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# Interaction Between the General Work-Related Physical Abilities and the Executive Function of Young People with Intellectual Disabilities

**SUMMARY OF THE DOCTORAL DISSERTATION**

Social Sciences,  
Education (S 007)

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ŠIAULIAI 2021

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# Jaunuolių, turinčių intelekto sutrikimą, bendrųjų fizinių darbinių gebėjimų ir vykdomosios funkcijos sąveika

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## INTRODUCTION

**Scientific relevance of the research.** Vocational training is a prerequisite for the preparedness of young people with intellectual disabilities to compete in the labour market, to develop the independence and social skills needed in public life (Baranauskienė, Ruškus 2004; Smith, Grigal, Sulewski 2013; Abdullah, Yasin, Deli et al., 2015; Zwicker et al., 2017; Tomaszewski, 2018) that encourage to become active members of their community (Petcu, Chezan, Van Horn, 2015). The benefits of work activity for a person are characterized by autonomy and financial freedom, increased self-esteem, emotional well-being, improved quality of life (Becker, Drake, 2003; Lemaire, Mallik, 2008; Smith, Grigal, Sulewski 2013; Novak, 2015; Zwicker, Zaresani, Emery, 2017).

Vocational training or vocational rehabilitation are key measures aimed at empowering people with disabilities to participate in the labour market and at ensuring opportunities for social participation. Therefore, the development of work-related and social skills plays an important role in the process of vocational empowerment, as this is one of the most important conditions for the successful socialization of people with disabilities (Radzevičienė, 2003; Radzevičienė, Jurevičienė, 2008; Zwicker et al., 2017). In Lithuania, psychosocial support and assistance related to the profession does not have a clear system and often it includes only short-term project activities, such as career counselling, mediation, development of independent life skills, health education, etc. (Baranauskienė et al., 2004; Public Audit Report, 2020).

According to the documents regulating special education, from 1 September, 2012, after the completion of the individualized basic education programme, students with intellectual disabilities are offered to continue their education according to the vocational training programme or to learn according to the social skills

development programme<sup>1</sup>. As a result, vocational training institutions have become the main pathway for young people with intellectual disabilities to the labour market. However, very often, people with disabilities even after having acquired vocational education face difficulties in adapting to the labour market and, at the same time, in planning independent living. Young adults with special needs face many challenges in transitioning to the labour market: difficulties in finding employment, retaining the workplace, problems of socialization and social adaptation in the workplace and in everyday life (Ratzon, Schejter, Alon, Schreuer, 2011; Baranauskienė, Ruškus, 2004; Nycyk, 2018). Young people often face the following difficulties: a “crazy” pace of work; fatigue; health problems; hard physical work; lack of practical skills; competition; lack of responsibility and motivation; communication problems, etc. (Baranauskienė et al., 2004). The main ones are related to the physical capacity and stress that a person experiences when he/she has not performed work-related tasks or specific actions or when he/she has performed them but with many difficulties, when maximum physical or cognitive effort is required or when working for a long time (Ratzon et al., 2011).

In Lithuania, the problem issues of vocational training, vocational adaptation and employment of people with disabilities are analysed by conducting scientific research on the following topics: the attitude of employers and co-workers to the working capacity of people with disabilities; participation of people with disabilities in the labour market, organization of vocational training (Baranauskienė 2000; 2003; Baranauskienė, Ruškus, 2004; Baranauskienė, 2006; Lagūnaitė, Zaborskis, 2010; Batūraitė, 2016; Virbaliienė, Baranauskienė, 2017); prerequisites for the success of vocational rehabilitation of people with disabilities (Baranauskienė,

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<sup>1</sup>Order of the Minister of Education and Science of the Republic of Lithuania of 30 September, 2011 No. V-1795 “*On the Approval of the Description of the Procedure for Organizing Education for Students with Special Educational Needs*”. Valstybės žinios, 2011-10-11, No. 122-5769

Juodraitis, 2008); the phenomenon of disability (Ruškus, 2002); barriers to the social participation of people with disabilities and possible solutions based on good practice (Ruškus et al., 2007); problems of accessibility to health services (Baranauskienė, 2019). Foreign authors much more extensively investigate the vocational training of young people with special educational needs and the problems of their participation in the labour market in scientific research of psychology (Mourik et al., 2005; Hart et al., 2014, Roach, 2019), disability research (Luftig, Muthert, 2005; Grant, 2008; Trembath, Balandin, Stancliffe et al., 2010; Ratzon et al., 2011; Petcu, Chezan, Van Horn, 2015; Tholen, Hultkrantz, Persson, 2017; Zwicker et al., 2017), education science (Smith et al., 2013; Hart, Crippen, 2014; Abdullah et al., 2015), politics (Grover, Piggott, 2015; Novak, 2015), vocational rehabilitation (Becker, Drake, 2003; Lemaire, Mallik, 2008; Shields, Taylor, Fernhall, 2010; Grigal, Migliore, Hart, 2014; Thoresen et al., 2018), public health (Sveinsdottir et al., 2018).

The physical readiness of young people with intellectual disabilities for work activity in Lithuania has been analysed in several scientific works (Grinienė, Pudaitė, 2003; Gerulaitis, Žukauskaitė, 2013, Mockevičienė, Žukauskaitė, Dobrovolskytė, 2013; Radzevičienė, Kazlauskas, 2013). No other research focused on the physical readiness of young people with intellectual disabilities for work activity could be found, except for the above-mentioned authors. Research on this topic is much more actively conducted in foreign countries (Becker, Drake, 2003; Keyserling, 2000, 2003; Kober, Eggleton, 2005; Grant, 2008; Kaye, 2009; Maehler, Schuchardt, 2009; Trembath, Balandin, Stancliffe, Togher, 2010; Grigal, Migliore, Hart, 2014; Barnett, Crippen, 2014; Abdullah, Yasin, Deli, Abdullah, 2015; Petcu, Chezan, Van Horn, 2015; Lysaght, Petner-Arrey, Howell-Moneta, Cobigo, 2017). It is also noticed that in Lithuania there is a lack of research that would reveal the features of the development of the executive function of young people with intellectual disabilities and the opportunities for

developing them in the educational process, and the influence of the executive function on social participation. The executive function comprises a group of cognitive abilities (inhibitory control, working memory, cognitive flexibility) that control, regulate, and manage other abilities and the individual's behaviour (Elliott, 2003; Breidokienė, Jusienė, 2012; Roebers, 2017). The executive function allows us to mentally “play” with ideas, adapt quickly and flexibly to changed circumstances, make decisions, resist temptations, focus on activities, meet new unforeseen challenges and is closely linked to learning abilities (Diamond, 2013; Roebers, 2017). It is therefore considered a crucial factor for successful social adaptation (Welsh, Pennington, Groisser, 1991; Hakkarainen, Brėdikytė, Brandišauskienė, Sujetaitė-Volungevičienė, 2015; Rodrigues, Santos, Rodrigues, 2019) and participation in a competitive labour market (Tomaszewski et al., 2018).

