



## Research? Learning? Exploring? Individual Knowledge Acquisition

Andrea BENCE-FEKETE

[fekete.andrea@ke.hu](mailto:fekete.andrea@ke.hu)

(Kaposvári University, Kaposvár, Hungary)

Received: 05.11.2017; Accepted: 28.12.2017

**Abstract:** *The development and modification of learning skills did not follow the boom of the other areas. In the teaching materials verbal knowledge is still the most significant, which does not require thinking and creativity from the students during acquisition; what more, sometimes even the pedagogues do not like those students, who apply unique problem-solving strategies. Making the knowledge applicable does not happen via passive reception, but rather via active learning based on individual thinking and experiences. Research based knowledge acquisition may be applied already from the age of 10; and it enables an prepares children to get along creatively in our knowledge-based society, which requires the individual search and use of information and sources, sensitivity towards problems and a general knowledge of research methods. During the lecture I will introduce the working group of young researchers, where children learn the basics of research step-by-step and show how the roles of students and teachers change during the individual discoveries. So-called “Dunántúli Mandulafa” is a scientific competition of 10-19-year-old young researchers, where they show their first ever presentation and make their first scientific publication - considering the abilities originating from their age, certainly.*

**Keywords:** research-based learning, primary school, experience, experimental learning

### *Introduction*

The world around us had gone through radical changes in the past decades, thanks to the rapid development of science and technology. The amount of new information increased; and the scientific researchers have created an incredibly huge knowledge base, which is expected to be acquired verbally by the next generation. However, this method cannot be applied in real life, as it does not result in applicable, useful knowledge for

getting by in the world. The development and modification of learning skills did not follow the boom of the other areas. The perception and information about knowledge is going under continuous transformation and extension; and this is why we need to re-think the quality, structure and distribution of teaching materials in school; as well as the forms of measurement and evaluation (Vass, 2009). The primary aim of the world, the family and the school are to support the children in getting along with the huge amount of information, while growing up. We need to show them the new ways of information acquisition in order to help them own applicable knowledge; we need to provide them a basis on which they may build new knowledge individually throughout a life. Meeting the requirements of the new era, they need to constantly be ready for renewal.

The new expectations include - above others - the need for experience, which is getting harder and harder to fulfill, since, thanks to the quick emerging of media, children are affected by numerous colorful stimuli. When choosing the educational methods, we need to be careful to choose the ones, which raise the attention of children and motivate them to act, think and gain experiences individually; and which are also suitable for the transmission of new knowledge efficiently. Nowadays it is not the only aim of school to reproduce culture and assimilate the future generation, but it also needs to prepare them for life, matching the needs of the changing world (Bruner, 2004).

Future pedagogues also need to be prepared for the challenges of the 21<sup>st</sup> century during their educational process. The 'what' segment of teaching is highly important, but we need to put an even bigger emphasis on 'how' we do it, to make sure the information transmitted will reach the goal and transform into applicable knowledge.

### *Transformation of the role of a pedagogue*

During the transformation of society, the changes in the culture of pedagogy are inevitable as well; the progress is continuous. However, we need to think if the methods did actually transform in practice, since in most of the schools the desks are located as in the centuries before, pedagogue standing facing the class and explaining the material throughout the lesson, expecting the children to sit and listen. So, it is reasonable to ask: has the change already happened, or are we still at the preliminary phase of transformation?

The main aim of schools would be to develop high level competences; however traditional education is not suitable for this purpose, not able to meet these requirements. In traditional institutions they do not strive enough for the development of independence and self-control of students; or to apply inner motives in general. In the teaching-learning process frontal education is in focus, pedagogues do not consider individual characteristics upon choosing the teaching methods. Unfortunately, the present schools are performance-oriented and do not focus enough on raising the students to become happy, even tempered adults (Klein & Soponyai, 2011).

It is a constant task of the educational system and the society of pedagogues to acquire the most up-to-date educational toolbars, which

meet the requirements of our present time and may successfully be applied among children and young adults. The transformation of the educational system had been in progress throughout history; and the search for the right path is continuous even nowadays.

The paradigm shift has brought the competence-based, criteria-oriented supportive pedagogy. The changes in the approach resulted in the transformation of the role of pedagogues; from the central transmitter of information, teachers became the people, who support and direct the learning process. Their most important activity is the support and direction of the individual learning process of students via cooperative acquisition and processing of information, while considering their individual abilities. However, the paradigm shift is obstructed by the fact that nowadays educational system is still designed for traditional education, so meeting the expectations is often hindered (Bodoni, 2012).

