physical education classes.

The reason why the Olympic Games were cited as an example in this study is that The International Olympic Committee (IOC) clearly refers to the word of "peace" which is related to "reconciliation" in The Olympic Charter (IOC, 2016) as the Olympic philosophy. The word or the concept of "peace" is not found in the ideology of other large-scale international sport events at the present time.

Discussion

1 How "reconciliation" is understood in sport

How should the word "reconciliation" be captured in sport? (Because the Japanese course of study is also analyzed. How to interpret "reconciliation" in Japanese is shown in note1.

Sport is a real phenomenon and actual condition that occurs in reality. For this reason, the function "reconciliation" does not exist in sport itself as an objective phenomenon. Players and spectators while playing may be aware of "reconciliation", or remark about it. However, that awareness is an emotional sense or thought that players and spectators feel as human beings. In other words, the sport itself which is occurring as a phenomenon does not feel it, but is the subjective feeling of human beings concerned in sport. Therefore, the phenomenon itself of sport cannot be a party of "reconciliation" itself.

Speaking logically, "reconciliation" is a role as effect of physical, mental and social method and means which are given sensitivity to a phenomenon of sport to the heart of players (human being) and the individuals who already have mutual strife and conflict.

2 The content of physical education and sport required globally in contemporary society. In 2015, The International Charter of Physical Education, Physical Activity and Sport developed jointly by Intergovernmental Committee for Physical Education and Sport (CIGEPS) and Permanent Consultative Council (PCC) were announced after approval of the General Assembly. This is a revision of the 1st edition "International Charter of Physical Education and Sport (UNESCO, 1978)" which was announced as the original edition in 1978 (UNESCO, 1978). The reason for this revision has been stated below: "Based on the universal spirit of The Old Charter, and integrating the significant evolutions in the field of sport since 1978, the revised Charter introduces universal principles such as gender equality, non-discrimination and social inclusion in and through sport. It also highlights the benefits of physical activity, the sustainability of sport, the inclusion of persons with disabilities and the protection of children.

While The Original Charter (The Old Charter) consists of 12 preamble and 8 articles (appendix material), The New Charter consists of 13 preamble and 12 articles (Table 1). In terms of content, both The Original and The New Charters are supposed to be based on The United Nations Charter in the first item and The Universal Declaration of Human Rights in the second item.

Table 1

International Charter of Physical Education,
Physical Activity and Sport (Preamble)

1. Recalling that in the Charter of the United Nations the peoples proclaimed their faith in fundamental human rights and in the dignity and worth of the human person, and affirmed their determination to promote social progress and better standards of life;
2. Recalling that by the terms of the Universal Declaration of Human Rights, everyone is entitled to all the rights and freedoms set forth therein without discrimination of any kind, such as to race, color, sex, language, religion, political or other opinion, national or social origin, property, birth or other status;
3. Convinced that a condition for the exercise of human rights is the safety and freedom of every human being to develop and preserve their physical, psychological and social well-being and capabilities;
4. Emphasizing that resources, authority and responsibility for physical education, physical activity and sport must be allocated without discrimination on the basis of gender, age, disability or any other basis, to overcome the exclusion experienced by vulnerable or marginalized groups;
5. Acknowledging that cultural diversity in physical education, physical activity and sport forms part of humanity's intangible heritage and includes physical play, recreation, dance, organized, casual, competitive, traditional and indigenous sport and games;
6. Recognizing that physical education, physical activity and sport can bring a variety of individual and societal benefits, such as health, social and economic development, youth empowerment, reconciliation and peace;

Table 1 continue

7. Highlighting that the provision of quality physical education, physical activity and sport is essential, to realize their full potential to promote values such as fair play, equality, honesty, excellence, commitment, courage, teamwork, respect for rules and laws, respect for self and others, community spirit and solidarity, as well as fun and enjoyment;
8. Stressing that, in order to achieve quality physical education, physical activity and sport, all personnel, professional and volunteer alike, must have access to suitable training, supervision and counselling;
9. Underlining that early play experience with parents and careers, and participation in quality physical education are essential entry points for children to learn the skills, attitudes, values, knowledge, understanding and enjoyment necessary for lifelong participation in physical activity, sport and in society at large;
10. Emphasizing that physical education, physical activity and sport should seek to promote stronger bonds between people, solidarity, mutual respect and understanding, and respect for the integrity and dignity of every human being;
11. Insisting that concerted action and co-operation between stakeholders at all levels is the prerequisite for protecting the integrity and potential benefits of physical education, physical activity and sport from discrimination, racism, homophobia, bullying, doping, manipulation, excessive training of children, sexual exploitation, trafficking, as well as violence;
12. Aware that physical education, physical activity and sport can be enriched by undertaking them responsibly in a natural environment, and that this inspires respect for the Planet's resources and a concern to conserve and use these resources for the greater good of humanity;
13. Proclaims this International Charter that puts physical education, physical activity and sport at the service of human development, and urges everyone, especially governments, intergovernmental organizations, sport organizations, non-governmental entities, the business community, the media, educators, researchers, sport professionals and volunteers, participants and their support personnel, referees, families, as well as spectators to commit to and disseminate this Charter, so that its principles can become a reality for all human beings.

Comparing the preamble of these Original and The New Charters, the "a variety of individual and societal benefits" shown in the 6th item of The New Charter is based on “to preserve and develop the physical, intellectual and moral powers of the human being improves the quality of life at the national and the international levels" in The Original Charter. However, the words of "economic development" and "youth empowerment" including "reconciliation" in The New Charter are not found in The Original Charter.

Although these words themselves are not written in The original Charter, "a more effective contribution to the inculcation of fundamental human values underlying the full development of peoples" in The Original Charter or "promote closer communion between peoples and between individuals together with disinterested emulation, solidarity and fraternity, mutual respect and understanding, full respect for the intention and conten

as the phrase of "the integrity and dignity of human beings" are interpreted as being concretely declared as a keyword in accordance with the period of The New Charter enacted in 2015.

As the background of The New Charter, we can image the Afghanistan problem of refugees large-scale-sized all over Europe in 2014 (Japan Times, 2015) of the previous year, missiles by North Korea to the Japan Sea launched in 1993 (Japan Times, 2017) and onward, because we have been influenced under the international policies and economics. These circumstances have come to indicate the limit of structuralism theory of international relations which was accepted in Europe and the United States so far. The United Nations, The International Court of Justice, the historic powerhouse, related countries, etc. may have served as arbitrators in the past and often proceeded toward solution. However, they are not functioning satisfactorily at present and the situation remains unchanged.

The New Charter is not necessarily concerned with such concrete situations. However, there is no doubt about the situation that the content of Table 2 is being constrained. In the view of the present situation, the content of the 6th item of The New Charter "physical education, physical activity and sport can bring a variety of individual and societal benefits, such as health, social and economic development, youth empowerment, reconciliation and peace" is very important and to be considered.

Accordingly, we can say it is required worldwide for current sport to consider the concept of "a variety of individual and societal benefits" such as "reconciliation", "economic development", and "youth empowerment". It is also a problem that no actual examples proved "reconciliation" by sport. This is because the concrete evaluation criteria of "reconciliation/peace" are not clearly presented. If such criteria are unknown or ambiguous, there will naturally not be a common understanding between the parties.

Despite The Olympic Charter calling for world peace, firm results are not evident which means that "reconciliation" has not occurred. In other words, the Olympic Games as a sport event exists in the present situation, but it cannot be said to have fully demonstrated the function of "reconciliation."

Therefore, the role of physical education and sport in contemporary society, is supposed to improve the situation. However, physical education and sport are only possible means of “reconciliation”, since there is no clear case of international conflict or confirmation that can be led to "reconciliation" at the present time.

3 “Reconciliation” in the Commentary of the Course of Study for Junior High School. The word "reconciliation" does not appear The Old and New Commentary of The Courses of Study for Junior High School (the

volume on Health and Physical Education). However, as a similar concept, as in The Old and New Commentary, we can find the words "international goodwill" and "world peace" in physical education theory units. In Japan, the subject of health and physical education at junior high school consists of two major fields of physical education and health. This physical education field is composed of a total of 8 areas, each of 7 exercise areas and the area of physical education theory conducted in the classroom. Table 2 shows the major items of "physical education theory" unit for third-grade pupil at junior high school describing the words of "international goodwill" and "world peace."

The concrete contents of 1) -a) in Table 2 are as shown in Table 3- 1 (details later). The word of "reconciliation" is not used here. However, the content of the sentence "provide opportunities for a slow self-development" largely correspond to the contents of "new young empowerment" in Charter and "the charter concretely showing the cultural significance of sport both in Japan and abroad" is interpreted as the content that refers to the existence of this charter itself.

Table 2

Area of Theory of Sport and Physical Education
The Unit of Cultural Significance and Role of Global Sport Events

Theory of Sport and Physical Education
1) To enable the students to understand the significance of sport as culture.
a) Sport is important for leading a cultural life and living better.
b) The Olympics, international sport events and the like play a major role in international goodwill and world peace.
c) Sport brings people together people by transcending differences in ethnicity, country, race, gender and handicaps.

The concrete content of 1)-b) is shown in the 2nd item on Table 3. The word "reconciliation" is not used here either. However, similar words "international goodwill" and "world peace" are described. As can be seen from the context of this sentence, the content "to convey the educational significance and ethical value of the sport events, to deepen people's mutual understanding" implies the use sport as a means/method.

The Commentary of The Old and New Courses of Study in Japan identify sport as means and method of "international goodwill" and "world peace." This content corresponds to the content of 11 items of The Original Charter and item 11th of The New Charter. This to say, it shows that "international goodwill" and "world peace" are roles of the sport events. Although the successful case is not shown, the charter describes a realistic

expression that advances the meaning of the possibility of sport. In other words, the role of sport is equated with a practical means or method for "international goodwill" and "world peace".

The concrete content of 1)-c) is shown in the 3rd item on Table 3. The word "reconciliation" is not found here either. However, the sentence points out that there is the role of means/method in sport, there is cultural work to tie people to more than a race and a country, a race and the nature, havingobstacle or not, age and an area, a difference such as the climate for s port." This content corresponds to the content of the 2nd items of The Original Charter and the 4th item of The New Charter.

As seen so far, the word of "reconciliation" is not described in The Old and New version of The Commentary. At the same time, the content that The Original and The New Charter intended is reflected in these Commentaries. Therefore, it is necessary and important to recapture "reconciliation" as an approximating concept of "international goodwill" and "world peace", in order for the content of physical education theory to become a more substantial content based on the global situation.

In this case, "reconciliation" by sport is positioned as a gradual means and a method of playing a role for "international goodwill" and "world peace". More correctly, it is not a direct cause/effect relation such as "sport" → "reconciliation/ peace" but a stepwise method/method such as "sport" →"reconciliation" → "peace" to be pursued (details later). In any case, it is not a main purpose just to hold sport (events), but in the case of "international goodwill" and "world peace", it is a main point to stress "reconciliation" as a cultural role in the work of sport.

Table 3

Detailed Contents of The Unit of "Cultural Significance and Role Played by Global Sport Events"

	Contents
1	Cultural significance of sport in modern life To enable the students to understand sport in modern life have important cultural significance to provide healthy mind and body, rich interchange and foster self-development opportunities necessary to live fruitful and a life worth living. And to enable the students to understand that there are the Charter showed cultural significance of sport concretely and the sport promotion plan etc.
2	Cultural significance and role played by global sport events To enable the students to understand that The Olympic Games, Paralympic Games and international sport events play a major role in international goodwill and world peace by conveying the educational significance and ethical value of sport to people around the world and deepening mutual understanding. And to enable the students to understand the charm of sport spread all over the world and the roles of the Olympic Games and international sport events play in international goodwill and world peace are becoming even greater by developing of media.

Table 3 countion

3	Cultural work of sport to connect people To enable the students to understand that sport has cultural work that connects people beyond differences such as ethnicity, country, race, gender, presence or absence of ability, age, region and natural climate. To enable the students to understand when coming into these cases, the word of "sport" itself is spreading all over the world beyond the difference of country, region and language and sport events to interchange beyond differences such as age, sex, disability etc.

4 Introduction of "reconciliation" to physical education class and its example case 4 – 1 An examination on introducing the concept of "reconciliation" to physical education class.

The introduction of the concept of "reconciliation" to the physical education class can be examined from a variety of viewpoints. Here, as mentioned in the beginning, it can be examined from the standpoint of Physical education/sport pedagogy.

Although the current state of education in modern nations is diverse, the purpose of education in the present Japan is defined in Act No. 120 of 2006 by The Basic Act on Education (MEXT, 2006) in Japan shown in Table 4.

Table 4

Basic Act on Education

Chapter I. Aims and Principles of Education (Aims of Education) Article 1 Education shall aim for the full development of personality and strive to nurture the citizens, sound in mind and body, who are imbued with the qualities necessary for those who form a peaceful and democratic state and society.