Foreign scientific research analyses the weaknesses and strengths of the executive function of young people with intellectual disabilities very extensively, and research is conducted in the context of social sciences (Moffitt, Arseneault, Belsky et al., 2011; Dandashi, Karkar, Saad et al., 2015), in the fields of disability research (Elliot, 2003; Maehler, Schuchardt, 2009; Danielsson, Henry et al., 2010; Danielsson, Henry, Messer et al., 2012; Costanzo, Varuzza, Meghini et al., 2013; Tomaszewski et al., 2018) neurorehabilitation (Whitall, Getchell, McMenamin et al., 2006, Zelazo, Carlson, Kesek, 2008), psychology (Miyake, Friedman, Emerson et al., 2000; Rowe, Lavender, Turk, 2006; Miyake, Fredman, 2012), rehabilitation sciences (Rodrigues, 2019). It is noticed that in Lithuania there are no scientific researches that would investigate the development of the executive function of young people with intellectual disabilities and/or the opportunities for its development, or they are analysed only in the bachelor's and master's theses. The effect of physical activity on the executive function and psychomotor responses of children and young people with intellectual disabilities was studied



by Rėklaitienė, Požerienė (2008; 2012), on physical capacity – by Kuktelionytė, Skučas, (2014).

The problem of social participation, independent living skills and employment of young people with intellectual disabilities has been a long-standing problem (Roach, 2019) and often becomes a problem of parents (guardians) as well (Thoresen et al., 2018). The professional and social situation of young people with intellectual disabilities and their quality of life are determined by low physical capacity characteristic of them (Henderson, Henderson, 2003; Whitall, Getchell, McMenamin, Horn, Wilms-Floet, Clark, 2006; Beirne-Smith, Patton, Kim, 2006; Heinz, 2007; Rėklaitienė, Požerienė, 2008; 2012; Cuesta-Vargas, Soler-Martinez et al., 2013). It is observed that it is physical capacity that becomes a secondary factor in the process of vocational training, however, it requires much more attention, as most individuals get a job requiring physical strength (Ratzon et al. 2011). Low physical capacity causes difficulties in performing meaningful activities in a work or everyday environment, such as job performance errors, stress, and fatigue (Morse et al., 2009). Young people with intellectual disabilities have been found to have a much higher risk of injuries than their peers without intellectual disabilities. An increased likelihood of injuries in case of intellectual disabilities is associated with the disability and secondary disorders characteristic of it (attention deficit, hyperactivity, epilepsy, behavioural and emotional disorders, perceptual and communication disorders due to hearing and vision impairments). The most common injury mechanisms are falls (19%), assaults/quarrels (9.7%), sports injuries (8.3%), deep cuts (8.3%). The most common injuries were upper (34.6%) and lower (38.4%) extremity and head (18.3%) injuries (White, McPherson Lennox, Ware, 2018). Thus, it is very important to pay attention to this in physical work activity, as this risk increases in an unsafe work environment or may even be associated with a decrease in physical capacity, fatigue or stress in the work environment (Morse et al., 2009; Moffitt, 2012).

According to Tomaszewski et al. (2018), Rodrigues et al. (2019) adaptive behaviour and executive functions play a very important role in work activity. Adaptive behaviour includes the conceptual, practical, and social skills that accompany a person in daily activities (Schalock Borthwick-Duffy, Bradley, et al., 2010; Costanzo et al., 2013; Lysaght, Petner-Arrey, Howell-Moneta et al., 2017). People with intellectual disabilities often have problems of adaptive behaviour, impulsivity, communication, social responsibility, interpersonal skills, security, health care, occupational and other problems, and this determines the opportunities for their independence, occupation and employment (Schalock et al., 2010; Woolf, Woolf, Oakland, 2010, Nycyk, 2018). Young people often behave impulsively and unpredictably, are prone to delinquency, not following rules, instructions and so on (Moffit, 2012). Tomaszewski et al. (2018) revealed that executive functions are more related to employment outcomes, and the working memory component is strongly related to the employment status of individuals with intellectual disabilities. The authors point out that it may be useful to include the development of skills of the executive function in vocational training programmes when preparing individuals for work activity. Properly organized development of cognitive and psychomotor skills has a positive effect on the promotion of adaptive behaviour (Whitt-Glover, Neill, Stettler, 2006; Salaun, Reynes et al., 2014; Selickaitė, Rėklaitienė & Požėrienė, 2014; Rodrigues et al., 2019).

Often, young people with intellectual disabilities experience social exclusion (Lysaght, Arrey, Howell-Moneta, Cobigo, 2017; Zwicker et al., 2017), which influences the formation of negative emotions. A person experiences stress, loneliness, sadness, which negatively affects the development of the executive function (Hillmann, Erickson, Kramer, 2008; Diamond, 2013; Wilson et al. 2017). The quality of the executive function is also affected by physical health and physical capacity. The latter factors also influence the benefits of the intervention of the executive function. A

person better demonstrates executive functions when he/she is happy, calm, well rested, physically prepared, feels physically healthy, and is socially supported and encouraged (Diamond, 2015). An educational programme that reinforces positive factors and/or reduces risk factors (Ho, Tsao, Bloch, Zeltzer, 2011) while “challenging” executive functions (Diamond, 2015) can have a strong impact on the preparedness for professional work activity of young people with intellectual disabilities (Tomaszewski et al., 2018). Therefore, it is important not only to improve physical condition, but also to promote learning and testing various motor skills, promote motor literacy (Skurvydas, 2017), develop the executive function providing an opportunity to experience joy, pride, confidence and provide a sense of social belonging (group or team member) (Carlson, White, 2013; Danielsson, Henry, Ronnberg, Nilsson, 2010; Danielsson, Henry, Messer, Ronnberg, 2012; Diamond, 2015).

There is a wealth of research that proves that it is properly applied physical exercise or learning maintaining recommended physical activity that not only *reduces the risk of health disorders* (Juodžbalienė et al., 2001; Faison-Hodge, Porretta et al., 2004; Whitt-Glover, O’Neill et al., 2006; Hutzler, 2007; Frey, Stanish et al., 2008; Rėklaitienė et al., 2008, 2012; Hiesinger, Tophoven, 2019), but also *increases physical capacity, cognitive and attentional abilities* (Hillman, Kramer et al., 2006; Whitall, Getchell et al., 2006; Davis, Tomporowski et al., 2011; Dandashi et al., 2015; Diamond, 2015; Ferreira et al., 2017 Skurvydas, 2017), *help to develop self-regulatory mechanisms* (Vainienė, Kardelis 2008; Selickaitė et al., 2014; Tomaszewski et al., 2018). Physical education of people with disabilities includes cognitive, emotional and psychomotor development. Through physical activity, the main focus is on the accumulation of knowledge, through the psychomotor field – on the formation of skills (Požėrienė, 2013). This is a very important aspect of the individual’s empowerment in order to increase and maintain the working capacity of young people with intellectual disabilities,

ensure their success in the transition from school to the labour market and independent living, however, it becomes a pedagogical problem. With the introduction of vocational training in modules, the number of hours of physical education has been reduced<sup>2</sup>. Physical education lessons do not provide conditions for the assessment and development of the physical capacity of young people with intellectual disabilities, taking into account individual abilities and powers. Lessons are led by physical education teachers, whose qualifications are often too narrow to work with students with special needs. Teachers lack special knowledge about the organization of physical capacity training in working with young people with intellectual disabilities in the process of vocational training. It is noted that there are no methodological recommendations for physical education teachers and other professionals working with young people with special needs in a vocational school.

The essence of the dissertation research is the search for answers to the following problem questions: what is the work-related physical capacity of young people in vocational schools, does it meet international standards for work requiring physical strength? What difficulties related to physical capacity do young people face in their work activity? How significant is the application of the programme of the development of work-related physical skills in the context of young people's social participation? What is the expression of the executive function of young people with intellectual disabilities and what are its strengths and weaknesses that determine their social participation and working capacity? What content of the programme of the development of physical capacity would have a positive impact not only on the young people's work-related physical

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<sup>2</sup>Order of the Ministry of Education, Science and Sport of the Republic of Lithuania of 22 August, 2019 No. V-929. "On the approval of the general vocational training plans for the academic years 2019-2020 and 2020-2021" Vilnius. <https://e-seimas.lrs.lt/portal/legalAct/lt/TAD/db936032c51311e993cff47c25bfa28c?jfwid=-hok3iff37>

abilities, but also on the executive function and reducing impulsivity? What is the interaction between physical readiness, work-related physical abilities, and the executive function?