Following social changes, the learning process in schools had also changed significantly; and became a horizontally and vertically spanning, lifelong process. We need to regard all competence fields equally important and they cannot be separated into distinct subjects, development may only be realized in a complex way (Falus & Vajnai, 2012). The present *National Curricula* (110/2012., 2016) poses an educational aim of developing nine key competences: mother-tongue competences, foreign language communication competences, mathematics, scientific and digital competences, efficient individual learning, social and citizenship competences, initiative and entrepreneurship competences, art and aesthetic competences. For the pedagogues to realize the harmonic development of all the nine competences it is essential to have a general knowledge of pedagogy, psychology and also to own the right set of toolbar and to be able to apply it creatively in all situations. Human characteristics, such as empathy, social sensitivity and tolerance towards differences are inevitable for individual development. The primary aim in the teaching-learning process of schools is to provide children with the feeling of success, an aim of life and a positive picture of the future. Besides learning we need to provide space for children to deploy the talents matching their fields of interest (Bencéné-Fekete, 2015).

However, knowing the methods is not enough for success, there is a need for a completely different approach. There is a need to transform the way pedagogues, the people supporting the learning process think; and they also have to trust children and their natural curiosity to explore the world. Positive approach and the respect towards individuality is important, which provides space for deploying talents and individual abilities.

### *Change in methodology*

A method is a set of processes, which lead to the goal. Educational methods include all the efforts of pedagogues and students towards reaching their goal; they are part of the educational process, components, which are applied in different strategies (Falus, 1998). In 2006 the *National Institute of Education* examined the methods and processes

pedagogues apply within institutional education. The results have shown that even in spite of the innovative initiatives most teachers still apply explanations and discussions; and frontal classwork is the most widespread methodology in the country (Honfi & Komlódi, 2010).

Visual aids support understanding the teaching material via experiences, but it is unsure that this methodology makes it possible to gain experiences in individual learning. Pedagogues still apply the methodologies bound to traditional education too often nowadays (Radnóti, 2008).

In order to maintain continuous curiosity and interest, we need to apply both traditional and new methodologies, selecting them considering the age characteristics, interests of the group and the information to be transmitted. There are no bad methods, but the requirement for efficient learning is to find the best method suiting the situation and apply it properly. The key will be the pedagogues, who may provide the right atmosphere for experiential learning by their enthusiasm and dedication (Bencéné-Fekete, 2012).

The three most commonly used forms of efficient education are the combinations of frontal classwork, small-group education and individual work (K. Nagy, 2005). We cannot say traditional methods are not efficient, but the choice of method and work type has to be carefully designed. We need to consider the aims and individual characteristics to find the best mean. Methods are strongly bound to the person applying it, so they cannot be separated from the personality of the pedagogue either. Success may highly be influenced by the approach of the pedagogue and the ability to identify themselves with the method. Traditional methods may also be made successful by pedagogues, who can identify themselves with inclusivity.

However, during the application of traditional teaching methods there is a risk both in cases of frontal classwork and individual work to put the interests and individual abilities of children into the background. The reason for the lack of success and motivation may usually be related to the wrong choice of methodology (K. Nagy, 2005).

Common activities and feeling of success may have a motivating effect on children, which makes them more willing to participate in learning than in cases of working alone. In cases of applying group work, however, we need to make sure that it is going to be real group work. In latent group works children sit separately, and the creation of the groups is random, not based on the conscious consideration of the aim and individual abilities. Sharing of responsibilities is not realized when only one child does the exercises and the evaluation is happening only on group level (Bencéné-Fekete, 2015). In case of real group works heterogeneous micro-groups (2-6 students) make it possible for students of different gender, possibly age, abilities and cultural background to work efficiently together. They may create a cooperative atmosphere, where - by the application of cooperative techniques - there is an opportunity for children to work together and find the pleasure in individual and group success (Arató & Varga, 2008).

The transformation of educational methods, the support of individual learning may have a stimulating effect on learning activities and the willingness to gather information. Students may react differently in different life situations. When pedagogues take the role of the sole

provider of information and the director of the learning process, children will become passive receivers of the teaching material, they will not think and their problem-solving strategies will be characterized by schemes. When teachers give the leading role away, children will be freer, more playful and curious; their creative problem-solving skills and thoughts will come to the surface. Playful curiosity is the basis for creative problem solving (K. Nagy, 2005). During the individual learning, which is based on research, children will think and try to find possible solutions, so they are going to acquire the basics of problem-solving thinking. This is how we may start to help children acquire the fundamentals of scientific research already in lower grade.