The direct and ultimate goal in this provision is "full development of personality" and its concrete content is "strive to nurture the citizens, sound in mind and body, who are imbued with the qualities for those who form a peaceful and democratic state and society".

Physical education is also positioned as a part of the comprehensive education. Accordingly, into the learning of a social sport role ”international goodwill” and “world peace” as written in no.3, it is proper procedure to introduce ”reconciliation.”

However, it is important to understand the educational meaning of "reconciliation" and devise the process of picking this up in classes no, so that the class time will not increase by incorporating this content newly.

4-2 "Reconciliation" in the examples

As described above, in the new and The Original Charters and The New and Old Courses of Study, "reconciliation" includes peace or

positioned in the same category as peace, and this relation is showed with 2 = 3, 1 → 2, 1 → 3 (fig.1).

However, this relation does not mean that "reconciliation" exists as a means/method of sport. In other words, it is focused on whether to consider "reconciliation" as a result of sport or as a possibility included in sport. For this reason, it will be important how to consider this "reconciliation".

Fig 1 shows that the implementation of a sport event leads to "international goodwill" and "World Peace". 1 → 3 is an ideal causal relationship, but this has no probability. The Olympic Games and various conventions have seen that it is not always the case that "international goodwill" and "world peace" always lead to a sport event.

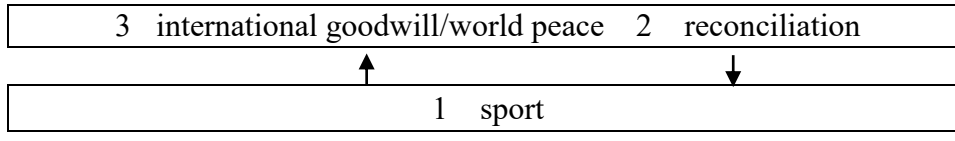

Figure 1. Consideration of Reconciliation 1

Then, how should this "reconciliation" is captured? This study views this "reconciliation" as a gradual work/role of the sport when learning in the class of the physical education theory. Therefore, it picks up the word "reconciliation" and proposes the concept "sport" → "reconciliation" → "peace".

These relations are shown to be in the schema of 1 → 2 → 3 in Fig 2. The connection of 1 → 3 is not direct, "reconciliation" will be closer to "3 international goodwill" and "world peace", by clarifying that 2 will be entered into the process of 1 → 3. "Reconciliation" presupposes a gradual means/method of playing sport or holding an event first.

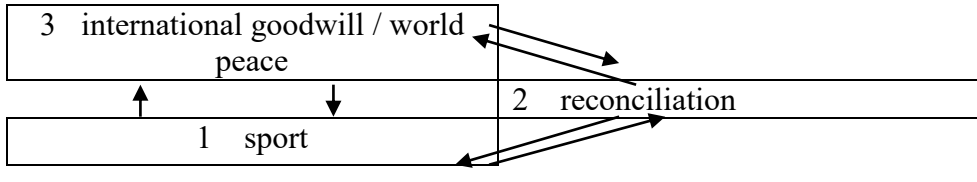

Figure 2. Consideration of Reconciliation 2

However, even if it is caught in the relation diagram of 1 → 2 → 3, it is not always the case that the conflicts that have already occurred are solved and the "international goodwill" and "world peace" are achieved simply by holding the sport event only one time. Players, directors and spectators who are actually participating in the sport event may have a consciousness of "reconciliation".

However, if the consciousness exists only for the person and only on the sporting spot, it has no broadness or objectivity.

Therefore, it is important, reasonable and realistic to think of a gradual or reversible correspondence relation such as 1 ⇔ 2 ⇔ 3 in Fig. 2 not as a only one-way diagram of 1 → 2 → 3, in order to realize the role of "sport" called "reconciliation."

However, it is impossible to explain to students in practical classes, because there is no report of success example based on this scheme.

4-3 The proposal of combined team formation between South Korea and North Korea. Under these circumstances, it is noteworthy that in 2017 Korea proposed the formation of a combined team with North Korea for the Pyeongchang Winter Olympic Games. In the past, there was participation of such a combined team in sport events, but now it is interrupted.

Why are relations between South Korea and North Korea bad? (Wikipedia, 2018) The reason for this is, briefly explained, that two separate regimes were established and not to be integrated after World War II. In other words, there is still a state now where the war has not ended yet between the two countries because it is in a cease-fire state under international law. Therefore, there is no official border between these two countries, and what is called a military borderline is drawn. In such a ceasefire situation, possession and launch of North Korean missiles and atomic bombs are nothing but a threat to the world, not to mention South Korea.

A possibility that global word of"reconciliation" has is examined in this study. Under this cease-fire state, Korea is exploring the path of democratic peace. The outline is as follows.

Unified football event of two countries are held in Seoul of Korea and Pyongyang of North Korea in 1990. In the next year, a combined team of these countries participated in World Youth Championships by International Football Federation (FIFA) held in Japan and Table Tennis World Championships in Portugal.

Furthermore, the two countries have joined in a joint admission with the opening ceremony of nine sport competitions so far, including the Sydney Olympic Games in 2000, the Asian Games in Pusan in Korea in 2002, the Athens Olympics in 2004 and so on. In addition, there were examples in which a football team leader visited Pyongyang for Asia Cup in Apr. 2017 and an ice hockey team leader visited Gangneung city in South Korea for test event for Olympic Games.

When seeing only these situations, 1→2 in Fig. 2 will be built. However, the relationship between the two countries has remained the same as before, and in the present situation it has not reached 2 → 3. Therefore, as

far as the current situation is concerned, 2 and 3 cannot be interpreted as the same level contents. In other words, partial "2 reconciliation" and the overall "3 international goodwill / world peace" are not directly connected as "=".

Based on such circumstances, South Korean president Moon Jae-in proposed a combined team with North Korea' to Lee Jong-seon ITF president on June 24, 2017 (Japan Times, 2017). In this background, South Korea is trying to reach peace with North Korea by using the Olympics. However, "The political environment must be resolved," North Korean member Chang Ung of the International Olympic Committee (IOC) said. North Korea first cited as a prerequisite the approval of the national Constitution and the cancel of sanctions from other countries.

How much power can sport demonstrate to such a political, economic dispute? No matter how optimistic we are, we have to say that its solution is difficult. Under the present circumstances, there is a discrepancy in the recognition of the problem from the start, because there is not a situation in which 1 → 2 of fig. 2 can be constructed. It takes time, but if this 1 → 2 is approved, 1 → 2 in the diagram will be enacted for the time being. In other words, it will prove the intention and possibility that "reconciliation" as a role of sport leads to "international goodwill" and "world peace".

In this way, the formation of a combined team will be the clue to "reconciliation."

Because the joint teams in the past provide evidence for possibility as "reconciliation." For 2 → 3, a wide variety of types, contents, and methods of the intended "reconciliation" must be examined comprehensively.

Then, what of sport content will become a clue to "reconciliation"? What of sport content leads to "international goodwill" and "world peace"? This is the content that is asked to students from the teacher, and at the same time it is also the important point that teacher want students to come up in class time. This is a pathway of 2 → 3, and if this is derived and set, it becomes the completion of a coherent schematization. However, as described above, currently there are no successful examples, the accuracy and probability of the answer are not justified. Even if students assume this answer, their answers may not be limited to one.

From the above, in the Physical education class, it is important for students to understand the contents that the sport event has a role to play for "international goodwill" and "World Peace" as a learning knowledge.

In this case, "reconciliation" will play the role of them by stages. And next, it will be a good learning and class of physical education which Develops a

thinking ability, judgment ability and expressive power that students will discuss about what a good point of sport will connect "reconciliation" with others in a group.

This answer will not be an accurate solution used in mathematical formulas. However, it is important for students to understand that the resolution of the dispute is not a solution by the repetition of the conflict, but there are possibilities and directions in which that these will be solved by the means and the method of "reconciliation" by sport.

4-4 Establishment of National Ainu Museum

The establishment of The National Ainu Museum has the following background. One is Japanese Government accepted "The United Nations Declaration on The Rights of Indigenous Peoples" in United Nations in 2007 and another is the Symbolic Space Basic Plan (ABHK, 1970; Cabinet Public Relation Office, 2018).

As the appendix appended data 3 showing, the establishment of this National Museum was not initially conceived for the purpose of inviting and fulfilling the Olympic Games, but it can be understood that it is due to the political and economic policies including the national recognition of the Ainu race as indigenous peoples and the insufficient countermeasures. It is said that the Ainu people lived in the age of Jomon period ceremonial culture as well as the mainland Japan (Honshu) in the past, and they now are widely living in Japan as Japanese. Because it was an ethnic group without letters/ character, the detail is largely recorded as the Ainu folklore oral records and other races.

Some books say that the mainland people (wajin) had seen a difference in the Ainu lives and customs and they have made discriminated against the Aborigines (the low-intelligence/barbarian) (Chiri, 2009; Hokkaido Daigaku, 2010; Arai, 1993) . Although the first appearance of the word of wajin is not certain, it is the word which was historically used mainly in Hokkaido as a word expressing the Japanese other than Ainu after the modern age. However, the Ainu called the wajin as "Sisam", "Shamo" or "Sisamuutara", as the meaning of "neighbor". Wajin did discrimination trade and restricted residence, and denied their fundamental human rights by making The Hokkaido Former Protection Law and Former aborigines school, etc (ABHK, 1970; Hokkaido Daigaku, 2010).

In 1457, the battle of Koshamain, a large-scale battle remaining in the history between the Wajin and the Ainu occurred, the battle of Shakshain in 1669 and the battle of Kunashiri-Menashi in 1789 also occurred (Hokkaido University Center, 2009). For the over three hundred years of these fighting backgrounds, due to the concern that the Ainu may be incorporated in Russia in the latter half of the 18th century, the Ainu

would be "different indigenous people" group, and it is said that the Goverment has a policy that tried to promote political and cultural assimilation for Wajin and to secure the possession of the Ezo land (Hokkaido University Center, 2010; Hirayama, 2008). Furthermore, it seems to have been influenced that the religion of the Ainu lived in Japan was basically pantheism (polytheism), while the religion of most Wajin was Buddhism.

In 1986, Prime Minister Nakasone Yasuhiro told "The United States is a compound state of multiple races, and education etc. is not necessarily easy, there are places that are far from reach (Chicagotribune , 1986). Since Japan is consisted by a single race, it is relatively easy to educate and reach by hand (an ellipsis)" at an apology interview of an intellectual level remark in The House of Representatives and got criticized by USA and the Utari Association. Racial discrimination against the Ainu race by bureaucrats is still going on now. And it is already known that overseas governments and research institutes stole and carried out the Ainu race's remains without permission, and their return have been currently taking place globally.

In this way, persecution to indigenous natives by persons of power is occurring not only in Japan, but also throughout the world. In 2011, in order to overcome this situation, the Government of Japan enacted "The Law Concerning The Promotion of The Ainu Race Culture and The Diffusion and Enlightenment of Knowledge on The Ainu Race Tradition, etc. to preserve the Ainu race culture (CAPP, 2018). If this develops, what happened at the Vancouver 2010 event in 2010 may happen in which something like a design that respectfully represents (First Nations such as Inuits living in Canada) could be the origin of the official emblem?
However, at this moment there is no such talk about the official emblem of the 2020 Tokyo Games. Currently, the Government of Japan is trying to regulate the opening time of The National Ainu Museum to 2020 when the Olympic Games will be held. The aim is to publicize to the world that the government, by peaceful Olympic Games, admits legitimate human rights of the Ainu race.

It may appear that this is not related to sport at first glance. However, as described in the above-mentioned International Charter of Physical Education, Physical Activity and Sport and The Course of Study, the terms of The Universal Declaration of Human Rights, "everyone is entitled to all the rights and freedoms set forth therein without discrimination of any kind, such as race, colour, sex, language, religion, political or other opinion, national or social origin, property, birth or other status", as Table 1-2 and Table 2-3.

In order to eliminate ethnic prejudice, "reconciliation" is necessary. Therefore, as a means/method against this prejudice, it is important to make "reconciliation" develop in this Museum. After the space to introduce the play and the exercise as the culture of Ainu in the National Ainu Museum is set up, if the visitor actually "see, hear, and know" them, the space and the time which can share the play and the exercise as the Ainu culture are secured there.

One such example is iomante. Iomante is one of the ritual festivals of the Ainu race that kill animals such as brown bears and send their soul, Kamui, to the gods world (kamuy mosir). It is a ritual of gratitude to nature that carefully breeds brown bears and others living in the natural world, then slaughters and uses the meat and leather as a souvenir of Kamui in actual life. Today, breeding and slaughtering of bears is not actually done, but Iomante, the festival of salmon who came back to the river, is being reported on TV every year. In this way, as a means/method of "reconciliation", "seeing, listening, knowing, and experiencing" the culture accompanying the physical activity of its ethnic group is also related to "understanding, sharing and supporting" this culture.