On the basis of the problem questions, 4 hypotheses were raised in the work:

1. Young people with intellectual disabilities have lower work-related physical abilities than the established international standards for work requiring physical strength (DOT).
2. Young males with intellectual disabilities have better general work-related physical abilities than young females with intellectual disabilities.
3. Young people with intellectual disabilities are characterized by risk behaviour and impulsivity, low inhibitory control. The application of physical exercise has a positive effect on the control of risk behaviour, impulsivity and inhibitory control in young people with intellectual disabilities.
4. An intervention, during which an integrated programme of the development of work-related physical abilities, psychomotor responses and executive function is applied, will have a positive effect on the indicators of young people's general work-related physical abilities, inhibitory control, impulsivity, risk behaviour and fatigue reduction.

**The object of the research** is the interaction of general work-related physical abilities and executive function of young people with intellectual disabilities.

**The aim of the research** is to investigate the interaction between general work-related physical abilities and executive function of young people with intellectual disabilities (mild and moderate) in vocational school and to prepare an evidence-based integrated programme of the development of work-related physical abilities to develop general physical abilities, psychomotor responses and executive function.

**The following objectives are set to achieve the aim of the research:**

1. To carry out a theoretical analysis on the topics of vocational training of young people with intellectual disabilities, physical readiness of young people for participation in work activity, development of the executive function and opportunities to develop general work-related physical abilities.
2. To assess the general work-related physical abilities, psychomotor responses, inhibitory control, impulsivity, risk behaviour, subjective feeling of fatigue in young people with intellectual disabilities and to reveal gender differences.
3. To create an integrated programme of the development of work-related physical abilities, psychomotor responses and executive function to develop physical readiness for work of young people with intellectual disabilities (mild and moderate) according to the dynamic, ecological theory of motor learning and to assess its impact on general work-related physical abilities and inhibitory control.
4. To determine the correlations between general work-related physical abilities and executive function before and after the experiment.

**Research strategy.** A *quantitative research strategy* (Cohen, Manion et al., 2000; Kardelis, 2002; Rumrill, Cook, Wiley, 2011; Bitinas, 2000; 2006; Rupšienė, Rutkienė, 2016) and the method of *quasi-experiment* (Cohen et al., 2000) were chosen to reveal the impact of the applied intervention on the physical capacity, executive function and their interaction in young people with intellectual disabilities. The method of quasi-experiment allows making small samples by convenience sampling, and this makes it possible to take account of many additional conditions such as subjects' possibilities, needs, characteristics, voluntary participation, active participation, etc. to make the research process more manageable for the researcher because the characteristics of the disability of the study participants

may determine the course and results of the study. The whole study was divided into 4 stages: 1) selection of research participants; 2) testing; 3) application of the intervention in the experimental group; 4) retesting of the research participants. The intervention (exposure method) lasted 3 months. The participants in the experimental group participated in physical activity twice a week for 45 minutes. An integrated programme for the development of physical abilities, psychomotor responses, and executive function was used during the sessions. There were no effects or constraints or additional conditions on the subjects of the control group.

The study involved 40 young people (20 males and 20 females) with intellectual disabilities. Each study participant was included in the study on the basis of pre-defined selection criteria and ethical principles of conducting research.

### **Methods of data collection and analysis**

**Scientific theoretical analysis** in the dissertation was performed using subscription and publicly available databases such as: EBSCO (MEDLINE, PubMed, Taylor & Francis, Semantic Schola, Eric, Wiley Online Library, NCBI, APA PsycInfo, APA PsycNet, Elsevier Science Direct, DOAJ, NIOSH, Google Scholar. In conducting the search for scientific literature, the topic of the dissertation and its interdisciplinarity were taken into account, therefore the search for scientific works was carried out in the fields of social sciences (education science, psychology, disability studies), rehabilitation, and neurorabilitation sciences.

**Testing by standardized tests and testing procedure.** In organizing testing procedures, the experience of the subjects is taken into account (Cohen et al., 2000), therefore, the study participants were introduced to the tasks and trained a few days before the testing procedures. To assess the level of general physical abilities, the subjects were introduced to the testing and pilot tests (developed by the computer software) were performed on the same day as the testing, and the best result of three tests was recorded. Testing procedures and training were organized in the first half of the day by

prior arrangement with the study participants. The same testing conditions were maintained for all study participants.

**To determine the level of general physical abilities**, Ergos II™ Work Simulator system 2011 was used. Determining the level of work-related physical abilities or general physical abilities allows to identify whether the subject meets the necessary physical requirements for a particular job (Boadella, Sluiter, 2003; Pre Fatigue lifting protocols, 2006; Snellen, 2010). This system was designed in accordance with the Dictionary of Occupational Titles (DOT), according to which computerized sets of tests for the physical requirements for a profession are compiled. In the Ergos II system, a basic set of tests was developed, consisting of 11 different tests evaluating: static and dynamic strength of body muscles; the general range of body movements in response to the stimulus and handling dexterity; upper extremity muscle strength.

**Go/No Go and Stroop tests were used to assess the control of the executive function.** These tests are used to evaluate inhibitory control (inhibition of the response to an agreed signal, processing rate, selective attention, interference, and executive performance) (Gligorovic, Buha, 2016). The tests are performed using the ANAM4 (Automated Neuropsychological Assessment Metrics – ANAM) software (Reeves, Winter, Bleiberg, Kane, 2007).

The **assessment of impulsivity** is performed applying the Balloon Analogue Risk Task (BART). This test makes it possible to predict the manifestation of risk behaviour and impulsivity. The test is performed using a computer with the PEBL (The Psychology Experiment Building Language) software.

The **NASA-TLX** (Task Load Index) **test** is used to assess **the difficulty of the task** (Hart, Staveland 1988). Respondents should subjectively assess workload according to the amount of effort required to complete the task (from very low to very high). A 20-point scale and 6 questions are provided.

**The Borg (1982) test is used to assess effort.** This test is designed to subjectively evaluate the effort put in during testing or



physical activity. The test provides a 20-point scale in which the subject must rate his/her effort in physical activity on a scale of 6 to 20 points.

The results of the study are recorded at the beginning (pretest) and at the end (posttest) of the experiment. Age, degree of intellectual disability, occupation, concomitant disorders and/or comorbidities, anthropometric height and weight data, arterial blood pressure (ABP mmHg) and heart rate (HR) were important for primary data collection.

### **Theoretical approaches of the dissertation research**

The **approach of social constructivism** (Vygotskis, 1978; Berger, Luckmann, 1999; Packer & Goicoechea 2000; Luckman, 2004; 2012; Elder-Vass, 2012) is based on the statement that the individuals' social and psychomotor development depends on their participation in social practice and relations with other people as well. The properties and physical structures of the human biological body are determined by our social experience, which in turn is conditioned by the structures and functions of the biological body (Elder-Vass, 2012), therefore, we must not forget that a person is a biological being and his/her activity in social reality is based on the *interactions of mind, body, activity and environment* (Vygotskis, 1978).