### *Research-based learning*

According to *Spronken-Smith and Harland* (2008) research-based teaching/learning is a pedagogical way, which enables students to experience the creation of knowledge. Learning stimulated by research is student-oriented; and a step towards self-controlled learning. During this process the research-skills of students are going to be improved and they will be more motivated towards lifelong learning. Research-based learning provides advantages for the pedagogues as well, since enables them to integrate learning and research, which will result in enhanced feeling of success for the teachers as well.

Research-based learning is an approach, which does not require the complete transformation of the traditional teaching methods. It certainly requires the transformation of the teaching-learning methods applied by the teachers and students in a way that the individual activity of students receives much more significant role in the problem-solution processes (Korom, Csíkos & Csapó, 2016).

*József Zsolnai* has already expressed (1996), that it is not enough for the young individuals to get to know the research results provided by others; they need to be taught for the active participation in science already in primary school. Individual research work strengthens the motivation towards the subject and the field of science, helps the development of cognitive skills and the acquisition of debate skills and professional communication.

The *National Curricula* (Nemzeti..., 2012) does not contain the term research-based learning, but the curricula include problem-solving, experimentation, research, gathering and handling information, critical thinking and active learning, which provide the fundamentals of research-based learning (Korom, Csíkos & Csapó, 2016).

The research-based approach focuses on learning, it is a student-oriented and makes teachers facilitators of the learning process. The method focuses on 'how to get to know it' rather than on 'what we already know', so students will become active participants of knowledge-construction, therefore their knowledge will be deeper. Pedagogues will measure the improvement in abilities and the understanding of the content, instead of the lexical knowledge. For this the classrooms need to be well-equipped and open, and the equipment should inspire students for research and the use of resources. Thanks to the worldwide web the

amount of information and the possibilities to consult are endless; students may move freely, interact with their companions and choose the right material and sources for their work.

During research-based learning students are able to match science with scientific methods. This methodology may be applied within different subjects and study fields, while children acquire the necessary sets of knowledge (Nagyné, 2010).

Children need to acquire the basics of research methodology already at their early stage of development - matching their age characteristics of course. However, for young-age development there is a need for qualified pedagogues, who bear with the right education in research methodology and scientific theory (Bognárné-Kocsis, 2014).

### *The role of pedagogues in research-based learning*

When teaching children for research it is always a dilemma how much part the pedagogue may take in creating the end-result. It is highly important to keep the boundaries and recognize that it is not the pedagogue, who is making the research presented by the students, but the young researchers should do the job with the guidance and support of their teachers.

The scholar activity may be an adaptation, a transformation of already existing material to one's own work, but completely new things may also be created matching to a certain activity; an individual work, such as a new measurement tool or educational aid. The small researches are realized as a result of the common research; the creative, individual activity of the student directed by the pedagogue. Besides the innovative atmosphere the knowledge of the pedagogues, their qualifications in research methodology, scientific education and motivation are also crucial (Bognárné-Kocsis, 2014).

Only those pedagogues will be able to support the research process of children, who do themselves also bear with the necessary competences: the ability to organize and direct a research based on the individual work of students, the ability to recognize and analyze unstructured problems, pose questions, support the in-class interactions and cooperative learning and evaluate students' work objectively (Korom, Csíkos & Csapó, 2016).

According to József Zsolnai (1996) pedagogues need to have skills in planning, organizing, analysis and have to get by in the world of science, values and need to be good communicators and ready for scientific creation. They also need to be capable of individual decision making and the recognition of their own faults, and above all, they should also be credible as pedagogues, open for the new things and mentally healthy, happy, balanced people.

When these are all given, the pedagogues need to be able to accept that the researches are the activities of the children, and they are the ones, who support them from the background. During the research pedagogues will have to accept the suggestions and ways the student suggests.

## *Acquisition of research methodology in primary school*

In school children need to be taught how to learn, they have to acquire the most efficient information-gathering techniques. The situation is the same in case of research-based learning: children need to learn the basics of research methodology already in primary school.

The first step is to create a creative pedagogical atmosphere, raise motivation and find the right topic, which implies curiosity and matches the age characteristics, enabling students to work on their topics on their own, guided by their mentors. The best way to identify individual topics is to organize a round-table talk, where students of different age and their mentors talk informally besides some coffee and biscuits. It is important to be informal, as research may not be forced on anyone, and enthusiasm may be brought only by a topic well-chosen, which helps the researchers through the harder periods as well. Older students may feel responsible and experienced throughout the talks and start to help the younger ones, who will be more likely to accept advice from their peers than the teachers. Lower grade students generally carry out informative studies, their favorite topics are pets, favorite books, the scientific background of their hobbies and sports and the introduction of their idols. Lower grade students often choose research topics from social and environmental sciences.

