

# POSSIBILITIES OF APPLICATION OF INQUIRY-BASED LEARNING WHEN DEVELOPING THE THINKING OF PUPILS WITH MILD INTELLECTUAL DISABILITY AND BEHAVIOUR DISORDERS – COMPARATIVE RESEARCH

Jiří Dostál<sup>1</sup>, Miroslav Janu<sup>2</sup>, Belgin Bal<sup>3</sup>, Prasart Nuangchalem<sup>4</sup>, Ján Stebila<sup>5</sup>

<sup>1,2</sup> Palacký University in Olomouc, Faculty of Education (CZECH REPUBLIC)

<sup>3</sup> Ondokuz Mayıs Üniversitesi Faculty of Education (TURKEY)

<sup>4</sup> Mahasarakham University, Faculty of Education (THAILAND)

<sup>5</sup> Matej Bel University, Faculty of Natural Sciences (SLOVAKIA)

## Abstract

The inclusion of pupils into schools of the main educational stream is emphasized at the international level. Recently, this trend is more strongly applied in post-communist countries, where the now-criticized approaches (based on the exclusion of pupils with mild intellectual disability and behaviour disorders – e.g. ADHD – and their inclusion into special schools) persisted for a long time. Currently, the discussion on appropriate educational approaches which should be applied is now under development. Contemporary tendencies emphasize principles of so-called inquiry-based learning (IBL).

This is the reason why the authors of this article compare published research conclusions at the international level. A number of them bring findings that the application of IBL influence positively the pupils with mild intellectual disability and behaviour disorders. However, there are also some researches that do not prove this finding. Based on the comparison, the authors conclude that the application of IBL positively contributes to the development of thinking of pupils with mild intellectual disability and behaviour disorders (ADHD).

Keywords: Inquiry-based learning, mild intellectual disability, pupil, child, ADHD.

## 1 INTRODUCTION

In the developed countries, currently observed tendencies are characteristic by an integration of pupils with mild mental retardation<sup>1</sup> and pupils with behavioural and learning disorders (ADHD) into the common basic schools<sup>2</sup>. The given situation is defined by social requirements, sometimes anchored in legislative<sup>3</sup>, among others the Convention on the Rights of Persons with Disabilities (UN)<sup>4</sup>.

The process of integration of pupils, who were excluded before, into the main educational stream contributes positively to the elimination of negative children experiences characterised by a feeling of exclusion from the society and from the participation in the co-education. They are therefore enabled to be included in one whole because even the society, in which they live, is one whole, even though it is internally differentiated. The selection of pupils and their placement into special schools has its advocates who refer to a possibility of application of special-educational approaches, a possibility of individual approach, etc. This is, however, a broader issue which will not be dealt at this place.

A number of issues which have to be solved successfully and removed in order to achieve positive effects emerging during the process of integration. The mentioned documents assume the use of

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<sup>1</sup> WHO classification: F70 Mild mental retardation (IQ 69 - 50).

<sup>2</sup> The term Common basic school (in compliance with other authors) will be used, which indicates mainstream basic school not educating disabled pupils primarily.

<sup>3</sup> E.g. Decree No. 147/2011 Coll., which changes a Decree No. 73/2005 Coll., about the education of children, pupils and students with special needs and education of children, pupils and students extraordinary gifted. By the Education Act 561/2004 Coll. § 2 Principles and Goals of Education), education shall be based on the principles of equal access of all citizens of the Czech Republic or nationals of any other European Union Member State to education without any discrimination based on any ground such as race, color, sex, language, belief or religion, nationality, ethnic or social origin, property, kith or kin, or the health condition or any other status of a citizen.

<sup>4</sup> Purpose of the Convention is: *to promote, protect and ensure the full and equal enjoyment of all human rights and fundamental freedoms by all persons with disabilities, and to promote respect for their inherent dignity.*

special methods, approaches, forms and means of education because it is desirable for the education of handicapped pupils to be effective and with the best possible results in fields of a complex personality development in order to enable every child to experience the success, and, among others, the satisfaction from the newly adopted knowledge<sup>5</sup>. Also one of the basic Czech curricular documents<sup>6</sup> mentions that it is necessary to create conditions for the pupils and their successful education and satisfaction of their special educational needs (cf. RVP ZV<sup>7</sup>, 2013, p. 122). It is obvious from the described situation that the number of cases, in which the special educational approaches are required even from a teacher of a main educational stream's school, is increasing, mainly in the fields of development of cognition, thinking, memory and attention, since one of the requirements put on the teacher is to stimulate the pupils to think creatively, reason logically and to solve problems.