The **theory of social participation** (Lave, Wenger, 1991; Lave, 1996, Ebersold, 2007; Ebersold, Schmitt, Priestley, 2011) is based on the condition of reality, through which each person meets his/her needs, constructs the knowledge, creates it in the interaction with other members of society and reveals his/her identity (Lave, Wenger, 1991). The closedness of social participation limits a person's social and psychomotor development, which is already affected by negative factors of the intellectual disability and other health disorders. The phenomenon of a closed "circle" is emerging, which disrupts young people's opportunities for self-expression and participation and increases their social exclusion, difficulties in finding employment and remaining in the labour market (Ebersold,

2007; 2011). Therefore, in accordance with the approaches of social participation, the aim is to eliminate “obstacles” that negatively affect a person’s social life and participation, and by using external and internal resources, the person with a disability is enabled to independently seek to become more actively involved in the life of the community or society (Ruškus et al., 2007).

The **perspective of empowerment** as a direction of the development of social participation is envisaged on the basis of the insights revealing empowerment presented by Freire (2002), Perkins, Zimmerman, (1995), Ruškus, Mažeikis (2007). The process of empowerment is seen as increasing opportunities and strengths through external and internal resources and curbing weaknesses, promoting responsibility for oneself and one’s needs (Ruškus et al., 2013). A person, who independently makes changes or actions in his/her individual path, which increase the control of quality of life and strengthen the individual’s abilities (Labonte, 1995; Freire, 2002) and change lifestyle, consumption habits to improve health, and so on (Daniele, 2017), is considered empowered. It is a person’s working capacity that depends on the interaction of external and internal resources (Ruškus, Mažeikis, 2007) and their expression (Freire, 2002), therefore, self-confidence and (self-)empowerment of people with disabilities in acquiring the necessary knowledge, skills, behaviour patterns, etc. can help to avoid dependence on others and to strive for independence, to experience success in professional activity.

The **theory of executive function** (Vygotskis, 1978; Welsh, 1991; Diamond, 2013; 2015; Rakickienė, 2015; Roebbers, 2017; Poon, 2018) is related to the individual’s activity, learning, behaviour, working capacity, social participation, success and life satisfaction. It is related not to knowing, but to execution and the effective management of skills and their adaptation to new situations. The development of the executive function manifests itself first at the social level and then at the individual level. Therefore, it is an integral part of social practice in the living world, and its effective

functioning leads to successful adaptation in different social environments and situations (Rodrigues et al., 2019; Spaniol, Danielsson, 2019).

**The epistemology of the dissertation research is based on the approach of social positivism** (Cohen, Manion, Morrison, 2000; Nekrašas, 2010; Taylor, Medina, 2011; Scotland, 2012), because every phenomenon (fact) is real (objective) and has specific features (subjectivity), and most importantly, the representatives of social positivism (Comte and Mill) do not rule out the view that social reality is constructed (Nekrašas, 2010). The dissertation combines the theories of Comte's social dynamics and Mill's liberal individualism for the cognition of the phenomenon under investigation. These theories explain the fact that social living conditions and social development depend on various factors, their interdependence, constructive and productive activity (Comte, 1858). According to Mill, progress is possible when seeking personal well-being, the condition of which is individualism, individual freedom, happiness, well-being, pleasure and recognition of diversity. The differences of each person require different conditions for development (Millis, 2001 [1859]). These cognitive attitudes of social positivism are important when it comes to assessing change or finding causal meanings and solutions to a problem. Positivism provides an opportunity not only to know phenomena, but also to reveal their relations by observing and evaluating with measurable facts (Bryant, 1985; Nekrašas, 2010; Scotland, 2012).

**Dynamic, ecological theory of motor learning** (Gibson, 1977; Gibson, Pick, 2000; Hutzler, 2007) is based on dynamic and ecological theories of motor control. *Dynamic systems theory of motor control* draws attention to the influence of changing environment on motor control and allows to explain the nature of motor variation, while *ecological theory of motor control* emphasizes the influence of environment on the efficiency of motor control. It is explained that the management of movements performed in different environments is different and it is important to understand the

relationship between movement and environmental conditions (Skurvydas, 2017), which determines how a person will adapt optimal movement performance strategies to changing environment. Therefore, motor preparation and the processes of environmental analysis that take place simultaneously and complement each other are necessary (Roller, Duff, Umphred, Byl, 2019). In the environment of work requiring physical strength, changes in the environment and working conditions are very often encountered, to which a person must be able to optimally adapt his/her physical work-related actions in order to maintain working capacity and health, however, if motor preparedness is not complete, frequent changes in the environment or work situation increase the risk of work-related health problems, fatigue, injuries, etc. (Ratzon et al., 2011).

### **Scientific novelty of the research**

There is a wealth of research, which proves that, namely, properly applied physical exercise or learning while maintaining recommended physical activity not only reduces the risk of health problems, but also increases physical capacity, cognitive and attentional abilities, helps develop self-regulatory mechanisms. However, there is a lack of methodological recommendations for the development of physical capacity in working with young people with intellectual disabilities in the vocational training process. Therefore, the idea of this dissertation research is not only to study the level of work-related physical abilities of young people with intellectual disabilities, the strengths and weaknesses of the executive function, but also to prepare practically tested methodological recommendations.

For the first time in Lithuania, a dissertation research was implemented, during which the evaluation of the subjects is performed using diagnostic equipment – Ergos II™ Work Simulator. This provides an opportunity to look objectively at the phenomenon under investigation. Tests of diagnostic equipment are focused on general physical work-related criteria but not on norms of

psychophysical development, therefore, regardless of a person's state of health or peculiarities of development, objective information about the person's physical ability is obtained. The obtained data can be compared with specific work or occupational group standards and the individual's abilities to work are assessed without harm to health (Baker, 2001; Boadella, Sluiter, 2003; Matheson, 2003; Gouttebauge et al., 2004; Gouttebauge et al., 2005; Snellen, 2010).

### **Practical significance of the research**

The designed theoretical systematic model of the development of physical capacity based on the dynamic, ecological theory of motor learning, focused on the development of motor literacy and general work-related physical abilities of young people with intellectual disabilities, can contribute to the structured and methodical development of respective integrated programmes that would help systematically increase the physical readiness of young people with intellectual disabilities for work activity.

The benefits of the developed and practically tested integrated programme of the development of work-related physical abilities, psychomotor responses and executive function are evaluated not only for the young people participating in the study, but also for vocational school teachers as this type of research and the development of practically tested programs provide an opportunity to convey methodological recommendations.

**Structure and scope of the dissertation.** The dissertation consists of an introduction, four chapters, conclusions, recommendations, references and appendices. The dissertation contains 82 tables (71 of them in the dissertation and 11 in the appendices), 14 figures (10 of them in the dissertation and 4 in the appendices). The list of references contains 287 sources. The total scope of the dissertation: 223 pages (without appendixes).