The next step will be to determine the problem within the topic, answering the question ‘what I should study?’ and to determine the research questions and hypotheses.

This is being followed by the creation of the research plan, which will also be the result of a brainstorming session. In the data collection phase, the researchers need to collect all the necessary information matching the topic; for which they need to acquire the general methodology of secondary data analysis to avoid the time wasted by correcting wrong habits. This will happen in the workshops, where a good way is to put the data of books and articles on colorful post-its, then highlighting and putting down the important information on paper by adding the source as well. On a wall or on the floor we may manage and organize the post-its at will and insert white papers with the additional thoughts - so we just need to write the end-result down afterwards. This method seems to be a game for children, but this way they will learn the basics of scientific referencing.

Literature review is followed by analysis and further brainstorming, where the information gathered is discussed; and the future path of the research and the methodology is set based on the previous findings. In the final phase conclusions and future suggestions are created with respect to the research problems and findings.

During the research subjective works are created, which go far beyond the relevant teaching material for each age group; we can identify the problem-sensitivity and unique thoughts of the students as well (Kiss, 2010).

When a research is done, children also need to learn how to present it to the public. During the workshops younger ones first listen to their older fellows, then they prepare their own presentations with the help of the others, in smaller groups, where they go through the things step-by-step,

evaluate each other's work and participate in the work of others cooperatively.

It is only after the first presentations, when children learn about debate-culture. First of all, they learn how to form questions, then they get into the creation of scientific answers as well as countering some questions politely.

The first research works will be the result of the cooperation of small groups, where teachers take supportive role in the background. For children it is going to be a success to be able to make a scientific presentation and publish their first papers. Exploratory learning motivates children to always search for the new instead of accepting the facts provided ready, which is the best way to motivate them for active learning.

### *The first competition of young researchers: 'Dunántúli Mandulafa'<sup>1</sup> conference*

Children are open for the things happening in their environment, their curiosity and interests are endless. The aim of their activities is to discover the world via experiences, just like researchers do their scientific work in the adult life to get to know the world and its general laws. The aim of the Dunántúli Mandulafa (Transdanubian Almond Tree) program series is identical to that of the KGYTK<sup>2</sup>: provides an opportunity for children interested in science to acquire the techniques and methods of individual learning via scientific presentations and researches. The main goal is to raise and maintain the interests of children and introduce them to the basics of scientific research (Kiss, 2010). The aim of the program is to support children developing individual thinking and scientific creativity already in primary school. This conference recalls the intellectuality of Janus Pannonius. In his poem about the almond tree the natural picture of the tree is matched to the fate of the individual; therefore, the vision becomes a symbol of faith, a sign of segregation and endangered, extraordinary values. In the conference the works of young researchers from primary and secondary schools are presented; then these papers are also published in a conference edition, which is of high value due to the fact that it contains the researches of highly talented young individuals, supported by their mentors. The tiny almond tree stood on the side of the Mecsek Mountain, lonely, blooming even under impossible circumstances to draw attention to itself, even if it was barely possible. The aim of our initiative is not to let talented children on their own, but provide them with mentors and peers, who may support them in utilizing their talents. The topics of the presentations are variable, they reflect the interests of students, which may be bound to their hobbies, free-time activities, teaching materials or scientific topics and problems far beyond these.

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<sup>1</sup> Name given by *Anita Belovári*, assistant professor of Kaposvár University, Faculty of Pedagogy.

<sup>2</sup> KGYTK Scientific Conference of Child Researchers, a talent support program. It was initiated in the schoolyear 1997-98 in the primary school of Zalabér as a part of the value-transmission program of *József Zsolnai*, led by *Albert Kiss*. From the schoolyear of 1999/2000 it has become a national competition of primary school students.



Three categories are open for the ones, who would like to enter the competition: lower and upper grade and high school. The youngest researchers are from third grade, who may enter with 10-minute-long presentations, upper grade students with 15 and high school students with 20 minutes of speech. The first step is to write an abstract, which is followed by the conference, where they present in front of a jury specialized in different areas; and there is space for scientific debates and the young researchers need to defend their research results - naturally considering their abilities by age categories. The most successful works will be published in a book, which is the first step towards the creation of writing a scientific paper. When writing the paper, children will acquire the basics of scientific writing, terminology and referencing.

The Scientific Conference of Child Researchers looks back to a history and set of traditions of decades; and has achieved outstanding results in the education of young researchers. However, many pedagogues are scared away by the fact that scientific works need to be handed in in a written format. In many cases pedagogues are not prepared to direct such a research, where students need to write a (maximum) 30-page-long study, matching the publication requirements in their fields. This is why, for encouraging the students and teachers, we created the program as an anteroom of KGYTK, where the smaller ones write 3-5 pages, upper grade students 8-10, and high school students 10-15 pages long studies as an introduction to the world of scientific writing. Many will take the courage at this competition to participate in the KGYTK with a new research in the next year.