About the relationship of sport by the course of study, "There is a wide variety of ways to be involved in exercise and sport, such as performing, watching and supporting them" in unit of "To enable the students to understand that exercise and sport are diverse." Therefore, it is possible that encountering the culture of the Ainu race through physical activity like Iomante may have a function as "reconciliation" for ethnic understanding. This is similar to the presentation of cultural and art which was incorporated in the early stage of the Olympic Games, and is currently being performed in the opening ceremony and closing ceremony as art performance.

4-5 Validity of the example

The validity of the examples here depends upon whether sport as a means/method can have the work/role of "reconciliation." It was confirmed that sport had the validity of "reconciliation" as described in 4-3 and 4-4 when this was compared with The Commentary of The Course of Study for Junior High School in the Japan. However, none of the two raised here has been implemented and it is not possible to examine its progress and results. As a result of this paper, the title is settled to be "the possibility of reconciliation achieved by sport as a mean/method".

It is thought that the concept of "reconciliation" will clarify the position of sport as learning materials in class in the future by reviewing the progress of these two examples and examining the results.

Conclusions

The conclusions obtained from the above results are mainly divided into the following two. First, sport as a means/method is to be recognized as possessing the possibility of "reconciliation", and its function (work/role) is worldwide now. Second, the usefulness of learning the sport's function of "reconciliation" in the physical education class has been confirmed. The conflicts that are occurring throughout the world are diverse, complicated and often prolonged. However, human beings should make "reconciliation" in the conflicts. To that end, it is essential to educate human beings who can understand the function of "reconciliation" and students are required to learn "reconciliation."

The sport class is naturally included in one of the culture of education, because the sport is seen as a culture in the world now. Preserving and inheriting a historical culture is a preservation of culture. Improvement and change which make culture better by responding to changes in the times and societies is the development of culture. Therefore, in order to put various disputes in "reconciliation", it is necessary and indispensable at the same time to have the education which develops a social culture of human formation (character) who can understand this.

For this reason, in actual physical education class, it is important to properly understand the word "reconciliation" and position it as a learning content. However, doing sport does not mean that all conflicts are "reconciliated." Both of these are prospects based on the interpretation of the literature, and there is no probability that the mutual relationships of sport and "reconciliation" are always constructed as shown in Fig.2. In the absence of the empirical example, the objects of the "reconciliation" will vary widely, because the contents of the conflicts that already occurred are various. For this reason, it is presumed that the method must be elastic and flexible.

The Understanding and proposition of these ”reconciliation” based on International Charter of Physical Education, Physical Activity and Sport by UNESCO and the new version of The Commentary of The Course of Study for Junior High School in Japan can be various depending on the condition of countries and societies.

In addition, at 9th Jun. 2018, North Korea announced to participate in Pyongyang Olympic Games (Japan Times, 2018). Nobody knows the real intention of North Korea, but South Korea is said to have used well the Olympic Games as a sport event.

Therefore, further studies have to be done to collect, analyze and examine The Course of Study, physical education theory class in each country, Pyongyang Olympic Games and the teaching plan based on these issues in the future.

Note

1 "Reconciliation" in dictionary definitions

According to some Japanese dictionaries, the word "reconciliation" is explained as follows.

Table 1

Explanation of “Reconciliation”

dictionary	explanation
Reconciliation (1)	和解，仲直り，調停，調和，一致，服従，締め(←日本語で)
Reconciliation = Wakai (2)	相互の意思がやわらいで，とけあうこと。なかなおり。争いをしている当事者が互いに譲歩しあって，その間の争いをやめることを約する契約。示談。
Wakai (3)	争いを止めて仲直りすること。和睦。また，仲裁すること。
Wakai (4)	仲直りすること。民事上の紛争で，当事者が譲り合って争いをやめること。また，その契約。

(1) Shigeru Takebayashi (ed.), New English-Japanese Dictionary, p.2056, Kenkyusha, 2002. (2) Izuru Niimura (ed.), Koujien, version 6, Iwanami Shoten, CACIO electronic dictionary, 2008. (3) Shougakukan Kokugo Jiten Hensyuubu (ed.), Seisenban Nihongo Dai Jiten, Shougakukan, CACIO electronic dictionary, 2006. (4) Yasuo Kitahara (ed.), Meikyo Kokugo Jiten, CACIO electronic dictionary, 2011.

The Japanese translation indicated first is ”reconciliation” in New English- Japanese Dictionary (1). In English "reconciliation" is transcribed into "Wakai" in Japanese. This word is not a loanword but a Japanese language, and this is used as a word meaning the above situation as explained in Japan, and has become established.As a meaning of this word, the word "nakanaori=reconciliation" comes out in every dictionary. The reconciliation is that the relationship between which the relationship has gone bad is to get along again (2).

These findings in this study, this word of "reconciliation" in sport is positioned as a means to "wakai= reconciliation ."

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ORIGINAL RESEARCH PAPER

COMPARISON OF ATTITUDE TOWARDS COMPULSORY PHYSICAL ACTIVITY AT THE UNIVERSITY AMONG STUDENTS FROM LATVIA AND BELARUS IN THE CONTEXT OF EXPERIENCE IN PHYSICAL EDUCATION

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Abstract

Students' attitude towards compulsory physical activity at the university has not been extensively studied in the context of their experience in physical education and existing multiple interpretations of criteria for assessing the experience in physical education. The goal of the research is – to determine the attitude towards compulsory physical activity at the University of University Students from Latvia and Belarus by assessing their experience in physical education, determining the indicator "Students' experience in physical education" based on the attitude criteria of the Theory of Planed Behaviour (TPB). The questionnaire involved 145 students (20.3±1.9) from the Riga Technical University and 111 students (19.1±1.1) from the Belarusian State University of Physical Training from the Faculty of Tourism and Hospitality. Methods: The T-test was used for independent and dependent samples, as well as factor analysis, correlation analysis, and linear regression. Results: In both countries, a scale based on

the TPB criteria measures the indicator "Students' attitude towards physical education" at all school periods. The indicator "Students' experience in physical education" can be assessed according to the developed TPB attitude criteria. The results show a statistically significant correlation between the experience in physical education gained at high school and the students' attitude towards compulsory physical activity at the university

Key words: *attitude, compulsory physical activity at university, experience, physical education, university students*

Introduction

Similarly to the rest of the world, for a significant part of students in Latvia and Belarus physical activity during leisure is lower than the recommended level (Vecenāne & Fernāte, 2012; Сулейманова, 2017), despite the fact that the improvement and preservation of health is the main motivating factor for physical activity in both Latvia and Belarus: in Belarus, students are aware of the impact of physical activity on health, and in Latvia, 82% of students have a positive attitude towards physical activity (Studentu un jauniešu sportošanas paradumi, 2012; Шаповалова & Врублевская, 2012). However, students list lack of time as the main obstacle to its implementation in everyday life (Ābele, 2014; Сулейманова, 2017).

After the restoration of independence in Latvia, compulsory physical activity at the university is not prescribed by the Law on Institutions of Higher Education, but at two higher education institutions physical activity is still compulsory for the first-year students (Studentu un jauniešu sportošanas paradumi, 2012). Nonetheless, compulsory physical activity has been preserved at universities in Belarus. The organization of such activity eliminates the obstacles to being physically active at the university; however, in both countries up to 50% of students show indifferent or negative attitude towards compulsory physical activity at the university (Koroļova, 2010; Šišlova & Fernāte, 2016; Vecenāne & Fernāte, 2012; Коледа & Новицкая, 2015; Сакович & Кузьмицкая, 2017; Шаповалова & Врублевская, 2012). It has been determined the attitude towards physical education is deteriorating (Carcamo et al., 2016; Subramaniama & Silverman, 2007), which, according to our assumption, may influence the attitude towards sport activity at the university.

Taking into account the above, as well as the fact that attitude is the beliefs and conviction that is related to experienced emotions and is formed in life experience and knowledge acquisition (Ghanji, 2001; Karimi, 1998; Špona, 2004), one might think about the negative experience during

physical education, which are included in the general education curriculum, as the negative experience in physical education was mentioned as an obstructive factor for participation in physical activity for both adolescents and youth, as well as adults (Allender et al., 2006; Beltrán-Carrillo et al., 2012; Brooks & Magnusson, 2006; Cardinal et al., 2013; Lewis, 2014; Strean, 2009; Subramaniama & Silverman, 2007). Students with a negative experience in physical education do not regularly attend the compulsory physical activity at the university and sometimes submit unjustified exemptions from physical activity (Šišlova & Fernāte, 2017). In study by B.Cardinal, Yan & M.Cardinal, (2013) about negative experiences in physical activity, was told that the people' accumulated experience, both good and bad, helps to shape their attitude and behaviour, feelings associated with experience are preserved as memories.

There is no common approach to determining the criteria of experience in physical education and physical activity and they have been identified as motivating or demotivating factors for the participation or absence of students, youth and adults in physical education and physical activity, interpreting the interviews according to the Self Determination Theory (SDT), Social Cognition Theory (SCT) and the TPB (Allender et al., 2006; Brooks & Magnusson, 2006; Beltrán-Carrillo et al., 2012, Cardinal et al., 2013; Lewis, 2014; Strean, 2009). The found criteria have not been established as the criteria defining the experience in sport. However, the TPB six semantic differentials *Useless/Useful; Negative/Positive (Bad/Good); Harmful/Beneficial; Unenjoyable/enjoyable; Undesirable/Desirable; Boring/Interesting* are applied around the world to determine the attitude towards physical activity and physical education (Baker et al., 2003; Gucciardi & Jackson, 2015; Gulley & Boggs, 2013). It is important physical education should be meaningful (Subramaniama & Silverman, 2007). The importance of the criterion *"Benefits"* has also been noted in other studies where TPB was not applied (Šišlova & Fernāte, 2015). Despite the fact that the use of TPB criteria is widespread throughout the world for the assessment of attitude towards physical education, the practice of TPB application is less prevalent in Easter Europe, as it requires a test adoption or development of a test according to the theory, which is a sufficiently complicated process related to the test validation check.

Students' attitude towards compulsory physical activity at the university has not been extensively studied in the context of their experience in physical education and existing multiple interpretations of criteria for assessing the experience in physical education. The aim of study is to determine the attitude towards compulsory physical activity at the University of University Students from Latvia and the Republic of Belarus

by assessing their experience in physical education at school, determining the indicator *"Students' experience in physical education"* based on the TPB attitude criteria.

Material and methods

The pilot research involved 145 students (72 women and 73 men) aged from 18 to 25 (20.3±1.9) from the Riga Technical University (RTU), for whom sport activity was compulsory in the first study year, 111 students (57 women and 54 men) aged from 18 to 23 (19.1±1.1) from the Belarusian State University of Physical Training (BSUPT) from the Faculty of Tourism and Hospitality, where subjects of the study programme are not sport related. In Belarus, physical activity is compulsory for 3 academic years for all students in all universities. RTU and BSUPT students had practically the same opportunities to choose sports: aerobics, athletic gymnastics, curative gymnastics, basketball, box, wrestling, swimming, track and field athletics, and volleyball. Students were offered to fill in the questionnaire voluntarily and anonymously in the presence of the researcher.

For the assessment of students' attitude towards physical education at primary school (grades 1 – 4), secondary school (grades 5–9) and high school (grades 10 – 12), an affirmation was formulated, which includes 6 specially developed criteria based on the TPB attitude semantic differentials - *Useless/Useful; Harmful/Beneficial; Unenjoyable/Enjoyable; Undesirable/Desirable; Boring/Interesting* (Baker et al., 2003; Gulley & Boggs, 2013; Gucciardi & Jackson, 2015), that physical education should be meaningful (Subramaniama & Silverman, 2007):

"Please, assess whether the sport classes" (according to a 5-point scale:1 – strongly disagree, 2 – disagree, 3 – undecided, 4 – agree, 5 – strongly agree):

1. Were useful;	***2. Were meaningful;***	***3. Gave benefits;***
4. Gave a sense of joy;	*5. Were desirable;*	*6. Were interesting*

The criteria were assigned the following titles: *"Useful", Meaningful", "Benefits", "Enjoyable", "Desirable", "Interesting".*

To determine whether students' experience in physical education can be assessed according to the TPB attitude criteria, as well as the direct measurement of students' attitude towards physical education, the method for simultaneously determining criteria validation was applied, when comparing the questions using correlation coefficient (Culbertson, Weychrauch & Huffcutt, 2017). For this purpose, in parallel to the TPB criteria question, the questionnaire also included the following direct questions: *"How do you assess your attitude towards physical education at primary school, secondary school and high school?"; "How do you assess*

your experience in physical education at primary school, secondary school and high school?" (According to a 5-point scale: 1 – very negative, 2 – negative, 3 – neutral, 4 – positive, 5 – very positive). In Latvia, the questions were asked in Latvian, in Belarus – in Russian. To determine whether the questions in both languages form the same structure, the principal axis factoring (PAF) of factor analysis was applied, which allows to obtain a more accurate solution in alignment measuring scale with theory (Dombrowski, McGill & Canivez, 2017).