In accordance with the mentioned findings, current educational trends, technology development, and social requirements and expectations, there emerges a question: which possibilities exist during the education of pupils with mild mental disability and learning disorders. The possible answer will be searched in connection to the theory of the inquiry-based learning with a use of the meta-analytical approaches focused on the published research conclusions and other studies, additionally followed by a performed synthesis.

## 2 METHODS USED

During the processing of this study, theoretical methods were used – mainly research takes and findings from papers included in Web of Science and SCOPUS databases. The findings were compared and analysed in order to deduce new conclusions.

Document analysis is a form of qualitative research in which documents are counted of the frequency and sequencing of particular words, phrases, or concepts (Miles & Huberman, 1994). Carley (1990) also demonstrates that texts with exactly the same number of specific concepts can easily have quite different meanings, once the relations among concepts are taken into account. Thus, a "network" analysis is required. (Yıldırım & Şimşek, 2013; Miles & Huberman, 1994; Patton, 1990).

Also, a method of induction was also applied – with its used, more general findings were deduced from concrete fragments.

## 3 TOPICALITY AND THE NEED TO SOLVE THE ISSUE

Some of European countries faced a frequent criticism in recent years, mainly because of an inappropriate approach to the education of pupils with mild mental disability<sup>8</sup> which was reacted on. The current changes occur and they obvious in the managing, strategic and executive documents. The Národní akční plan inkluzivního vzdělávání<sup>9</sup> (NAPIV, 2010) that reacts on the exclusion of a certain group of pupils outside of the main educational stream, states: *a socially-disadvantaged group of pupils stood for a long time outside the main interest of the organizing, didactically-methodological and personal measures of the Czech education*. This document uses a term 'inclusive education' and to fulfil its concept, it is required for the education to be based on the arrangement of a common school in a way that fulfils a concept of equal opportunities and offers an adequate support during the instruction to all children regardless their individual differences in order to develop maximally their educational potential (cf. ibidem p. 1).

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<sup>5</sup> This is a very broad issue. We state beforehand, that the primary goal of this project is the research of skills and knowledge. The knowledge in our project has a slightly wider definition: as a theoretical findings in the levels of "know what", "know how", "know where", "know why" composed in an order to be descriptive and usable in problem-solving or decisions and education (cf. Janík, 2005; Liebowitz, 1999). We will describe the level of knowledge, which has the potential of an interception with the level of skills and level of attitude. We will use term "skill" in accordance with J. Čáp (cf. Čáp, 1960) as *the promptness, given by learning, to fast, methodically correct and saving activity performance*. We reflect motor skills, manifesting themselves in inquiry activities (mainly in aids- and material-related manipulation), intellectual skills, demonstrated in the inquiry activities, and social skills (cf. Švec, 1998).

<sup>6</sup> In force in the Czech Republic.

<sup>7</sup> TN: Meaning *Rámcový vzdělávací program pro základní vzdělávání* (in English: *Framework Educational Programme for Basic Education*). However, the Czech abbreviation RVP ZV is used henceforth in this document.

<sup>8</sup> In the school year of 2013/14, 9,648 pupils were educated according to RVP ZV LMP (meaning *Rámcový vzdělávací program základního vzdělávání – příloha upravující vzdělávání žáků s lehkým mentálním postižením*; in English: *Framework Educational Programme for Basic Education of Pupils with Mild Mental Disabilities*), which is, comparing to the rest of EU countries, a large number (ČŠI, 2014, p. 26).

<sup>9</sup> TN: in English: *National Action Programme of the Inclusive Education*.