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## REVIEW OF THE CONTENTS OF THE DISSERTATION

**The scientific study presented in the first chapter of the dissertation was performed** by analysing scientific sources in the fields of social sciences (education science, psychology, disability studies), rehabilitation and neurorehabilitation sciences. Research carried out in different scientific fields and theoretical insights provided an opportunity to look at the problems examined in the dissertation research in an interdisciplinary way and to know the strengths and weaknesses of the phenomenon under investigation. We would like to single out the main theoretical statements that influenced the construction of the study and the interpretation of the study results. First of all, the physical difficulties of young people with intellectual disabilities remain secondary and they receive too little attention in the vocational training process. However, physical factors need to be in the centre of attention, as young people tend to choose occupations and get into jobs where physical strength is needed (painter-plasterer, bricklayer-concreter assistant, locksmith, room cleaner, etc.). Second, young people with intellectual disabilities are characterized by weaker muscle strength, results of endurance, dexterity, speed of performance of body movement, insufficient static balance, coordination, difficulties of cognitive function and psychosocial difficulties (inadequate risk behaviour, impulsivity, attention and memory problems, etc.). All these factors adversely affect the development of psychomotor responses, the



formation of motor skills required for work activity, general motor literacy and the young person's psychosocial health. Therefore, in addition to the social problems young people face in transitioning to the labour market, they also face physical difficulties, which in work activity play a significant role in maintaining their health, getting employed and retaining the workplace. Third, the process of socialization is inseparable from work activity, which is one of the main parts of adult occupational life and a goal pursued by every person with and without a disability because employment provides an opportunity to participate in the social environment, experience economic independence, general satisfaction with one's personal life and self-actualization. Vocational training is therefore becoming a prerequisite for preparing young people with special educational needs to compete in the labour market and it must meet the need for the necessary help and support. Fourth, young people's self-reliance and (self-)empowerment can help to avoid dependence on others and to seek independence, to succeed in their professional life. Empowerment-oriented physical activity aims to increase a person's healthiness, at the same time, to alleviate the problems experienced, giving participants the opportunities to develop knowledge and skills, which creates favourable conditions for the young person's independent living and social participation.

The **second chapter of the dissertation** defines the theoretical and methodological approaches of the research, presents the research design, research organization stages, describes the applied intervention, applied diagnostic assessment of general work-related physical abilities, executive function, impulsivity and risk behaviour, subjective fatigue. The organization of an integrated programme of general work-related physical abilities, psychomotor responses and executive function is described in detail. All data collection methods and the parameters of their statistical analysis are described. Information on the selection of research participants, the role of the researcher during the research, and research ethics are provided.

The **third chapter of the dissertation** presents and analyses the statistical data of the research in three stages: 1) the data obtained during the first test (general work-related physical abilities, response (inhibitory) control, impulsivity, subjective fatigue) are analysed from the aspect of gender, as well as the correspondence of general work-related physical abilities to the categories of work requiring physical strength and work not requiring physical strength; 2) changes in maximum static and dynamic strength, body movement speed, upper extremity strength, response (inhibitory) control, impulsivity and subjective fatigue in the groups and differences between the groups (experimental and control groups) are analysed; 3) comparison of work-related physical abilities with the categories of work requiring physical strength and work not requiring physical strength, after the experiment is performed.

*Statistical data analysis* was performed using the SPSS 20.0.0 software package for Windows. The application of the *Shapiro-Wilk* test revealed that the data distributions were abnormal, therefore non-parametric methods of statistical analysis were used. The *Mann-Whitney U* test was applied to calculate the differences in values between the two independent groups. *Z* criterion of the *Wilcoxon* test was applied to identify the differences of the variables in the two related samples. The Cohen's D criterion was calculated to assess the effect size. D – effect size, coefficients: small effect – 0.1-0.3; medium effect – 0.3-0.5; large (strong) effect > 0.5. The Spearman correlation coefficient was used to determine the correlation between the variables. Differences in results were considered statistically significant if the error probability value was  $p < 0.05$  when the reliability is 95% (Cohen, Manion, Morrison, 2000; Pukėnas, 2005; Leonavičienė, 2006).

The **fourth chapter of the dissertation** presents the discussion of the research results, comparison of the obtained data with other Lithuanian and foreign scientific research. The collected data are analysed by testing according to the intended research hypotheses: compliance of general work-related physical abilities with

international standards for physical work; indicators of risk behaviour, impulsivity, and inhibitory control and their relationship to work-related physical abilities; the impact of an integrated programme of the development of general work-related physical abilities, psychomotor responses and executive function. At the end of the chapter, the limitations of the dissertation research and further research perspectives are also discussed.

## SCIENTIFIC DISCUSSION

Empowering young people with intellectual disabilities to participate in a competitive labour market requires more extensive research and debate. In foreign scientific sources, it is possible to find research that reveals the opportunities and challenges of young people with intellectual disabilities to participate in professional activity (Ratzon et al., 2011; Nycyk, 2018). In the context of Lithuanian vocational training and labour market, similar research is lacking or it was conducted in the last decade and beyond. The research conducted focuses on pre-vocational orientation of people with disabilities (Batūraitė, 2016; Virbalienė et al., 2017), participation of people with disabilities in the labour market (Baranauskienė et al., 2004), vocational adaptation (Baranauskienė, 2006), vocational rehabilitation of people with disabilities (Baranauskienė et al., 2008; Baranauskienė, Gudinavičius, 2008), social participation of people with disabilities (Ruškus et al., 2007). However, there is a lack of an interdisciplinary approach and more comprehensive research that would not only create the conditions to substantiate the issues of social participation, unemployment, employment and career planning of young people with intellectual disabilities, but also help to find possible solutions to the current problem in different contexts (educational, political, social, cultural) because the perspective of empowerment is focused on the capacity of the whole to accept and change. Another problem that has

emerged is that only a very small part of Lithuanian researchers have carried out these researches and the strategies of all the researches are identical.

In Lithuania, the implementation of the ideas of empowerment and social participation in the educational, social, cultural and political context opens up more opportunities for people with disabilities, however, young people with intellectual disabilities still face big challenges in employment and adaptation in the work environment. In many cases, this is not only a problem of young people with intellectual disabilities themselves, but also of employers, co-workers, public attitudes and viewpoint, vocational training and organization procedures. Therefore, it is very important to analyse and solve existing problems according to the principle of interdisciplinarity, constructive activity, empowerment and the condition of individualism, which according to the representative of positivism, Mill (2001 [1859]), is the pursuit of personal well-being, recognizing each person's differences.

The benefits of work activity for people with intellectual disabilities are recognized by Lithuanian (Baranauskienė et al., 2004; Ruškus et al., 2007) and foreign researchers (Smith et al., 2013; Novak, 2015; Zwicker et al., 2017; Tomaszewski et al., 2018). This is one of the important components of social integration in the transition from a young person's life to adult life. The performed theoretical analysis revealed that the employment situation and integration of young people with intellectual disabilities into the labour market in Lithuania has been studied very little during the last decade, it is often limited to pre-vocational training research (Batūraitė, 2016, Virbalienė et al., 2017). It is therefore worthwhile to draw on the experience of foreign countries (Ratzon et al., 2011; Baker, 2012; Hart Barnet et al., 2014; Petcu et al., 2015; Lysaght et al., 2017; Tholen et al., 2017; Wilson et al. et al., 2017; Sveinsdottir et al., 2018) when conducting scientific research and to look for the opportunities for successful integration of young people with intellectual disabilities into the labour market.

It is stated that the success of social adaptation of young people with intellectual disabilities depends on the social environment and the relationship of young people with it (Vygotskis, 1978; Ruškus et al., 2007; Zelazo et al., 2008; Griffin et al., 2012; Pastula et al., 2012; Turnbull et al., 2013), however, there is a lack of deeper disclosure of the context of a success situation. It is believed that a person's activity and success depend not only on the social environment and the relationship with it, but also on the state of mental and physical health, executive function, the person cannot be separated from the biological body, the development of which is influenced by the social environment. We can substantiate this statement with the statement made by Elder-Vass (2012) that the properties and physical structures of the human biological body are conditioned by our social experience and vice versa – social experience is conditioned by the structures and functions of the biological body. As early as 1978, Vygotsky, a representative of social constructivism, stated that a person is a biological being, and that his/her activities in social reality are based on the interactions of mind, body, activity, and environment (Vygotskis, 1978).