For the analysis of results, descriptive statistics was used – arithmetic mean, standard deviation, and conclusive statistics – T-test for independent samples, paired sample T-test, factor analysis, regression analysis, Pearson correlation analysis. For the behavioural sciences, Cohen's standard (Cohen et al., 2003) will be used to evaluate the correlation coefficient to determine the strength of the relationship, or the effect size, where correlation coefficients between 0.10 and 0.29 represent a small association, coefficients between 0.30 and 0.49 represent a medium association, and coefficients of 0.50 and above represent a large association or relationship. The statistical significance criteria $p<0.05$. The results were processed using the Statistical Package for the Social Sciences (SPSS) version 23.0.

Results

In Latvia and Belarus at the beginning of studies at the university, the students' attitude towards physical activity was positive 3.88±1.04 and 3.72±1.06 respectively, and was not significantly different ($p=0.718>0.05$). It was more positive than at high school in Latvia, but in Belarus it was not change. Table 1 shows the statistical results of assessing students' attitude and experience in physical education according to the direct question, as well as evaluating students' attitude in physical education according to the TPB criteria.

Table 1

Students' Attitude, Experience in Physical Education According to the Direct Question, and Attitude towards Physical Education According to the TPB Criteria in Latvia and Belarus

		Primary School			**Secondary School**			**High School**		
		Mean	SD	p	Mean	SD	p	Mean	SD	p
Attitude towards PE	LAT	4.11	0.70	0.227	3.83	0.90	0.825	3.55	1.23	0.169
	BEL	3.98	1.00		3.82	0.96		3.72	1.02	
Experience in PE	LAT	3.83	0.97	0.036	3.56	1.00	1.000	3.36	1.18	0.026
	BEL	3.57	0.99		3.56	0.88		3.64	0.98	
Useful	LAT	3.77	1.22	0.509	3.63	1.09	0.831	3.39	1.28	0.215
	BEL	3.66	1.38		3.67	1.32		3.59	1.39	

Table 1 countion

Meaningful	**LAT**	**3.51**	**1.07**	**0.736**	**3.52**	**0.94**	**0.778**	**3.37**	**1.23**	**0.658**
	BEL	3.56	1.20		3.56	1.00		3.44	1.34	
Benefits	LAT	3.54	1.20	0.078	3.54	1.07	0.028	3.33	1.23	0.666
	BEL	3.26	1.29		3.23	1.23		3.26	1.35	
Enjoyable	LAT	3.79	1.21	0.856	3.49	1.16	0.825	3.34	1.31	0.150
	BEL	3.77	1.18		3,52	1.20		3.57	1.25	
Desirable	LAT	3.74	1,16	0.044	3.35	1.13	0.009	3.30	1.25	0.002
	BEL	4.05	1.19		3.74	1.19		3.79	1.24	
Interesting	LAT	3.77	1.16	0.371	3.45	1.10	0.680	3.31	1.26	0.976
	BEL	3.63	1.37		3.39	1.26		3.32	1.36	

Note. PE: physical education; LAT: Latvia; BEL: Belarus.

T-test for independent samples showed, that dispersions are not significantly different (Levene's tests $p>0.05$) and the average results of attitude assessment of Latvian and Belarussian samples were not significantly different ($p>0.05$). Differences have been determined when assessing experience at primary school and high school, as well as criteria *"Benefits"* at secondary school, and *"Desirable"* at all stages ($p\leq0.05$).

The results of factor analysis showed, that a factor according to the theory was established, which measures the indicator *"Students' attitude towards physical education"* according to the TPB attitude criteria *"Useful", "Meaningful", "Benefits", "Enjoyable", "Desirable", "Interesting"* at primary, secondary and high school in both Latvia and Belarus (Table 2).

Table 2.

Results of Factor Analysis and the Internal consistency of the scale

		Primary School	**Secondary School**	**High School**
Kaiser-Meyer-Olkin (KMO) Measure	Latvia	0.860	0.868	0.891
	Belarus	0.805	0.796	0.794
The Bartlett's Sphericity Test (BST), χ^2	Latvia	459.707	584.462	655.192
	Belarus	661.268	587.991	622.148
Extraction Sums of Squared Loadings, %	Latvia	57.224	63.805	68.500
	Belarus	69.348	65.532	67.521
Factor Loadings	Latvia	0.652 - 0.846	0.690 - 0.868	0.759 - 0.860
	Belarus	0.722 - 0.943	0.694 - 0.947	0.693 - 0.926
Cronbach Alfa	Latvia	0.887	0.911	0.928
	Belarus	0.930	0.915	0.922

Latvia (n = 145), Belarus (n = 111)

For both samples KMO indicator of sampling adequacy was high, as well as the indicator of BST was significant, $p<0.0001$. These results indicated that the sample size was sufficient in relation to the number of items of the YES-S, as well as that the correlations between the items significantly differed from zero and the items was suitable for factor distribution.

For both samples the obtained factor explains the criteria measured from 57.22% to 69.35%, which shows that the structure of the factor was good, as well as six criteria loaded obtained factor with a high loading of 0.652 - 0.947 (Lovik et al., 2017), which indicates that the developed scale was highly related to the known TPB attitude scales. The scales have one theoretical basis. The internal consistency of the scale - Cronbach Alfa was high.

The obtained results have been summarized graphically in Figure 1, which provides a well-visible picture of the dynamics of the studied criteria.

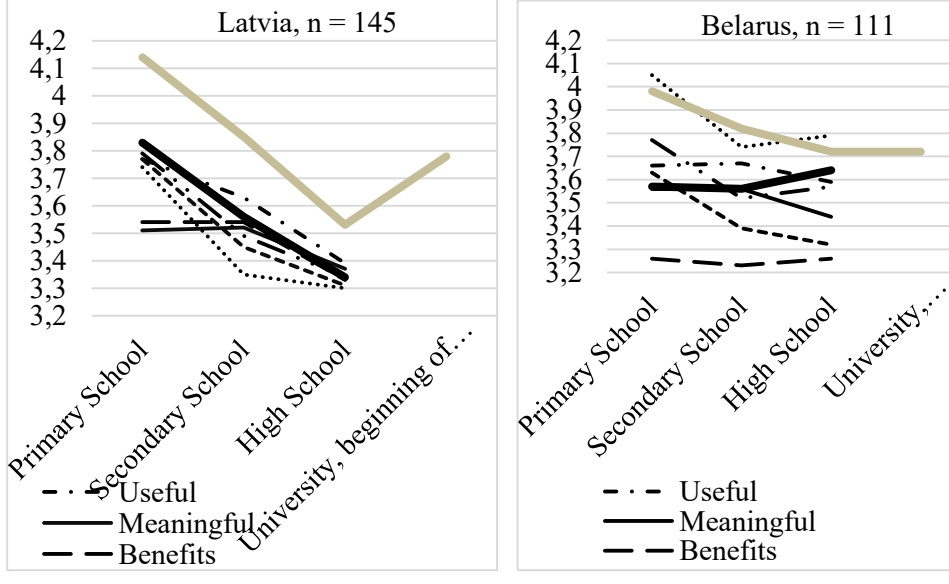


Figure 1. Dynamics of students' attitude and experience in physical education assessment

In the course of school, the assessment of the TPB attitude criteria for students in Latvia significantly deteriorated at all stages of school and at high school they were not exceed the mark 3.40 on a 5-point scale. At elementary school, criteria *"Meaningful"* and *"Benefits"* had lower scores and at primary school they did not significantly change, their significant deterioration took place at high school. In Belarus, changes in student

assessment were not so unequivocal. Significant deterioration predominantly occurred in the period primary school – secondary school, while assessments for criteria *"Useful", "Meaningful"* and *"Interesting"* significantly deteriorated at high school. The variable *"Benefits"* had lower evaluations and they did not change throughout school. According to the direct question, the attitude towards physical education considerably deteriorated both in Latvia and in Belarus. Reliability of the change confirm paired sample t criterion: $p \leq 0.05$.

Correlations between evaluations of students' attitude and experience in physical education according to the TPB criteria and assessments of students' attitude and experience in physical education according to the direct question are presented in Table 3.

Table 3

Correlations between Attitude TPB Criteria and Attitude and Experience in Physical Education at School According to the Direct Question

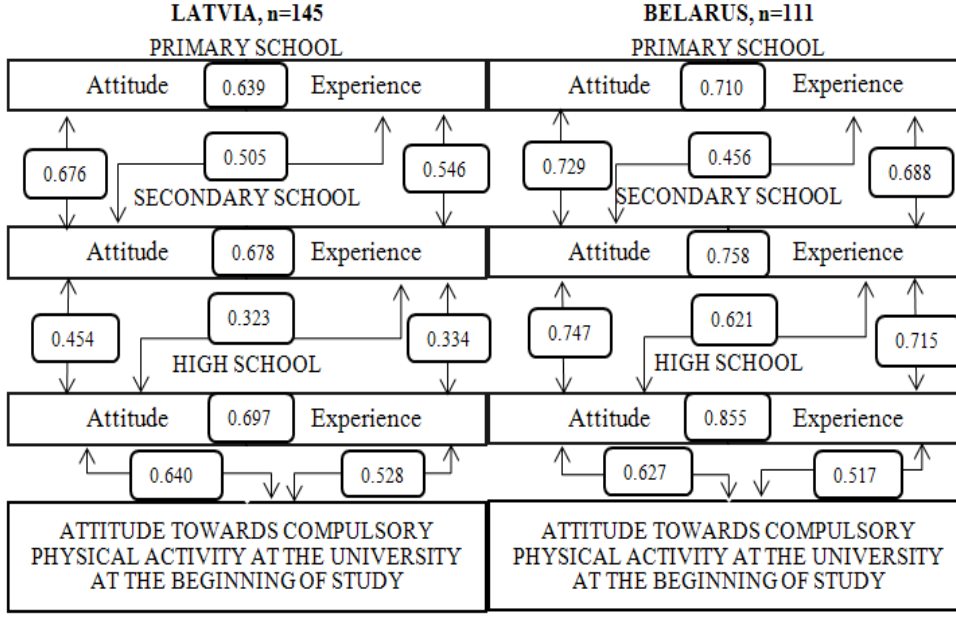
Latvia, n=145							
		Useful	Meaningful	Benefits	Enjoyable	Desirable	Interesting
Primary School	A	0.410	0.204*	0.287	0.492	0.458	0.469
	E	0.313	0.212*	0.309	0.520	0.450	0.429
Secondary School	A	0.407	0.286	0.272	0.413	0.491	0.437
	E	0.452	0.424	0.381	0.469	0.586	0.517
High School	A	0.479	0.499	0.548	0.583	0.577	0.637
	E	0.634	0.630	0.600	0.634	0.620	0.660
Belarus, n =111							
Primary School	A	0.284	0.155**	0.313	0.645	0.488	0.527
	E	0.509	0.412	0.474	0.484	0.356	0.601
Secondary School	A	0.161**	0.231*	0.357	0.703	0.505	0.512
	E	0.309	0.335	0.424	0.531	0.418	0.467
High School	A	0.126**	0.430	0.333	0.648	0.593	0.513
	E	0.175**	0.451	0.365	0.682	0.600	0.496

Note. A: attitude; E: experience.
Correlation is significant at the 0.01 level.
*Correlation is significant at the 0.05 level. **Correlation is not significant at the 0.05 level.

According to Cohen's standard (Cohen et al., 2003), the correlation coefficients showed that there were mostly average (0.30-0.49) and high (≥0.50) correlations between the studied indicators: only 11 out of 72 correlation coefficients indicated weak correlation, 4 of them were not statistically reliable. Thus, students' attitude and experience in physical education at school in Latvia and Belarus can be determined both via attitude TPB criteria and a direct question, but the question is debatable in the case if the correlation coefficients were not statistically reliable

(correlations in Belarus for the criteria *"Useful" and "Meaningful"*), which may be due to the variety of perception of the essence of concepts.

Figure 2 shows interesting correlations, which were found between students' attitude and experience, which were assessed according to the direct question.



Correlation is significant at the 0.01 level.

Figure 2. Correlations between attitude and experience in physical education

At each school stage, attitude was related to experience, which indicates that in their assessment students closely associated the both concepts: *"Attitude towards physical education"* and *"Experience in physical education"*. Each subsequent stage of school was related to the previous one when assessing both attitude and experience. The experience in physical education of the previous school stage was related to the attitude towards physical education in the next school stage. In Belarus, the closeness of the relation was greater than in Latvia. Consequently, in both Latvia and Belarus, students' attitude towards compulsory physical activity at the university was formed at high school, which, in turn, was influenced by the attitude and experience in physical education of the previous stages.