There is active decree 103/2014 Coll. regulating the terms and conditions of educating pupils with health deficiencies went into effect. *Based upon this specific legislation such a pupil can only be educated within the primary school educational system intended for such pupils exclusively for a period of time that is essential for the compensation of their health deficiency on condition that he/she fails to fulfil the purpose of educational process of the primary educational facility intended for pupils without any health deficiencies and at the same time he/she has expressed an explicit wish to do so even when the highly specific and individual needs of such a pupil have been taken into consideration and specific compensatory measures applied as defined under § 1, clause 2. Under this provision clause No. 1 shall not be applied in cases when the educational facility or a specific class within the facility has been reserved for the pupils suffering from a not very serious mental deficiency. However, the pupil can be placed within this type of educational facility in accordance with the conditions specified under clause No. 1 § 9, cl. 1 and upon the written confirmation provided by an expert physician. The school counselling board shall, under this provision, consider whether the reasons for this specific manner of education of such a pupil in accord with the clause No. 1 are still relevant and valid. In case the reasons for such a specific type of education have passed and thus cannot be considered as relevant any longer, the person designated by the law in order to legally represent the pupil or the pupil who has attained the age of maturity shall be offered the education within a facility or class intended for pupils without any health deficiencies.* It is obvious from the decree an increased emphasis on integration of the pupils with mild intellectual disability into the main educational stream.

#### **4 CHARACTERISTICS OF A PUPIL WITH MILD INTELLECTUAL DISABILITY AND ADHD AS A BASE FOR THE LEARNING PROJECTING**

For the pupils with mild intellectual disability, it is typical the superiority of the concrete and objective thinking, and their logical thinking is closely connected to reality, to concrete situations (cf. Švarcová, 2012, p. 48-49; Krejčířová & Valenta, 1997, p. 34; Fischer & Škoda, 2008). I. Švarcová also (2011, p. 37) states that individuals are not able to fully acquire the knowledge and fulfil the requirements of the primary school educational programme: The children with a mild intellectual disability benefit from the education that is focused on their skill development and compensation of their disabilities. This is one of the reasons the RVP ZV was developed – a part of it manages the education of pupils with mild intellectual disabilities (2005). It states (p. 9) that is necessary to inspire pupil with mild mental disability to think creatively, logically and to solve problems. Such requirement puts higher demands on the concept of instruction even when teaching pupils without disability; teaching pupils with mild intellectual disabilities is much more complex, since the superiority of the concrete and objective thinking is typical, and their logical thinking is closely connected to reality, and even slight generalization from particular situation is often impossible. In the global scale, there is a great portion of assets used to find new ways of education based on the constructivist theories, just like the inquiry-based education. But little or no attention is put upon the research of this issue connected to the teaching of the pupils with a mild intellectual disability (mainly in connection to development of knowledge and skills).

A pupil with ADHD<sup>10</sup> (Attention Deficit Hyperactivity Disorder) is characterised by symptoms of inattention, hyperactivity and impulsivity. According to the Diagnostic and Statistical Manual of Mental Disorders (American Psychiatric Association, 1994), the disorders related to ADHD are classified into the following three groups:

- Predominantly inattentive subtype
- Predominantly hyperactive-impulsive subtype
- Combined subtype

During the instruction, the pupil expresses themselves i.a. by quick and even non-adequate reactions, difficult understanding of their own emotions, lower self-assessment, excessive movements, and increased speech expressions.

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<sup>10</sup> ADHD is categorized in the US classification of disorders DSM-IV from the year 1994 (American Psychiatric Association, 1994).

## 5 A PUPIL WITH MILD INTELLECTUAL DISABILITY AND ADHD – COMPARISON OF RESEARCH RESULTS IN CONTEXT OF APPLICATION OF THE INQUIRY-BASED LEARNING

As it will be elaborated later, many different approaches are tested during the instruction of handicapped pupils. One of them is typical of pupils' activity focused on the accomplishment of tasks of an exploring nature that can be included in the concept of so-called inquiry-based instruction.

The concept of the inquiry-based learning is being solved from different perspectives in the papers of many authors, see e.g. M. Papáček (2010), D. Nezvalová, M. Bílek, and K. Hrbáčková (2010), T. Janík & I. Stuchlíková (2010), J. Dostál (2015a), or S. Abels (2014). This learning concept is fairly well-elaborated at the theoretical level in the international dimension, however, not in the area of mild intellectual disabled pupils or ADHD. Works and papers are aimed mainly on the broader connections of the integration and the educational approaches applicable in the instruction at schools of the main educational stream with the included pupils become marginal in the area of scientific research. However, the fact that there is a whole range of publications of the methodology (non-scientific) nature that focus on the partial and general development of the personality of children with mild intellectual disability or ADHD: i.a. O. Müller (2010), L. A. Kurtz (2015), and C. R. Carter (2014).