It turned out that in Lithuania almost no attention is paid to the knowledge of physical difficulties of persons with intellectual disabilities and the solution of the problems they cause in their work activity, so that the young person would have favourable conditions to constructively build his/her future. It is focused only on social problems, notwithstanding the fact that some of them may be due to the adverse interaction between a person's mind, body, activity and the environment.

Scientific analysis helped to reveal the current situation that most young people with intellectual disabilities find employment in jobs requiring physical strength, where physical capacity remains very important. Therefore, vocational schools must also pay sufficient attention to physical education lessons, development of general work-related physical abilities, health promotion, which currently happens sporadically or in the implementation of project

activities. These statements can be confirmed by the works of Ratzon et al., 2011 Pastula et al., (2012), Oviedo et al., (2014), Rodrigues et al., (2019), and other researchers. Another factor revealed and investigated in the theoretical analysis is the executive function, which is also very important in work activity, performing work actions, maintaining relationships with other people, seeking the adaptive behaviour of the person in the workplace and other social environments (Jacobson et al., 2007; Chapman et al., 2006; Schalock et al. 2010; Cuesta-Vargas, Solera-Martinez et al., 2013). The scientific study confirmed that the development of the executive function of young people with intellectual disabilities has features characteristic only of this group of people, the negative influence of which determines the young person's social participation, learning, work capacity, independent living (Rowe et al., 2006; Danielsson et al., 2010; Costanzo et al., 2013). Often the inadequacy of the executive function influences the inappropriate risk or impulsive behaviour of young people with intellectual disabilities in the workplace and for this reason they are described by employers as improperly behaving persons and are disliked, a negative public attitude is formed. According to scientific research, it has been proven (Fisher et al., 2011; Salaun et al., 2014; Selickaitė et al., 2014; Skurvydas, 2016) that it is physical exercise that has a positive effect not only on physical capacity and general health, but also on the executive function (Taylor et al., 1996; Diamond et al., 2007; Diamond, 2015). Taking into account these and many other similar scientific statements, which are analysed in the first chapter of the dissertation (see page 18), an educational programme based on the perspective of the empowerment of young people with intellectual disabilities (Perkins et al., 1995; Freire, 2002) has been developed, which includes physical activity, the development of motor skills, and the development of the executive function by enabling young people to experience a sense of social belonging (Carlson et al., 2013; Danielsson et al., 2010), to acquire knowledge and skills of physical readiness, to develop motor skills, and to shape new ones by

repairing the errors formed. However, it cannot be said that executive skills are homogeneous among people with intellectual disabilities and do not have common features for all. This is influenced by the aetiology of intellectual disabilities, comorbidities, social environment, education, the amount and magnitude of social interactions (Costanzo et al., 2013; Rodrigues et al., 2019).

The results of the study confirmed that the general work-related physical abilities of young people with intellectual disabilities meet the international standards (DOT) for work requiring physical strength, however, when performing work activities that are not related to strength but involve higher risks, they do not meet the international standards (DOT) for work not requiring physical strength. It should be borne in mind that any physical work requires the ability to perform work activities safely and ergonomically to maintain health, however, in case of impaired psychomotor function, this is difficult and increases the probability to experience faster fatigue, stress and increases the risk of occupational injuries. We suppose that these factors can have a significant impact on the length of stay of young people with intellectual disabilities in the workplace. The results of the study also confirmed that young people with intellectual disabilities are characterized by risk behaviour and impulsivity, low inhibitory control. Meanwhile, the application of the intervention with an integrated programme of the development of general work-related physical abilities, psychomotor responses and executive function has a positive impact on the indicators of young people's general work-related physical abilities, inhibitory control, impulsivity, risk behaviour, and fatigue reduction. This confirms the statement that physical exercise affects not only physical capacity but also the executive function that is responsible for managing emotions and behaviour. Therefore, it is useful to develop the general work-related physical abilities of young people with intellectual disabilities through physical education programmes in vocational schools. These results of the dissertation are consistent with the research conducted by Danielsson et al., (2010), Shields et al.,

(2010), Ratzon et al., (2011), Pastula et al., (2012), Oviedo et al., (2014), Rodrigues et al., (2019).

The data of the dissertation research confirm the importance of the perspective of the empowerment of individuals, which states that activities, which increase individuals' abilities to implement desired actions and achieve personal results (Daniele, 2017), have an important role in personal empowerment and social participation. Meanwhile, a person, who independently makes changes or actions in his/her individual path, which increase the control of quality of life and strengthen the individual's abilities and change lifestyle, consumption habits to improve health, and so on, is considered empowered (Labonte, 1995; Freire, 2002; Daniele, 2017). We can confirm that in order to empower young people with intellectual disabilities to participate in the competitive labour market, it is useful to include programmes that comprise the development of physical capacity and executive function. The benefits of the programme are based on the statement that a higher physical capacity and the optimal management of the executive function can lead to the success of a young person with an intellectual disability in vocational training, work activity, independent living and quality of life in general. Programmes can be integrated into physical education lessons, however, physical education teachers should take a special course or a study module should be included for newly trained physical education teachers, which provides knowledge about people with special educational needs, the organization of their physical activity and the development of work-related physical abilities. According to the statements made by foreign researchers (Mourik et al., 2005; Lemaire et al., 2008; Carmeri et al., 2009; Shields et al., 2010; Ratzon et al., 2011; Morrise et al., 2013; Grover, et al., 2015; Pestana et al., 2018; Rodrigues et al., 2019), we can state that in order to ensure high-quality vocational training for people with special needs, it is necessary to assess the situation and organize education in accordance with the principle of interdisciplinarity, because the characteristics of the disability or disorder often also determine



learning and adaptation difficulties. However, providing the necessary educational support, providing an opportunity to receive additional social services that strengthen or maintain health, helps to empower people with disabilities to take an active part in the learning process, during the process of the acquisition of practical skills and competing successfully in the labour market, and the individuals' opportunities for social participation are increased.

## CONCLUSIONS

1. According to the theoretical analysis, young people with intellectual disabilities are usually employed in jobs that require physical strength (painter-plasterer, bricklayer-concreter assistant, room cleaner, locksmith, etc.), although their physical capacity is lower than that of other peers, they experience more health problems, which also determine the reasons for employment. This situation leads to early job loss, risk of work-related health problems, injuries, increasing stress, fatigue, risk behaviour. The appropriate character of educational help and support in a vocational school has a positive effect on a young person's further career path to success. It is worth noting that the organization of optimal physical activity and the stimulation of cognitive functions through physical activity are very important for the working capacity and psychosocial health of young people with intellectual disabilities, the expression of adaptive behaviour, self-control, impulsivity due to the peculiarities of the disability, therefore, it can be one of the forms of educational help and support to empower young people with intellectual disabilities.
2. The first and second hypotheses of the dissertation research that young people with intellectual disabilities have lower general work-related physical abilities than the established international standards for work requiring physical strength (DOT) and that young males with intellectual disabilities have better general work-related physical abilities than young females with intellectual disabilities were partially confirmed.
  - It was found that performing static and dynamic work, when body muscle strength is used, the physical results of more than half of the study participants corresponded to the categories of medium and heavy work requiring physical strength, however, the performance of manual work and physical activities not related to strength by young people

with intellectual disabilities does not meet the requirements for physical work.