Taking into consideration the correlations developed at high school and at the university at the beginning of the studies, the following regression model was developed:

Students' Attitude at University (AU)Y – Students' Experience in High School (EHS)X

Latvia:(AU)Y=2.15+0.66(EHS)X

Regression statistics: R^2=0.279; F=47.732 (p=0.000), the coefficients were statistically significant (p<0.001). The model is significant.

Belarus:(AU)Y=1.64+0.57(EHS)X

Regression statistics: R^2=0.267; F=39.756 (p=0.000), the coefficients were statistically significant (p<0.001). The model is significant.

For the high school stage, where the assessment marks of the researched indicators were lower than in the primary school stage, correlations were determined between the TPB attitude and experience criteria (Table 4).

Table 4

Correlations between TPB Attitude and Experience Criteria in the High School

Latvia, n = 145						**Belarus, n = 111**				
Useful										Useful
0.759	Meaningful								Meaningful	0.737
0.754	0.710	Benefits							0.846	0.767
0.590	0.532	0.690	Enjoyable					0.570	0.667	0.315
0.670	0.664	0.657	0.696	Desirable		Desirable	0.820	0.560	0.581	0.416
0.685	0.707	0.691	0.677	0.773	Interesting	0.723	0.712	0.822	0.803	0.627

Correlation is significant at the 0.01 level

According to the Cohen's standard (Cohen et al., 2003), the correlation coefficients indicated that there mostly was a close (≥0.50) correlation between the researched indicators. The cross-correlations showed that the TPB criteria for attitude and experience in physical education were divided into two domains – cognitive: *"Useful", "Meaningful", "Benefits"* and affective: *"Enjoyable", "Desirable", "Interesting*. Both in Latvia and in Belarus, the most significant binding criteria for the cognitive and emotional domains were "Meaningful*" and "Benefits"*, as well as in Latvia – criterion *"Useful"*.

Discussion

In Latvia and Belarus at the beginning of studies at the university, the students' attitude of towards compulsory physical activity was positive and did not significantly differ. In Latvia, it was better than at high school, but lower than at primary school. In Belarus, it did not change in comparison to the attitude at high school, but it was also lower than at primary school. However, mean of assessing did not get a mark 4 (positive)

on 5 – point scale. The results showed a statistically significant correlation between the experience in physical education gained at high school and the students' attitude towards compulsory physical activity at the university, which, in turn, was influenced by the attitude and experience in physical education of previous stages. Studies provide similar information. Students with negative experience in physical education at school badly attend compulsory physical activity at the university and submit unjustified exemptions from physical activity (Šišlova & Fernāte, 2017). Negative experience in physical education was noted as an obstructive factor for participation in physical activity for adolescents and youth, as well as adults (Allender et al., 2006; Brooks & Magnusson, 2006; Strean, 2009; Beltrán-Carrillo et al., 2012; Cardinal et al., 2013; Lewis, 2014). Our research the developed regression model showed – for students to have a convincingly positive attitude towards physical activity (point 4) at the university, the assessment of experience in sport education at high school in Latvia must be not less than 4 points, while in Belarus it must be higher than 4.1 points on a 5-point scale, which did not correspond to this research findings: experience in physical education in high school was 3.36±1.18 in Latvia and 3.64±0.98 in Belarus.

To improve students' experience in physical education at high school, it is necessary to improve the emotional experience, which was assessed by the criteria *"Enjoyable", "Desirable", "Interesting"*, which, in turn, are related to *"Meaningful"* of the class and the sense of gain. In Latvia and Belarus, the attitude and experience criteria "Benefits", which is related to emotional experience in physical education at high school, were assessed as sufficiently low at school. Studies provide following information. Physical education should be meaningful (Subramaniama & Silverman, 2007). The improvement of attitude towards compulsory physical activity at the university is associated with the sense of gain (Šišlova & Fernāte, 2015).

In time, the attitude towards physical education and the experience in physical education tended to deteriorate. The deterioration of attitude at school is shown in research data, where the attitude towards physical education was assessed for students of different age groups (Subramaniama & Silverman, 2007; Carcamo et al., 2016). In our research, the attitude and experience were evaluated for one and the same person based on their memory.

The indicator *"Students' experience in physical education at school"* can be assessed according to the TPB attitude criteria *"Useful", "Meaningful", "Benefits", "Enjoyable", "Desirable", "Interesting"* at primary, secondary and high school, but the question is debatable in

Belarusian students' assessment of criteria *"Useful" and "Meaningful"*, which may be due to of the fact that students perceive the essence of the concepts differently.

For the first time, students' attitude towards compulsory physical activity at the university in the context of experience in physical education at school has been evaluated, as well as assessment criteria for experience in physical education have been determined. The research was conducted as a pilot study and shows a need to expand the research in terms of both the number of students and the essence of the set experience criteria. Based on our analysis, we determine design considerations for technologies that promote and support physical activity. An understanding of the needs of the population is a critical step in the design process, and this article provides a unique insight for those who work in this growing field.

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Conflict of Interest

This research was partially supported by Erasmus+ programme project "Higher education student and staff mobility between Programme and Partner Countries" No. 2015-1-LV01-KA107-013377, which is financed by the European Council.

Ethical committee of Latvian Academy of Sport Education approval was granted for the study: judgment No. 1/51813. Belarusian State University of Physical Training agreed to conduct a pilot study in the framework of the Erasmus+ programme project "Higher education student and staff mobility between Programme and Partner Countries" No. 2015-1-LV01-KA107-013377. The questionnaire was anonymous. Formal consent was gained from all the participants were made aware of the study.

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REVIEW PAPER

OUTDOOR ACTIVITIES IN PRE-SCHOOL EDUCATION, LATVIAN-NORWEGIAN EXPERIENCE (COMPARATIVE ASPECT IN LATVIA AND NORWAY)

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Abstract

Preschool children spend a large part of their day in kindergartens, therefore, it does matter how useful this time is and how it is used to ensure comprehensive development of a child. In light of the above, to learn more about the trends in how the preschools organize their activities, the following research objective was set: to review and compare the experience of the organisation of outdoor activities in Latvian and Norwegian preschools. In order to implement the research objective, the daily activity plans and specific organisational trends of the private preschools "Ābeļzieds" (Latvia) and "Blatoppen" (Norway) were researched. Comparative analysis was carried out in regard to the organization of outdoor activities in extracurricular education institutions in Latvia and Norway. The research participants were the private kindergarten "Zeltābele" in Latvia and the private kindergarten "Blatoppen" (Blåtoppen) in Norway. Both preschools provide their services to children up to 5 years of age. It was found that in the Latvian preschool children spent less time outdoors compared to the Norwegian preschool and many outdoor activities which the Norwegian preschool provides are considered dangerous for children in the Latvian preschool, based on the legislation of the Republic of Latvia. The biggest difference was that in Norway meals are often served outdoors, including cooking on open fire. A positive feature observed in the preschool time management was the fact that both the Latvian and the Norwegian preschool twice a year organised a trip to a farm so that children could learn more about farm animals, also walks in the neighbourhood are being organised. The Latvian preschool organized such walks no more than once a week, while the Norwegian preschool organized such walks three times a week.

Key words: *preschools, outdoor activities, physical activities in nature*

Introduction

Quality physical and emotional development of children is not possible without physical activity. Physical activity in nature has a very beneficial impact on the child development in general. The environment serves as the medium of beneficial impact on the overall development of a child (Cosco, 2007).

Psychotherapist Antra Sloka believes that activities in fresh air promote brain development, reduce concentration problems and it is easier for a child to learn and acquire new academic subjects. It also increases the child's well-being. Children who spend at least two hours in the fresh air each day are much happier than those who entertain themselves indoors. Nature lovers will be healthier (fresh air strengthens immunity), flexible and it is easier for them to become aware of themselves as personalities. Fresh air relieves stress and increases immunity. The psychotherapist stresses that some research shows that 64% of children in the United Kingdom only play in fresh air once a week. In the last year 21% of the children have not visited the countryside and spend their time only in cities, entertainment centres and shopping centres (Sloka, 2010).

Doing physical activities outdoors the children learn about the environment. For children life is movement and sensory stimulation (Piaget, 1952). The children obtain the information about the environment through self-experience, gaining experience and information through activities that promote the child's development, like climbing, catching, holding balance, grabbing items, searching something, jumping, swinging, rolling, running etc. (Cosko, 2007).

Preschool children spend a large part of their day in kindergartens, therefore, it does matter how useful this time is and how it is used to ensure comprehensive development of a child. In light of the above, to learn more about the trends in how the preschools organize their activities, the following research objective was set: to review and compare the experience of the organisation of outdoor activities in Latvian and Norwegian preschools.

To reach the objective of the research the following tasks were set:

1. To review the daily activity schedule of a preschool and determine the trends in organising activities in Latvia.
2. To review the daily activity schedule of a preschool and determine the trends in organising activities in Norway.
3. To carry out a comparative analysis in regard to the organization of outdoor activities in extracurricular education institutions in Latvia and Norway.

Material and methods

In the major cities of Latvia there are an insufficient number of places in the municipal preschool educational institutions (PEI). According to the data collected by Lursoft, of all registered preschools, 67% are registered in Riga and 70% of the preschools registered in the recent years are low-capital limited liability companies (Lursoft, 2014). Each year the number of private preschools in Latvia is growing. For this reason, the research participants were the private kindergarten "Zeltābele" in Latvia and the private kindergarten "Blatoppen" (Blåtoppen) in Norway.

PEI "Zeltābele" is a private preschool in Riga, Ķengarags. The preschool is located on the bank of river Daugava. 35 children aged 1.5 to 5 are attending this preschool. The children are divided into groups based on their age and development.

Kristiansund is a city in the Western Norway (population 24 442 as at 1 January 2017). The private preschool "Blatoppen" is one of the three JSC Arena Barn (Atlantis, Draget and Blatoppen) private preschools in Kristiansund. There are 6 groups of children aged 1.5 to 5 – three groups for the younger children and three groups for the older children.

To achieve the above objective and carry out the related tasks, the following methods were applied: document analysis - the regulatory acts of Latvia and Norway, internal regulations of PEI "Zeltābele" and "Blatoppen". Also, interviews were carried out with the staff of both PEIs and image analysis – the analysis of the children's drawings.

Results

In order to achieve the objective of the study, first, the activity of preschools and the organisation of schedule in preschools in Latvia was carried out. Several regulations and regulatory enactments of the Cabinet of Ministers of the Republic of Latvia regarding the work of preschools were examined. The guidelines of the State Inspectorate for Protection of Children's Rights of the Ministry of Welfare of the Republic of Latvia state that: "At an early age of 2 – 4 years it is necessary to support all activities of the child related to learning more about environment, thus, ensuring the dominant impulse of the self" (State Inspectorate for Protection of Children's Rights, Ministry of Welfare of the Republic of Latvia, 2008).

The manager of PEI "Zeltābele" Agrita Gailuma explains: ""Zeltābele" is a special preschool for special children. They are creative, free and happy. We are here to make the daily lives of children unusual, colourful and bright. To enrich the world through songs, games and music and make it more beautiful and better through art. We customize our

program to each child based on their needs, level of knowledge and skills and interests" (Gailuma, 2016).

Currently, there are 35 children aged 1.5 to 5 attending this preschool. The children are divided into groups based on their age and development. As Agrita Gailuma mentions in the interview, to evaluate and determine the moment when the child should be moved to the senior group a test is carried out using "Zvaigzne ABC" 2010 work sheets for 4-year-old children. The children are observed and the child's ability to retain attention is assessed.

Each group has a teacher and a teacher's assistant. The surveyed preschool provides meals three times a day.

After breakfast the children are engaged in educational and creative activities. Before lunch approximately one hour is used for a walk in fresh air. After lunch, around from 13.30 to 15.00, the children rest. The children are sleeping in specially equipped rooms (PEI day schedule, 2015). During the dark season the children take walks only before lunch but during the light season walks are organised also in the afternoon. This is due to the lighting provided in the preschool territory.

Both educational and sport activities are organized by the preschool. The educational and creative activities take up one hour and 30 minutes of the daily schedule (from 10.00 to 11.30). Indoor games and activities take place from 16.00 (PEI day schedule, 2015).

For the most part, all activities are organised on the preschool premises, except from 11.30 to 12.20 when the children are taken outdoors, in the territory of the preschool.