From the analysis of the published research (cf. Hua, Shore, and Makarova, 2012; Camenzulia & Buhagiari, 2013; Lee Yeun, 2009; Cameron & Chudler, 2003; Fitzakerley, Michlin, Paton, and Dubinsky, 2013) and findings of our own research (will be later more elaborated), it turns out that the constructivist approaches – mainly the inquiry-based education and its application – may contribute even more to the education of the pupils with mild intellectual disability – even though the current state of cognition does not provide a clear-cut answer on questions related to the education of pupils with intellectual disability and application of the approaches of the inquiry education. Yet we managed to find out empirically via a local research that the inquiry methods are applicable during the education of the handicapped pupils and they do contribute to a lot higher potential of the generally-developed personality of a pupil which can be helpful for their integration into their daily lives.

The following authors focused in their study on the research of pupils with mild intellectual disability: M. Aydeniz, D. F. Cihak, S. C. Graham, and L. Retinger (2012). They researched the influence of the application of the inquiry-based learning on the five researched pupils while they published detailed results. As a topic of the instruction, electrical circuits were chosen that had been studied also in other studies related to the pupils with no handicap, see e.g. Č. Serafín (2005) and J. Dostál (2015b). They reach a conclusion concluded that pupils better acquire scientific terms and they have a more positive attitude towards the science and technology. The use of kits for assembling of electrical circuits had a significant influence on the learning of basic school pupils with learning disorders. They state that *the findings based on this study suggest that the use of the inquiry-based learning at basic school may positively influence results of pupils with learning disorders* (Aydeniz, Cihak, Graham, and Retinger, 2012, p. 200).

S. Abels (2015) deals with pupils with cognitive and personality disorders. He studied the significance of using the inquiry-based education at the 5<sup>th</sup> and 6<sup>th</sup> grade of the basic school while he performed a deeper analysis of two pupils. Those pupils were diagnosed as handicapped in the fields of “emotional and social development” and also “learning”. Via the videostudy, it was possible to discover a positive influence of the inquiry-based learning during chemistry lessons. The observed pupils engaged successfully in the fulfilment of the inquiry tasks and the development of social skills was also successful.

The possibility of application of the inquiry-based learning of pupils with social, emotional and behavioural disorders<sup>11</sup> is defined by J. Camenzulia<sup>1</sup> & M. A. Buhagiari<sup>b</sup> (2013) – their conclusions sound positively. They state claims of pupils who are considered as representative: *I liked it because it was something original.....something that not every teacher does in their mathematics lessons. (p. 74) It was a great activity and I enjoyed it.; The class was great. I liked it very much. Let's do it again.* For the pupils with learning, social and emotional disorders (including the behavioural disorders), the highest rate of fear, frustration, feelings of guilt and anger is typical. In this context, the observed teacher assessed the instruction as following: *Due to the use of the inquiry-based learning, I got the feeling that pupils will not attend the class just because it is listed in their timetables, but also because they actually enjoy the subject and they are motivated to learn new things. That satisfies me and motivates me as well in my following activity and preparation for another class.* It is obvious that the

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<sup>11</sup> The authors use the term SEBD (social, emotional and behavioural difficulties).

success generates a positive approach to the following instruction projecting. This reality is important also in relation to the burn-out syndrome that is eliminated by that. Furthermore, the teacher states: *the inquiry-based learning has a very positive influence on behaviour of pupils with special educational needs, such as ADHD. In the framework of the inquiry-based learning, the pupils are in the centre of attention and they are active. That helps pupils with SEBD because it is not expected that they will just sit down and listen.*

A number of studies focuses on the individuals with ADHD in the pre-school or younger school age. The need of choice of special educational approaches remains, however, even in the framework of the university preparation, which was pointed out by O. Hua, B. M. Shore, and E. Makarova (2012). In their study, they dealt with pupils suffering with ADHD, however, the pupils were also talented – as they state *the pupils deviate twice from the normality*. The obtained findings are demonstrated also on a case of a university student who failed in some of her study-related situations. Based on the experience, they concluded that for the fields including talent is also appropriate to use the inquiry-based learning that has to be modified regarding limits resulting from ADHD. The pupils have to be supported more in the process of planning of the individual inquiry steps – if they are not, the loss of motivation, which is normally very strong among these students, may occur.