- It was found that the maximum static lifting strength (bench height, ankle height and shoulder height) and upper extremity strength of young males with intellectual disabilities is higher than that of young females with intellectual disabilities. Also, the maximum stability of muscle strength (coefficient of variation of strength is lower) is better among the males. The indicators of inhibitory control did not differ statistically significantly between females and males, however, it was found that young males tend to take risks and behave more impulsively than young females. Performing tasks during the testing of general work-related physical abilities, young females experienced greater psychological fatigue and exerted more effort than young males, which may have been due to lower general work-related physical abilities.
3. Referring to the results of the study, we can state that the third and fourth hypotheses of the dissertation research were confirmed. The application of physical exercise has a positive effect on the indicators of the risk behaviour, impulsivity and inhibitory control of young people with intellectual disabilities. The intervention with an integrated programme of the development of general work-related physical abilities, psychomotor responses and executive function has a positive effect on the indicators of young people's general work-related physical abilities, inhibitory control, impulsivity, risk behaviour and fatigue reduction.
- It was found that the integrated programme of the development of general work-related physical abilities, psychomotor responses and executive function had a statistically significant effect ( $p < 0.05$ ) on the indicators of the maximum static strength of body muscles, strength stability, body movement response speed, hand dexterity in

response to the stimulus, hand grip and wrist flexion strength stability comparing the changes in the results of the experimental group with the control group.

- It was found that the applied integrated programme of the development of general work-related physical abilities, psychomotor responses and executive function had a medium (Cohen's  $D > 0.3$ ) effect on the maximum static strength during lifting ankle height and shoulder height, pushing cart height, pulling cart height and shoulder height, dynamic (10 kg) carrying and lifting. The applied programme had a large (Cohen's  $D > 0.5$ ) effect on the results of the maximum static strength during lifting bench height, the speed of body movements reaching forward, handling dexterity, hand grip and pinch strength, forearm pronation and supination, wrist flexion and extension. Assessing the changes in the executive function, it was found that the applied intervention programme had a positive medium (Cohen's  $D > 0.3$ ) effect on the mean response time and impulsivity (statistically significant reduction in the number of blows and the number of exploding balloons). The applied programme also had a large (Cohen's  $D > 0.5$ ) effect on the reduction of effort and fatigue.
- It was found that the applied integrated programme of the development of general work-related physical abilities, psychomotor responses and executive function had a positive effect on the change of young people's strength levels corresponding to work categories: static lifting (bench, ankle and shoulder height), left hand grip strength; left forearm supination strength; left wrist flexion strength; right wrist extension strength; the speed of body movements reaching forward, handling dexterity. The level of the competitiveness of body movement speed and handling dexterity in the experimental group increased by

10.85%, the level of body muscle strength by work categories increased on average by 12.18%. In the control group, as expected, no statistically significant changes were observed between the strength levels corresponding to the job categories before and after the study.

4. Before and after the experiment, moderate ( $r > 0.5$ ) correlations were found between the variables of body muscle static strength and body movement speed in response to the stimulus and between body movement speed, handling dexterity in response to the stimulus (psychomotor responses) and inhibitory control. The obtained results reveal that the development of static body muscle strength and endurance improves the speed of body movements and handling dexterity in response to the stimulus, however, the static body strength has no direct relationship with inhibitory control. Therefore, education should include not only the development of physical abilities, but also the development of the executive function, which is very important in work activity. An integrated programme of the development of general work-related physical abilities must include physical exercises that develop not only body muscle strength and endurance, but also the speed of body movements, handling dexterity (psychomotor functions), dual task exercises to stimulate cognitive functions.

## RECOMMENDATIONS

These recommendations are addressed to vocational training institutions that run vocational training programmes for students with special needs. The recommendations focus on optimizing vocational training in order to increase the participation of people with intellectual disabilities in the labour market and to acquire the necessary social skills for independent living.

The prepared recommendations can be followed by the administration of a vocational school, vocational teachers, other teachers developing students' social skills. These recommendations can also serve as a partial support for the preparation of the programmes of the development of social skills for vocational school students and proposals prepared by vocational training institutions for the Ministry of Education, Science and Sport on the organization of vocational training for students with special needs and the provision of educational assistance.

### **Recommendations for vocational schools:**

1. Vocational schools, where students with special needs study, should provide appropriate educational support and rehabilitation services for people with weaker health. It is recommended that the team of professionals consist of a special educator, social educator, psychologist, career specialist, physiotherapist or applied physical activity specialist.
2. To develop and organize integrated programmes of the development of general work-related physical abilities in accordance with the assessment system of general physical work-related physical abilities, which would include the development of physical working capacity and social competencies required in professional and daily life activities.
3. Programmes designed to develop the general work-related physical abilities of young people with intellectual disabilities should include: 1) an objective assessment of general work-related physical abilities; 2) analysis of the results of the

assessment and comparison with the requirements set for the profession; 3) assessment of problem areas (physical, functional, psychosocial, environmental factors), revealing the individual strengths and weaknesses of the young person; 4) preparation of an intervention plan in accordance with the dynamic, ecological theory of motor learning, when the young person is encouraged to become an active developer of his/her motor skills through active participation, observation and evaluation of mistakes, feelings, where the teacher retains the role of a consultant; 5) monitoring and evaluation of the impact of the intervention programme, anticipation of further educational goals (see Figure 1, page 25).

4. To carry out the programmes of the development of general work-related physical abilities in an integrated manner during physical education lessons and non-formal education. When preparing the programmes, it is recommended that physical education teachers take into account the combinations of applied physical exercises, the content and intensity of the programme, the possibilities of individual adaptation. It is suggested that the content of the programme should include the development of body muscle strength, endurance, psychomotor functions, physical exercise that stimulate cognitive functions (application of the dual task method, sports games, martial arts, dance, etc.). Also, the educational environment and tools must be changing, stimulating the performance of various movements, motivating, creating a feeling of satisfaction, joy, success and victory (competitiveness and competition during the game), creating imitations of work actions, developing economical and safe motor skills.
5. In order to develop the motor literacy of young people with intellectual disabilities in the field of vocational training and to achieve a positive impact, not only the sessions of the development of physical working capacity should be organized, but also the necessary theoretical and practical knowledge should be provided, general physical activity should be promoted, and

values favourable for physical and psychosocial health should be developed.

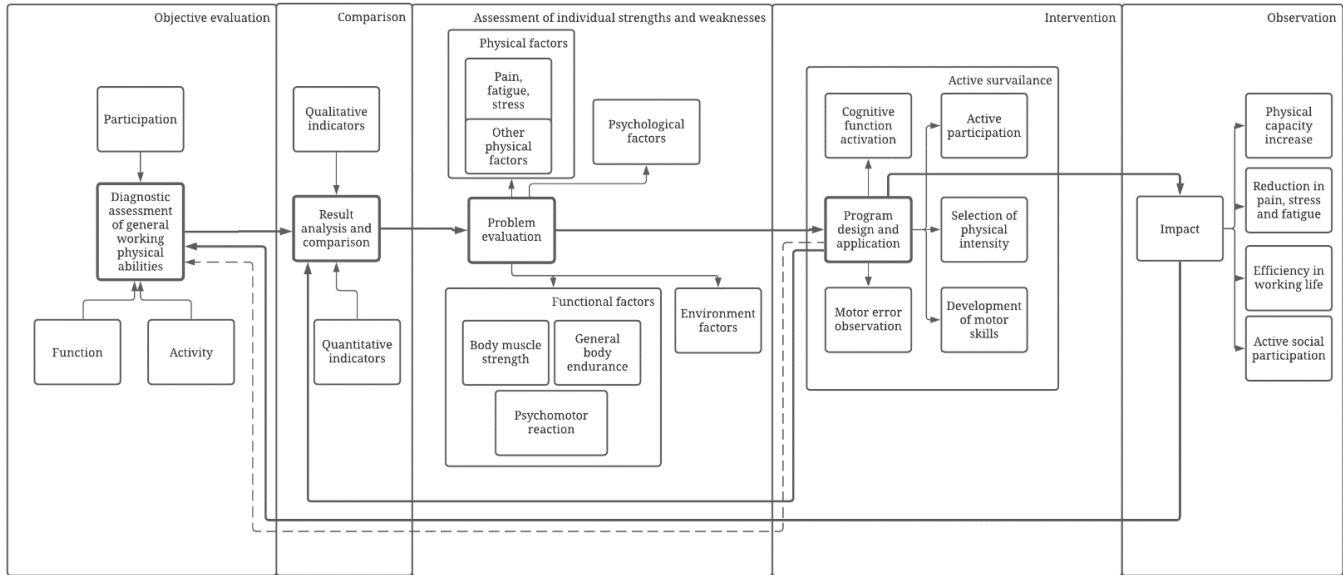
6. After the introduction of integrated programmes of the development of general work-related physical abilities and social skills, vocational schools are suggested performing long-term monitoring and evaluation of the effectiveness of the programmes, updating the programmes and ensuring the novelty, smoothness and innovativeness of the content of the programmes.