Figure 1. Meteņi celebration in the Ethnographic open-air museum (source: Facebook "Zeltābele")

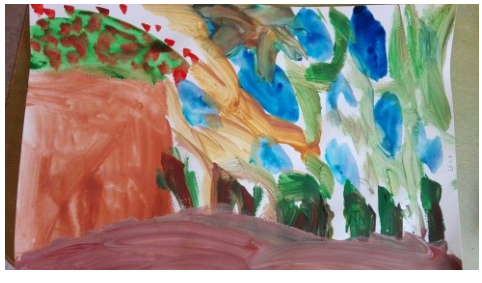
While children are outside in the preschool territory there are no special activities organized for them, the children play on their own in the

playground. The preschool also organises walks in the neighbourhood, on the banks of river Daugava. According to the preschool manager in educational matters, once or twice a year the children visit a farm to learn about the farm animals and the environment. Trips outside the territory of the preschool are organised 6 to 7 times a year (Gailuma, 2016). As a lot of time in the daily work of the preschool is devoted to various Latvian traditional holidays and customs, these trips are often related to these celebrations and learning more about the Latvian customs, for example, Meteņi celebration (Fig. 1).

The content of the creative and educational activities is organized thematically. For example, during spring (in March) the children learn about bird and the creative lessons involve, for example, making bird nests. 3 – 4 times a year the children attend the theatre. Fridays are defined as hiking days. Hiking is not done each Friday, but during the outdoor time the students are involved in various household chores like raking leaves and working in the greenhouse in the preschool territory, where the children can help in gardening work and watch tomatoes and cucumbers ripening. The preschool also has a corner with two rabbits and the children learn about pets and taking care of them.

Outdoor walks are also a hygiene requirement as provided by the Cabinet Regulation No. 890. The preschools in Latvia work according to the usual schedule also in cold weather, except refraining from outdoor walks. The regulations also provide the hygiene requirements for institutions that provide childcare services outside the place of residence of the child. The regulation provides that if the air temperature is below minus 10 degrees Celsius, no walks in the fresh air should be organised for children less than three years of age (Cabinet Regulation No. 890, 2016).

As a part of the research the pre-schoolers drew the activities they prefer the most during their free time in the preschool.



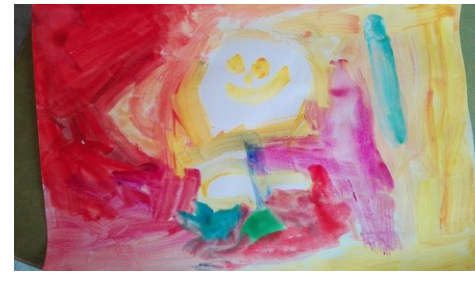


Figure 2., 3. PII Favourite free time activities of the pre-schoolers of PEI "Zeltābele"

Images were analysed and it was found that in all submitted drawings (6 drawings) the children depicted outdoor activities (Fig. 2,3). Half of them depicted that the like playing on the playground and in the swing (Fig. 4).

Figure 4. Favourite free time activities of the pre-schoolers of PEI "Zeltābele" (the swing)

The rest depicted activities in nature, in the park. The authors of the drawings are 4 to 5 years old students of PEI "Zeltābele".

There is a study carried out on the preschool work and the trends in the organisation of activities in Norway. The study on "Children's activities in Norwegian preschools" was carried out from 2009 to 2013 by the Bergen University College researchers Jan Helge Kallestad and Elin Eriksen Odegaard.

Table 1

Types and frequency of activities organised in Norwegian PEIs (Kallestad, Odegaard, 2013)

Subject area	Percent (n = 115)	Percent* (n = 138)
1: Natural science, environment and technique	5.2	8.7
2: Communication, language and text	18.3	21.7
3: Numbers, space and form	7.0	10.2
4: Art, culture and creativity	33.0	33.3
5: Ethics religion and philosophy	1.7	1.5
6: Society and local community	1.7	3.6
7: Body, motion and health	20.0	21.0
8: Combination of 1—7 above	13 x	

In Norwegian preschools the priority is given to art and cultural activities (33.0% and 33.3%), physical and health-promoting activities take the second place (20% and 21%). The least content in Norwegian PEIs is devoted to religion, ethics and philosophy (Tab. 1).

Table 2

Outdoor and indoor activities in Norwegian PEIs (Kallestad, Odegaard, 2013)

Activities	Selected observations* (n = 671)	Total observations (n = 798)
Indoor activities		
Art performance	13.9	13.0
"Play with…"	12.7	13.0
Roleplay	10.9	11.0
Construction	10.4	10.8
Reading books	9.2	9.8
Music activities	4.6	4.5
Other indoor activities	9.7	9.0
Outdoor activities		
Play in sandpit	6.1	6.3
Using playground equipment	5.7	5.4
Excursions/trips	4.8	4.6
Roleplay outdoor	4.0	3.9
Play with natural materials	3.3	3.6
Play with bikes	1.6	1.8
Other outdoor activities	1.5	3.1

In Norwegian preschools the most popular indoor activities are art lessons and playtime, while musical practice is the least available (Tab. 2). The most popular outdoor activities are playing in sandboxes and playgrounds. The third most popular are tours and trips. The children spend the least amount of time playing with natural materials.

As the teacher of the "Blatoppen" preschool Evita Pētersone explained: "The purpose of the preschools "Atlantis", "Draget" and "Blatoppen" is focused on acquiring primary experience, the participation of the children and positive outdoor experience. This can largely be described as providing information in such a way as to have the largest possible sensory impact on the child. In organizing the daily content, we focus the most on general physical development opportunities through the development of motor ability in both younger and older children" (Pētersone, 2016).

The preschool employees are certain that "... the development of the children is positively influenced by outdoor walks already from early age. This supports multi-sensory development and by being outside, in fresh air each day, the child gains a lot of impressions. No other environment allows developing the motor skills in children as outdoor activities in the fresh air. Care must be taken to ensure that the children can find a suitable tempo and many activities depend on the location of the preschool" (Pētersone, 2016).

The preschool is located in the Southwest of Kristiansund city. The territory of the preschool resembles a small forest grove – it was natural terrain features like hills, valleys, trees and shrubs. The area is roughly divided into two parts - for the older and the younger children. This makes it easier to look after the children and the older and younger children engage in different type of play and move at different speed. In the winter when there is snow and ice the children use the hills as slides. It is allowed to run, jump, climb trees. E.Pētersone: "After the first couple of falls and trips the children understand themselves that they should be careful." The older children very much like to play next to a 1.5m high rock ledge. It is allowed to jump from it and climb it, of course, under the supervision of teachers. When there is no snow, the children use sandboxes, buckets, shovels, rakes, sieves etc. All of this is also used during the rain, especially water from puddles. After downpours children guide streams and build dams. The children are not restricted; it is allowed to get dirty.

The children spend a large part of the day outside the preschool premises, outdoors: "We practice, make experiments in different environments. It is an amazing feeling, to discover the world with children. We think that curiosity is the main incentive to learn and our mission is to promote and protect it. Therefore, we strive to ensure free and unconstrained development of the child's curiosity and to stimulate it."

Although JSC Arena Barn are private preschools they are bound by the UN Convention On the Rights of the Child which puts emphasis of the child's rights of expression, as well as the National Action Plan (Rammeplan for barnehagen innhold og oppgaver) developed by the Education Department of Norway and which entered into force on 1 March 2006 as amended on 10 January 2011. The National Action Plan provides the general guidelines, rules, tasks and content. Thus, the state ensures that the institutions and organisations responsible for care and protection of children comply with uniform requirements regarding safety, health, number and qualifications of the personnel and quality supervision.

In addition to the National Action Plan there are binding municipal provisions which ensure that the Kristiansund Municipality assesses the compliance of the preschool building with its purpose, evaluates the outdoor environment and playgrounds and their compliance with the law, this document also provides that preschools shall ensure the educational services during the day to children aged 1 to 5 years.

The children are divided into groups based on two principles – by age and the base distribution where the division is not reliant on age and children of all ages may be in the same base. Further division depends on activities. The "Blatoppen" preschool is positioned as more inclined towards

physical activity or a nature preschool, where all activities focus mostly on physical activities in fresh air which promote motor development and, consequently, the language development and other (Pētersone, 2016).

"Blatoppen" preschool is also a culture-oriented preschool. This means that the children participate in the culture life of the city, learn more about them, learn about the environment where they live in, grow up in and of which they are a part. "General exposure to art, culture and aesthetics provides the children with opportunities for versatile perception, adventure, experiment, creative activity, thinking and communication" (National Action Plan, 2006).

The annual theme of the preschool is "Our city" which is referred to throughout the year. Each group has their own subtopics, also set for a year. The preschool staffs make sure that the children gain impressions and experience in accordance with the themes. Thus, the children learn through their senses and gain experience as active participants (Pētersone, 2016).

Based on the Learning by doing theory (John Dewey) which includes 5 steps, there is a distinction of primary and secondary experience. According to the author of the theory the primary experience is based on the interaction between the physical and the social environment. The secondary experience is the active experience, the reaction induced by the object and the environment resulting in knowledge. The failure and uncertainty of the primary experience causes the reaction the result of which is learning (Miettinen, 2010).

Based on the Learning by Doing theory, the preschool supports the curiosity and creativity of the children through challenges based on the child's interests and willingness to work and learn information (development) (Pētersone, 2016).

The preschool day schedule (Tab. 3) includes both educational activities (reading fairy tales, singing songs) and outdoor activities. The preschools "Atlantis", "Draget" and "Blatoppen" share one bus. The bus is used by the students and the teachers to go on trips outside the city twice a year. Excursions to farms are expensive and are only recommended to older children accompanied by parents. Older children go on hikes outside the territory of the preschool from 9.30 to 13.00. During the hike meal is prepared on a campfire (Pētersone, 2016).

Figure 5, 6. Outdoor activities in PEI "Blatoppen" (Norway)

In the interview the preschool teacher explained that: "Children spend a lot of time outdoors, it is a priority. Activities, walks and simply playing in fresh air – it is all supported" (Pētersone, 2016). The preschool organizes walks outside the territory of the preschool. The destinations of the walks are places in the local parks and forests to ensure comprehensive development of the children. "Climbing, crawling, balancing – it is all very fun and exciting for the children," (Pētersone, 2016), for example, the preschool management has determined that hikes and walks should be organized three times per week for the "Crows" group (the senior group).

Figure 7, 8. Cooking on a campfire during a hike

In the last week of January 2016 the "Crows" group went on two hikes and cooked lunch on a campfire. Another hike is planned during which tents will be pitched. The preschool makes sure that the children spend a lot of time outdoors: "Sometimes children spend the whole day outside after the breakfast, if the weather conditions permit it. In that case, we also have lunch outside" (Pētersone, 2016).

Figure 9., 10. Hiking in the area

While the children are outside, there are also educational activities and various teaching experiments organized (Fig. 7,8).

Figure 11, 12. Educational activities

As a part of outdoor activities, the children are taught geometrical figures, the children are encouraged to pay attention to natural processes, there are also creative activities, like painting with gouache paints in the snow (Fig. 11,12).

Figure 13, 14. Creative activities in the snow

In is interesting that Norwegian preschools also provide activities that help to learn household skills such as driving a nail in a wooden plank or treating a wooden branch with a knife (Fig. 15,16).

Figure 15, 16. Learning life skills

We asked about the potential injuries during such activities? E.Pētersone: "It is simple. It all happens under adult supervision and control. Sometimes we have bumped foreheads and split lips, but very rarely. Before any activity we discuss the rules. The children want to participate, so they patiently wait for their turn. There haven't been any special cases. Last year, when we were nailing with the 3 year olds, one of them swung the hammer so hard that he hit himself in the head. He settled down and continued to work."

Just like in the Latvian preschool, the Norwegian students drew their favourite activities in the preschool. Drawings of 7 authors were provided. All of them are 5 years old.

Images were analysed and it was found that only in three of the submitted drawings the children depicted outdoor activities, for example, "playing outside when the weather is good" (Fig. 17), as well as climbing trees and sliding down the hill in winter. One child's drawing depicts several things – a pencil, a shovel, Lego, a plane, scissors, glasses and a man (Fig. 18). After the discussion with the teacher the child revealed that he likes very many things, including digging.

Three of the children depicted playing with a particular child without mentioning the specific activity. Three children have drawn that they enjoy playing with Lego.

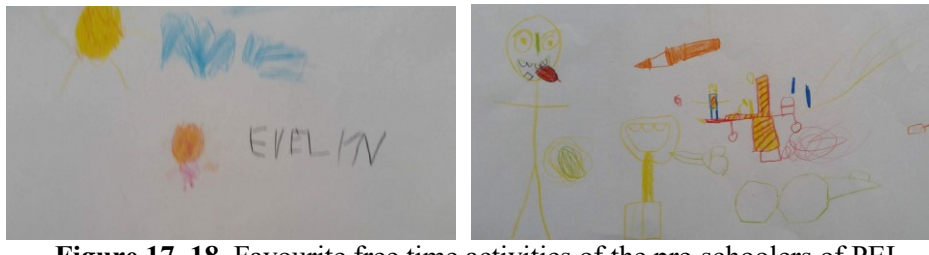


Figure 17, 18. Favourite free time activities of the pre-schoolers of PEI "Blatoppen"

Based on the interviews with the preschool representatives (in Latvia and Norway) and the analysis of the PEI day schedule, the comparative table of the PEI day schedule was developed (Tab. 3). The table shows and compares the daily content of the activities in Latvian and Norwegian preschool. This table provides a simple review of the content of the daily preschool activities.