The problem-based learning is very closely related to the inquiry-based learning<sup>12</sup>. Therefore we would like to introduce also the conclusions of B. R. Belland, K. D. Glazewski, and P. A. Ertmer (2009) and their researches as well. There suggest that included groups of pupils with the special educational needs have a significant potential to become engaged in the problem-based and inquiry-based learning. Additionally, a higher motivation and social trust of the pupils were observed.

## 6 RESEARCH PERSPECTIVES

As it was already mentioned before, the pupil with mild intellectual disability is typical by inactivity of perception, slowness of perception and narrowing of the range of perception (cf. Valenta, Michalík, Lečbych at al., 2012, p. 139), attention and memory disorder, narrowed imagination, problems with acquisition of terms, consideration and thinking. Despite the mentioned obstacles, it is very important to develop the level of the cognitive abilities systematically and create enough of opportunities of obtaining of the new experience and cognition among the handicapped pupils.

In connection to works of our project team and works by e.g. M. Vítková et al. (2004), B. Bazalová (2014), E. Zezulková (2014), M. Bartoňová (2013), O. Krejčířová (2013), O. Krejčířová, Z. Kozáková & O. Müller (2013), S. Hachová (2013), M. Valenta & J. Michalík (2012), P. Bendová & P. Zíkl (2011), in which are elaborated various aspects of education of the pupils with mild intellectual disability, it is desirable to focus following research activities on two subareas, which are closely connected and their separate study would not enable a wholly penetration into the essence of studied phenomena.

By the analysis, it was found out that the least-elaborated area of education is the area dealing with the development of a skill to solve problems (the first subarea) and the area connected to the problem solving – the development of knowledge and other skills (second subarea)<sup>13</sup>. The pupils' development of problem solving is closely connected to the inquiry-based learning although these two areas are not fully overlapping. The basic research question therefore: which ways may enable the development and acquisition of a skill to solve problems efficiently with related knowledge and other skills among the pupils with mild intellectual disability?

There are more other questions related to the previous one: by a which way should the teacher stimulate the problem situations; how should they develop the pupil's cognition of problem; how should they support the pupil's willingness to deal with the problem and to (re)solve it; how should they manage and stimulate the process of problem-solving; is the application of the problem solving beneficial for the development of knowledge and permanency of their acquisition? In relation to the school education, the stated questions have not got satisfying answers yet. The research interest should be focused on pupils with mild intellectual disability integrated at a common primary school. By solving of the defined questions, it is possible not only to enrich the educational theory of handicapped pupils, but also to provide findings transferrable into the process of education at schools.

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<sup>12</sup> There exist mutual intersection between the problem-based instruction and the inquiry-based instruction which are considered by the mentioned authors.

<sup>13</sup> In the RVP ZV – LMP is this competence stated as a key *Competence to solve problems* (2005, p. 12).

## 7 CONCLUSION

As it results even from the currently valid basic strategic document, it is necessary to support the compensation of all types of handicap, and the development of all types of talent which is based on the principle of support individualization (Strategie vzdělávací politiky České republiky do roku 2020<sup>14</sup>, p. 17). It is necessary to focus on groups where the early leave from the educational process is a higher risk than among the rest of population. In the Czech Republic, those are mainly children and pupils with special educational needs, i.e. persons with health handicap, health or social disadvantage (ibidem, p. 10).

From the cited documents, it is definitely obvious that the current tendency will go through the way of integration as in form of integrating the pupils with mild intellectual disability and ADHD into common schools. It is counted on significant individualisation measures at an individual level of every pupil. By this chapter, we wanted at least partially react on the current situation because the current educational theory does not provide findings at the level of possibilities and ways of development of problem solving by pupils in the framework of basic education. However, the requirement focused on the development of the pupils' ability to solve problems and to discover unusual solutions is present at the same time (cf. RVP ZV, 2013; RVP ZV – LMP, 2005).

The need of solving of the outlined issue is evidenced also by a publication by the High Level Group on Science Education at the European Commission (Science Education Now: A renewed Pedagogy for the Future of Europe, 2007) that states that the inquiry-based education demonstrated its effectiveness in the primary and secondary education, and also among the pupils with special needs, including the talented ones.

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<sup>14</sup> TN: In English: Strategy of the educational policy of the Czech Republic to 2020.

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