**For the developers of the social skills development programmes for vocational schools:**

1. It is recommended to develop a social skills programme for young people with intellectual disabilities, forming respective methodological activity groups of the Qualifications and Vocational Education and Training Development Centre, involving the persons responsible for vocational training of the National Agency for Education and the Ministry of Education, Science and Sport. The content of the programme should comprise not only general social competences, but also competences necessary for professional success: language skills, career planning, self-advocacy in the labour market, application of professional knowledge, planning, organization, financial management, entrepreneurship, independent living, self-confidence, morality and self-control skills and so on. The programme must include not only the development of professional skills but also the development of psychosocial skills aimed at maintaining, preserving and improving emotional and physical health in the work environment, daily life and other activities.
2. Assessment and training of general physical work-related abilities should start as early as possible (after starting vocational training), as this is one of the conditions for successful learning and participation in the competitive labour market of young people with special needs. Therefore, it is important to provide a system for the assessment of young people's general physical



work-related abilities, which would have continuity and enable the assessment and comparison of individual general physical work-related abilities with the physical, functional and psychosocial requirements set for the profession.



**Figure1.** Systematic model of the development of the dynamic, ecological physical capacity (compiled by the author of the work referring to the theoretical insights of Gibson, Pick, (2000), Hutzler (2007) and practical examples)

## **Approval of the results of the dissertation research**

### ***Publications on the topic of the dissertation***

1. **Dobrovolskyte, I. (2020).** Training of general working physical skills of young adults with intellectual disabilities through an integrated physical capacity program. *Social Welfare: Interdisciplinary Approach*, 1(10), 121-131. DOI: 10.21277/sw.v1i10.556
2. Baranauskienė, I., **Dobrovolskytė, I.** (2017). Preconditions for the successful integration of disabled persons into the labour market. *In Proceedings of the International Scientific Conference. Volume II* (Vol. 378, p. 387).
3. Mylytė J., **Dobrovolskytė I.**, Baranauskienė I., Serdiuk L. (2015). Model of Vocational Rehabilitation of People with Disabilities: Case analysis. *Development Prospects of the System of Vocational Rehabilitation of People with Disabilities: Experience of Lithuania and Ukraine*. Šiauliai, ISBN 9786098179026, p. 69-84.
4. Savenkoviėnė, A., Baranauskienė, I., **Dobrovolskytė, I.** (2015). Evaluation of the speed of psychomotor reactions and dynamic carrying of vocational school students with ERGOS II work simulator // Специалист XXI века: психолого-педагогическая культура и профессиональная компетентность: материалы IV международной научно-практической конференции (Барановичи, 22 октября 2015 года) [Specialist of the XXI century: psychological and pedagogical culture and professional competence: materials of the IV international scientific and practical conference (Baranavichy, October 22, 2015)]. Baranavichy: Baranavichy State University, 2015. ISBN: 9789854986876. P. 68-70

### ***Presentations on the topic of the dissertation***

1. **Dobrovolskytė, I.** Mokinių, turinčių specialiųjų poreikių, profesijos pasirinkimo galimybės ir perspektyva [Career options and perspectives for students with special needs]. Respublikinėje mokytojų metodinėje-praktinėje

- konferencijoje „Švietimo pagalbos specialistų ir mokytojų bendradarbiavimas ugdant skirtingų gebėjimų mokinius“, 2020 m. gruodžio 22 d.
2. **Dobrovolskytė, I.** Šiandienos realybė ir poreikis profesinio mokymo įstaigose. [Today's reality and need in vocational training institutions] *Diskusija dėl modulinio profesinio mokymo programų turinio pritaikymo specialiuoju ugdymosi poreikių turintiems asmenims*. KPMPC, 2020 m. vasario 11 d.
  3. **Dobrovolskytė, I.** (2019). Profesinės mokyklos jaunuolių, turinčių intelekto sutrikimą, vykdomosios funkcijos lavinimas per fizinę veiklą: stiprybės ir silpnybės [Development of the executive function of young people with intellectual disabilities in vocational school through physical activity: strengths and weaknesses]. *SHELDON: mokinių, turinčių emocijų, elgesio ir mokymosi sunkumų, išmanusis mokymosi motyvacijos intervencijos modelis [SHELDON: Smart Learning Motivation Intervention Model for Students with Emotional, Behavioural and Learning Difficulties]*. Tarptautinė mokslinė-praktinė konferencija (Pranešimų tezės) [International Scientific-Practical Conference (Abstracts)]. Šiauliai University. p. 31-34.
  4. Savenkovienė A., **Dobrovolskytė I.** (2015). Evaluation of Functional Capacity of Vocational School Students of Decorator's Speciality. *Actual problems of people's education in integrated educational environment in the light of implementation of the convention about the rights of people with disabilities. XV International Scientific-Practical Conference*, Kyiv, p. 303-306
  5. Baranauskienė I., **Dobrovolskytė I.** (2015). Evaluation of Vocational School Students' Physical Abilities by Ergos II Work Simulator device. *International Scientific Conference. Assistive Technology to Support Human Development. Cracow*, p-7.

***Delivered workshops on the topic of the dissertation***

24-25 October, 2017, delivered a seminar on the topic “***Physical Self-Development in Vocational Rehabilitation Activity***” at an international conference “*Профессиональная реабилитация и возможности обучения детей с особыми потребностями*” [*Vocational rehabilitation and educational opportunities for children with special needs*], Kazakhstan, Almaty.

***Other scientific publications prepared in collaboration with a group of researchers***

Radzevičienė, L., Vaitkevičius J. V., Mockevičienė D., Aleknavičiūtė-Ablonskė V., **Dobrovolskytė I.**, Miliūnienė L., Navickienė V., Savenkovienė A. (2016). *Paauglių fizinis aktyvumas ir sveikata [Adolescent physical activity and health]*. Mokslo studija [Research study]. Kaunas: Vitae Litera. ISBN: 9786094542251. 275 p.

## INFORMATION ABOUT THE AUTHOR

**Education.** In 2011, a bachelor's degree in Education and a professional qualification of a special educator (specialization – pedagogy of physical education of children with special needs, physiotherapy) at Šiauliai University were obtained. In 2013, a master's degree in Education Science (specialization – management of applied physical education) at Šiauliai University was obtained. In 2016, a bachelor's degree in Physiotherapy and a qualification of a physiotherapist in the joint study programme of Šiauliai University and Klaipėda University was obtained.

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**Research interests:** development of physical work-related abilities, expression of executive functions in professional activity, assessment of physical and functional health, vocational rehabilitation, health education.

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## NOTES

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