Table 3

A comparison of daily activities in preschool in Latvia and in Norway

Activity	Time	„Zeltābele" (Latvia)	Time	„Blatoppen" (Norway)
Arrival of the children	from 8.00 (official opening hours from 7.00)	Group teacher welcomes the children	from 6.45	Welcomed by one assistant in each age group Around 7.15 each other group assistant arrives.
Breakfast	9.30-10.00	Breakfast	8.30-9.00	Breakfast
Creative, educational sessions	10.00-11.30	Creative, educational sessions	9.00-10.00	Working with themes, fairy-tale reading, singing
Outdoor activity	11.30-12.30	Walking in fresh air – playtime, work, bservations, development of movement	Until 11.30 Until 12.00	for junior groups for senior groups
Lunch	12.30-13.00	Lunch	12.00-12.30	Lunch (senior groups may eat outside)
Rest	Until 15.00	All - nap	Until 14.00	Juniors – nap outside, in the carriage The older children are playing outside, no naps.
Tea time	15.30	Tea time	14.00	Fruit time
Creative, educational sessions	From 16.00	Drawing, filling in worksheets, finishing the creative work started in the morning	-	-
Outdoor activity	-	During the lighter time (from mid-March to mid-October)	From 14.00	Playground games
Going home	Until 18.00 (opening hours until 19.00)	Going home	16.30	Going home

The table shows that the working hours of the preschools are very different. In Latvia the preschools are open from 7.00 to 19.00, while in Norway the PEI starts the work earlier – at 6.45 and works until 16.30, while in some preschools until 17.30.

Disscusion

The activities organised by the preschools are similar, in both case they include creative and educational activities, but there are differences in the frequency and the organisation of specific activities.

Both PEIs that participated in the study have organized meals, but based on the interview and the image analysis results, cooking on campfire is common in the Norwegian PEI. Unlike the meal organization in Latvia, in the Norwegian PEI there are two meals (breakfast and lunch). The last meal in the Norwegian preschool is the fruit time at 14.00.

The Norwegian pre-schoolers often bake bread and sausages on twigs they have prepared. The core of the Norwegian preschool day schedule is spending as much time as possible outdoors, regardless of the weather.

In Norway the children hike in the nature every week, sometimes even several times a week and the hiking route is based on the principle - learning to overcome natural barriers. Interview and image analysis shows that the hiking routes are chosen in the stony terrain, overgrown meadows, thick forests and near natural water bodies where there is a natural necessity to overcome fallen trees, large stones and wade deep snow. Unlike the Latvian PEI, in Norway ski lessons are organized for the children.

The analysis of the children's drawings shows that in the Latvian PEI children (100% of the participants) emphasize being in nature, being outdoors, while only 43% of the Norwegian PEI students depicted outdoor activities as their favourite occupation. The Norwegian PEI students depicted playing with a friend or Lego as their favourite activity. The authors of the study suppose that the Norwegian children spend so much time outdoors that they are perceived as common, self-evident part of the day.

Conclusions

1. The operation of preschool education institutions, including private institutions, is governed by the national regulatory enactments, as well as the UN Convention on the Rights of the Child. In Latvia, much like in Norway the preschool curriculum may give preference to certain activities, such as cultural activities, health-promoting activities etc.
2. In the Latvian preschool the children stay outdoors for one hour

in the morning and, if it is still light outside, another hour in the afternoon. In contrast, the Norwegian children spend the most of the day - 4 to 5 hours - outside, including the nap for the younger children who sleep in the carriage outside.

3. The Latvian preschool education provides nap for all children, in Norway – only the youngest ones.

4. In Latvian preschool, while children are outside in the preschool territory there are no special activities organized for them, the children play on their own in the playground. Unlike in the Norwegian preschool, the children are monitored so that they wouldn't get too dirty, for example, by jumping in the puddles, also no items are used that could be considered dangerous for the children (nails, hammer).

5. Both the Latvian and the Norwegian preschool organises a trip to a farm twice a year for the children to learn about farm animals and environment.

6. The curriculum of the Latvian PEI devotes a lot of time for the explanation of the Latvian traditional celebrations and customs, most of these events take place in nature by playing games, for example, Meteņi celebration.

7. The Latvian preschool "Ābeļzieds" organises walks in the neighbourhood, for example, the banks of river Daugava, less than once a week, while the Norwegian preschool "Blatoppen" organised hikes three times a week.

8. There are small differences concerning catering. The Latvian PEI provides three meals - breakfast, lunch and tea, all served only indoors. The Norwegian PEI provides breakfast and lunch and instead of tea there is "fruit time". The biggest difference is that in Norway meals are often served outdoors, including cooking on open fire.

9. The analysis of the children's drawings shows that in the Latvian PEI children emphasize being in nature, being outdoors, and while only three out of seven of the Norwegian PEI students' depicted outdoor activities as their favourite occupation. The Norwegian PEI students depicted playing with a friend or Lego as their favourite activity.

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REVIEW PAPER

RECREATIONAL ACTIVITIES TO IMPROVE COHESION IN WOMEN FLOORBALL TEAM

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Abstract

A group of athletes, although they share common goals, does not make a team. Team cohesion has been widely considered as a guarantee of the group work's efficiency, and people tend to be a part of effective groups. In a cohesive team the team's identity is clear, mutual relationships are good and the participants of the group value the fact that they are members of the group. Using recreational activities beside trainings and competitions, it is possible to achieve a better mutual understanding and trust between team members, thus improving understanding and cooperation during the game. The aim of the research topic is to develop a set of recreational activities to improve mutual understanding and cooperation during the game for the players of newly formed women's floorball team. Subjects and methods: Women`s floorball team. Improvement of players' mutual cooperation during team workout routines of women's floorball team. Methods used in the study: study and analysis of literature, survey – questionnaires, Group Environment Questionnaire [2], pedagogical experiment, video analysis, mathematical statistics. Based on the results obtained from questionnaires, a set of recreational activities corresponding to the needs, wishes and possibilities of team players was developed with the aim to improve mutual understanding and cooperation. By implementing the developed recreational activities in a floorball team, the cooperation and mutual understanding between the players have improved. Players are united in pursuit of a common goal. By determining the team cohesion with the Group's environmental questionnaire before, during, and after the experiment, it was concluded that the implementation of recreational activities has improved the mutual understanding and cooperation of floorball team players.

Questionnaires and oral surveys determined the recreation habits of the players. The dynamics of understanding and cooperation during the experiment has a trend to improve, as it can be concluded from the answers of the Group's Environmental Questionnaire. Recommendations have been drawn for planning, organizing and managing the recreational activities of women's floorball team.

Key words*: floorball, team cohesion, recreational activities.*

Introduction

Floorball is a team game that is played indoors with plastic sticks and a ball. The game of floorball was created as a safe form of indoor field hockey where the risk of injury is lower than in other kinds of hockey, but the game still requires from the player speed, strength, and ability to make quick decisions about cooperation between players, both in offence and defence [11]. Taking into consideration that the game is fast and the situations change rapidly, players must not only be able to assess the situation quickly, but also to predict the further development of the game, conducting it to the direction that is necessary for the team and favourable for he players. It doesn't depend only on the players' technical and tactical proficiency [10]. Mutual understanding between players in different game situations is very important. Team cohesion has been widely considered as a guarantee of the group work's efficiency, and people tend to be a part of effective groups [1, 3]. In a cohesive team the team's identity is clear, mutual relationships are good and the participants of the group value the fact that they are members of the group. The fact that they are "one of them" makes the participants to not want to quit such group [4, 7]. It may be related to the emotions, sense of belonging, and satisfaction with the environment and team-mates, but also to the results achieved by the team, because the results achieved by cohesive groups are higher if compared to the groups where all the members work individually 7, 8]**.** This also applies to sports teams. Collective efficacy can be achieved when group members share a common belief that they can execute all the small components to complete the large task of the group fully and effectively**.** In a group where team work is based on the understanding of collective effectiveness, all its members are convinced that each and every member of he group shall fulfil their individual tasks to achieve the common result successfully [6,12].

A group of athletes, although they share common goals, does not make a team. In order for this group to become a unified team, it has to undergo individual team formation process. This process consists of the following phases: a team formation phase when team members get to know

each other and each other's abilities; "fermentation" or confrontation phase the characteristic features of which are revolt against the leaders and not listening to the coach, the roles for team members are established, and the most common cause of disagreement is stress caused by the tension between the team members; the cool down phase during which confrontation is replaced by cooperation to achieve common goals what creates a sense of satisfaction for the accomplished work; and the phase of stabilization or work [7, 12, 13].

Duration of each phase, as well as all the processes during the team formation in each team will be different, but the sequence will remain the same [8, 14].

In sports games cohesion of a team is considered to be a factor that increases the efficiency and coaches associate to it the success or failure of a team. Often coaches, in hopes for a higher score, are forming lines (or shifts) based on the best results attained individually. But it does not always meet the expectations, as the players with the best individual statistical indicators within one shift might not reach the expected results [4]. Using recreational activities beside trainings and competitions, it is possible to achieve a better mutual understanding and trust between team members thus improving understanding and cooperation during the game. It is believed that in team sports cohesion affects results, and results affect cohesion. Every team wants to be successful, but their effectiveness may vary [1, 3].

Sports psychologists (Carron, Brawley Widmeyer) have formulated the cohesion for group of athletes as a dynamic process that is reflected in the tendency for a group to stick together and remain united in pursuit of its aims and objectives, and/or meeting the emotional factors of group members. The authors agree that definition is based on four interrelated factors [1, 3].

According to these factors cohesion is multidimensional, because the cohesion of sports team is based on more than one factor; it is dynamic, since it changes while the team is working on it; instrumental, as it reflects the reasons for the formation and existence of the group; and emotional, since it is related to the emotional experience that is affected by the attitude and value system of the athletes [3, 4].

It is clear from the above that in order to create a cohesive team, it is necessary to consider all four factors. The aforementioned definition of cohesion is based on the conceptual model for group cohesion established by the authors of the definition, and serves as the baseline for most of the research on the cohesion in sports [5].

The conceptual model of cohesion analyses four trends of cohesion: group integration (on task, social), individual link to group (on task, social),

external factors (league in which they play, family), and internal factors (sex, personality traits) [13].

In any group or team there are mutual relationships between people on individual or group level. While determining the teams' overall cohesion it should be taken into consideration that mutual relationships are formed in all directions thus making a special network, a network that shall strengthen the sense of belonging and pride of being a part of team. And the sense of belonging is the key factor that ensures the well-founded existence of the group. In this case, even if some players leave the team, other team members do not have the intention to leave – they value the team [9].

Michael Hogg has indicated that the attractiveness of the group is social attractiveness. As a contrast to individual preferences, social attractiveness is depersonalised and is expressed as affection towards the group that embodies special qualities as a whole [9].

Cohesion is a qualitative characteristic of the cohesion process in a fixed moment in time. Cohesion shows the degree of devotion to the group of the group members.

Cohesion was thought to be as an adhesive that holds team members together. The instruments were developed to measure the strength of this adhesive. Carron et al. (1985) developed the Group Environment Questionnaire (GEQ) to measure four manifestations of cohesion in sport teams: (1) individual attractions to the group-task (ATG-T), which indicates a member's feelings about his or her personal involvement with the group's task; (2) individual attractions to the group-social (ATG-S), a member's feelings about his or her personal social interactions with the group; (3) group integration-task (GI-T), a member's perceptions of the similarity and unity of the group as a whole around its tasks and goals; and group integration-social (GI-S), a member's perception of the similarity and closeness of the group as a social unit [3,4].

Numerous studies have shown a positive correlation between team cohesion and team success. For example, Carron et al. (2002) analysed the relationships between team cohesion and team success and found a strong relationship between cohesion and team success. Cohesion is regarded as significant variable in team sports events [3, 4].

The *aim* of the research topic is to develop a set of recreational activities to improve mutual understanding and cooperation during the game for the players of newly formed women's floorball team.

Material and Methods

Women`s floorball team. Improvement of players' mutual cooperation during team workout routines of women's floorball team.

Methods used in the study: *study and analysis of literature, survey – questionnaires, Group Environment Questionnaire [2], pedagogical experiment, video analysis, mathematical statistics.*

First of all we carried out players' survey about the common interests of leisure activities. Taking into consideration the results of the survey, we established a set of recreational activities – five events for the period from October to January. We used the test "Group Environment Questionnaire" translated into Latvian to determine the dynamics of group cohesion. The questionnaire determining atmosphere in the group was completed three times – at the beginning of the experiment, at mid-term and at the end of the experiment.