## *Conclusions*

The opinion of psychologists varies on whether there is a need for the acquisition of research methodology already in primary school. Some specialists regard it straining for the children, others think it may cause a deflection of self-image to raise young researchers (Bognárné-Kocsis, 2014) However, practices show that children learn to discover the world consciously, step-by-step and to find explanations to the happenings and processes of our world. Students learn to think, take responsibility for their own work and to not accept the - possibly wrong - information provided without any doubts. They will have doubts, questions, they will discover and learn how to prove hypotheses.

Certainly, it is not predestined that these young researchers will end up as Nobel-prize winning professors of the future, but those, who are raised into research will learn how to think, discover the world and design problem-solving strategies, while experiencing the feeling of success.

## References

- 110/2012. (VI. 4.) Korm. rendelet a Nemzeti alaptanterv kiadásáról, bevezetéséről és alkalmazásáról (2016). *Magyar Közlöny*, 66, 10635-10847.
- Arató, F., & Varga, A. (2008). *Együtt - tanulók kézikönyve*. Budapest: Educatio Társadalmi Közhasznú Társaság.
- Bencéné-Fekete Andrea (2012). Alternatív módszerek alkalmazása a hitoktató képzésben. *Acta Scientiarum*, 37, 85-92.
- Bencéné-Fekete Andrea (2015). A KIP helye a modern pedagógiai módszerek között. In Vörös Klára (Ed.), *A megújulás útjai II: A KIP-módszer használata általános iskolákban a Dél-Dunántúl régióban* (pp. 7-20). Kaposvár: Kaposvári Egyetem Pedagógiai Kar.
- Bodoni Ágnes (2012). *Reformpedagógia*. Kolozsvár: Ábel.
- Bognárné-Kocsis Judit (2014). Általános iskolás korú gyermekek kutatásra nevelésének elméleti és gyakorlati kérdései. In Torgyik Judit (Ed.), *Sokszínű pedagógiai kultúra* (pp. 258-267). Komárno: International Research Institute.
- Bruner, J. (2004). *Az oktatás kultúrája*. Budapest: Gondolat.
- Falus Iván (1998). *Didaktika*. Budapest: Nemzeti Tankönyvkiadó.
- Falus Katalin, & Vajnai Viktória (Eds.) (2012). *Kulcskompetenciák komplex fejlesztése: Modellek és jó gyakorlatok*. Budapest: Oktatókutatató és Fejlesztő Intézet.
- Honfi Anita, & Komlódi Nóra (2010). *Projektpedagógia*. Budapest: Műszaki.
- K. Nagy Emese (2005). A társas interakció mint tudásgyarapító tényező a heterogén osztályokban. *Iskolakultúra*, 15 (5), 16-25.
- Kiss Albert (2010). *A Tudományos diákkör az általános iskolában: A diákkör létrehozása és működtetése*. Zalabér: Zalabéri Általános Iskola, Alapfokú Művészetoktatási Intézmény, Óvoda.
- Klein Sándor, & Soponyai Dóra (Eds.) (2011). *A tanulás szabadsága Magyarországon*. Budapest: Edge.
- Korom Erzsébet, Csíkos Csaba, & Csapó Benő (2016). A kutatásalapú tanulás megvalósításának feltételei a természettudományok tanításában. *Iskolakultúra*, 26 (3), 30-42.
- Nagy Lászlóné (2010). A kutatásalapú tanulás/tanítás ('inquiry-based learning/teaching', IBL) és a természettudományok tanítása. *Iskolakultúra*, 20 (12), 31-51.
- Nemzeti alaptanterv* (2012). Budapest: Oktatókutatató- és Fejlesztő Intézet.
- Radnóti Katalin (2008). *A projektpedagógia mint az integrált nevelés eszköze. Elméleti háttér és gyakorlati példák a módszer alkalmazására*. Budapest: Educatio Társadalmi Szolgáltató Közhasznú Társaság.
- Spronken-Smith, R., & Harland, T. (2009). Learning to teach with problem-based learning. *Active Learning in Higher Education*, 10 (2), 138-153.
- Vass Vilmos (2009). *A kompetencia fogalmának értelmezése*. Retrieved from <http://ofi.hu/tudastar/hidak-tantargyak-kozott/kompetencia-fogalmanak> [12.10.2017].
- Zsolnai József (1996). *Alkotó pedagógia*. Pécs: JPTE.