In order to determine the dynamics of the results during the experiment, a single-factor ANOVA analysis was used and it showed that the results are different. The compliance with the normal distribution of data was tested with the Shapiro-Wilk test. It was concluded that the breakdown of the data does not conform to the normal distribution, hence the Wilcoxon Nonparametric Criteria was used. Examining the results using Wilcoxon Criteria, a statistically significant change (increase) in the results was concluded ($p<0.05$). This means that recreational activities used to strengthen the cohesion of the team have achieved the desired result.

Results

Women's floorball team *RSU* (Riga Stradiņš University) is a three times champion of Latvian Championship Premier League and several times have been between the award-winning teams. At the end of the previous season only six players remained in the team. At the beginning of the new season the team composition was restored by inviting experienced floorball players who have been left without a team after they started their studies in Riga. The average age of the players in the team is 20.3 years. During workout routines and test matches it was obvious that players' technical preparedness meets the requirements of Premier League team, but there is no mutual understanding and cooperation during the game is far from the desired. Questionnaires and oral surveys marked the recreation habits of team's players. Based on the results obtained from questionnaires a set of recreational activities corresponding to the needs, wishes and possibilities of team players was developed with the aim to improve mutual understanding and cooperation.

In order to give the opportunity to the players to get to know each other in non-standard situations, a trip in the sea by a fishing boat was the first recreational, team-building activity. During this event, the owner of the boat – a fisherman – explained to the players the process of fishing and told

about the species of fish in the sea. Members of the team were divided into small groups of four. In each group there was one player from the previous season. This way while performing a common task the players had the chance to get to know each other better, talk more, and listen to each other. The task of the groups was to sing as many songs about the sea or fishing as they can.

This event took place after team had participated in an international tournament and before the regular championship. Teams' performance in the tournament was the worst in the history of the team. This was explained by the new composition of the team. And it was concluded during video analysis that the team members couldn't come to mutual understanding even in the most common situations.

The second team building activity was dinner, prepared by all the players together. This event took place after the first game of Latvian Championship where they lost the game with the result 3:5 to the team they had defeated during previous seasons. For this event there were also small groups formed taking into consideration that in each group there had to be a player who:

... knows how to bake pies;
... likes salad;
... has never prepared an ice cream cocktail;
... finds his/her way in the store very well.

After they divided into groups, there was a lottery to determine which dish each group should prepare for the dinner. After a short, 10 minute discussion all players went to the store together. Then they started to prepare dinner in the kitchen. After the dinner several party games enhancing cooperation and familiarization were organized; team members learned a lot of new things about each other.

After this event when players met in the training they greeted each other with a smile, and their behaviour became more peaceful and kinder, including in the episodes of failures. While preparing for the next game, as well as during the game, the general spirit of the team was friendlier and the attitude towards each other – more comprehending. The players greeted each other more after successful episodes and also cheered more after some errors. During the video analysis of the game it was concluded that the cohesion and mutual understanding between players had improved significantly. Analysing the video of the next game, it was established that in case of failure players were unable or unwilling to support each other. Leading players had problems to realize their shots or find assistants, the offence was not completed, and the ball was given to the opponents easily.

The third recreational event was a field trip to Valmiera. During this trip the players learned a new game – geocaching. They searched for the hidden prizes – geocaches or caches – along the way and in the city of destination. They also completed various tasks and games to improve cooperation. After this field trip a more vivid and active exchange of opinions between the players was observed. Video analysis of the game that was played after this trip revealed that mutual understanding and assistance in tense situations during the game had improved.

The next team building activity took place in December, when the players went all together to cheer for Latvian national women's team in the World Championship. Three players from the team *RSU* were included in the national team – the goalkeeper and two forwards. To prepare for the cheering, the players of the team *RSU* during their practice prepared a 20 seconds video greeting for the players of the national team.

The fifth team building event was held after eight games of the regular championship, at the beginning of January. For this event the players arrived in masks. The various tasks, including floorball in the masks, created a very good mood and a lot of fun. The creativity, enthusiasm and positive emotions of the participants while performing the tasks enhanced even more the cohesion of the team.

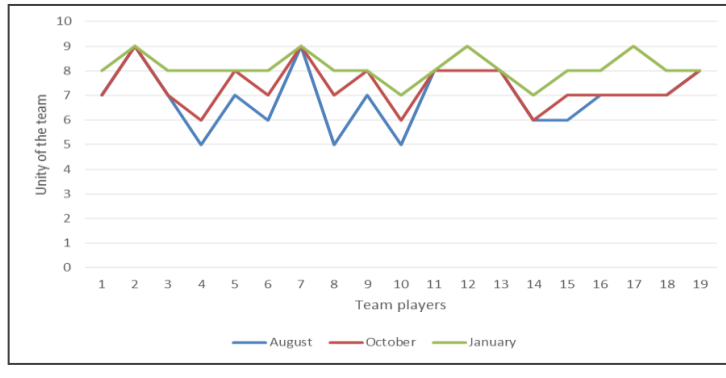

Figure1. Unity of the team to achieve common goals

In the Fig.1. we can see the dynamics of the opinions of the players about the unity in team during the period from August to January, when the surveys were conducted. The second survey took place at the end of October.

To calculate the statistical significance of the changes of the received responses was used nonparametric statistical criterion of Wilkokson. The unity of the team to achieve common goals has improved. The improvement is statistically significant ($p<0.05$).

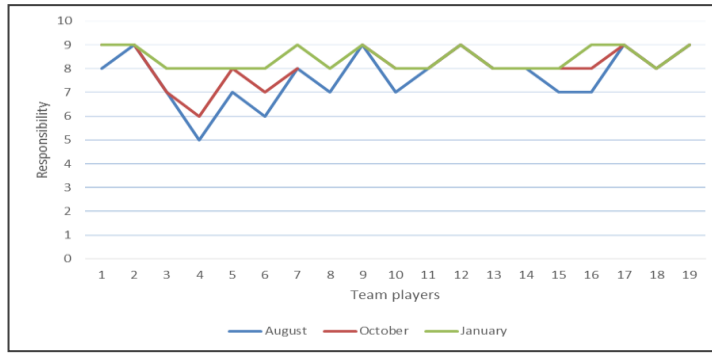

Figure 2. Shared responsibility in case of poor performance

In the Fig. 2. graph we can see the changes in the opinion of the players about shared responsibility in cases of poor performances during games. Also the cases when performance was great and successful were considered as good cooperation and qualified as a good result of such cooperation, rather than just stressing individual performance.

The level of shared responsibility in case of poor performance has increased. The increase of responsibility is statistically significant ($p<0.05$).

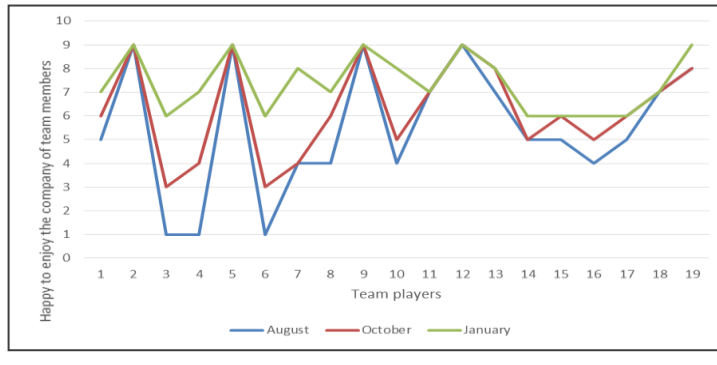

Figure 3. Happy to enjoy the company of team members in the free time

The possibility that free time outside floorball games and workouts will be spent with fellow team players has increased significantly. The changes in answers in the Fig. 3. confirm that.

At the end of the experiment the desire of the players to spend their free time together with other team members has increased. The increase is statistically significant ($p<0.05$).

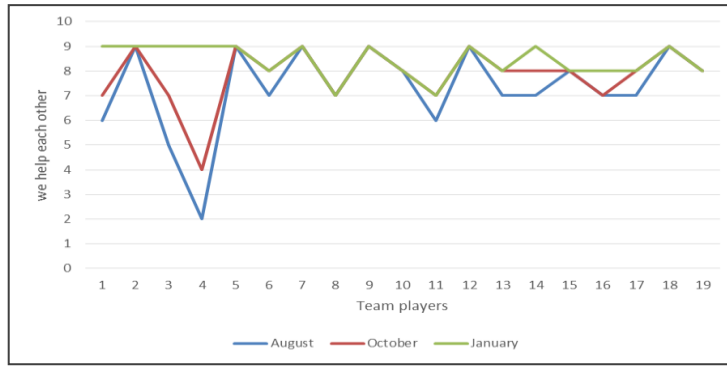

Figure 4. In our team we help each other

The fact that the players are ready to correct the errors or faults of their team mates in different situations can be seen in the Fig.4. The video analysis confirmed that the players really act like that. The statistical analysis of the research shoves that the willingness of the players to correct the errors or faults made by their team mates is statistically significant ($p<0.05$). By implementing the developed recreational activities in a floorball team, the cooperation and mutual understanding between the players have improved. The players are united in pursuit of common goal. By determining the team cohesion with the *Group's Environmental Questionnaire* before, during, and after the experiment, it was concluded that the implementation of recreational activities has improved the mutual understanding and cooperation of floorball team players. The dynamics of understanding and cooperation during the experiment has a trend to improve, as it can be concluded from the answers of the *Group's Environmental Questionnaire***.**

Discussion

The recreation habits of the players of the women's floorball team RSU were determined based on questionnaires and oral surveys. Based on the results obtained from questionnaires and surveys, a set of recreational activities corresponding to the needs, wishes and possibilities of team players was developed with the aim to improve mutual understanding and cooperation. The set of activities consisted of five events. Three of them were intended for indoors and two – for outdoors. The number of the participants in each event was from fifteen to nineteen (all players of the team). The events were organized in the period from August to December. By implementing the developed recreational activities in a floorball team, the cooperation and mutual understanding between its players have improved. Players are united in pursuit of common goal.

By determining the team cohesion with the *Group's Environmental Questionnaire* before, during, and after the experiment, it was concluded that the implementation of recreational activities has improved the mutual understanding and cooperation of players from the women's floorball team *RSU*. The dynamics of understanding and cooperation during the experiment has a tendency to improve, as it can be concluded from the answers of the *Group's Environmental Questionnaire***.** At the beginning of the experiment two of the players circled the number 5 near the statement "Our team is united in efforts to achieve common goals" which means that they had doubts about the unity of the team. However, at the end of the experiment the unity of the players or understanding that the team has a common goal had improved. At the end of the experiment the players circled mostly 8 and 9 for the statements which means that the level of cohesion in the team is high. To determine the statistical significance of the changes the t-Test for paired samples were used: Paired Two Sample for Means.

The results obtained show that recreational activities can be used to strengthen the cohesion of the team. The content, frequency and type of activities shall be determined by conducting surveys or interviewing team members. Many sports specialists have conducted researches on correlation between team cohesion and team success. Researches show that mutual understanding helps in the improvement of results.

Conclusions

Questionnaires and oral surveys determined the recreation habits of the players of the women's floorball team *RSU*. Based on the results obtained from questionnaires, a set of recreational activities corresponding to the needs, wishes and possibilities of team players was developed with the aim to improve mutual understanding and cooperation.

The dynamics of understanding and cooperation during the experiment has a trend to improve, as it can be concluded from the answers of the *Group's Environmental Questionnaire***.**

Recommendations have been drawn for planning, organizing and managing the recreational activities of women's floorball team that can also be used for other women sports teams with players over the age of 16 years, with three to five years of experience in the sport, who have previously trained in various sports clubs:

1. It would be beneficial to conduct a survey to determine recreation habits and desires of players with the aim to create a set of recreational activities for the specific team.

2. The cohesion of the team can vanish easily, that is why it is recommended to organize team building activities once a month. It is recommended to organize recreational activities every two months, and especially before important games. It is not necessarily for them to last the whole day or several days. After evaluating the situation in the team, it may be sufficient to organize a dinner for all players of the team in order to restore the sense of unity in team.
3. While planning and organizing recreational activities, the interests, desires, knowledge, and skills of team's players must be taken into consideration. It is also important to evaluate discretely the financial situation, and find the time free from work or studies.
4. While planning recreational activities, the opinion and character of every player must be taken into consideration, creating an opportunity for each team member to feel important and needed to the other participants. There should be conditions so that each participant could be in the middle of attention as a "central figure" at least once during the event.
5. It is recommended to include team building tasks in recreational activities that require from participants to combine efforts and join in groups of three to five people.
6. When organizing events, do not be afraid to offer a previously unknown activity, since recreational activities help to discover hidden talents. Also for people who are normally shy and quiet they help to become more active and loosen up thus improving mutual understanding between team members.

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Claessens (2010) found evidence that attention will be given to multi-compartment models, such as the 3-water, 3-mineral and 4-compartment models, to assess percentage of body fat.

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