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Differentiated Development in the School in Particular Motivation

Introduction

One of the most important tasks of education is to recognize the differences and otherness between the children. The introduction of integrated education and training in schools justified the implementation of differentiated development.

Integrated education assumes child-centred pedagogy. It holds that according to the developmental level of students, the perception of reality, the degree of thinking, perception and action competencies, students are capable of learning (Papp, 2006).

Differentiation is an old concept in pedagogy. Learning, the education process, teaching strategies, methods, classroom management, work forms, organization methods, are all topics that appear in the literature (Falus, 1998; M. Nádasi, 1986; Golnhofer–Nádasi, 1980; Papp, 2006). However, primary school education can be characterized by an authoritarian teaching style, the application of frontal work and strong performance orientation.

The assumptions of differentiated education

This means the individualization of goals; other target designation for all children, according to this, differentiation is one of the principles of learning. Assistance acts upon the child, so differentiated learning is also the principle of assistance and individual performance evaluation.

According to Wocken (1996), another assumption is the two-teacher model (Papp, 1995). Differentiation requires two professionals. In everyday teaching practice, differentiation is a process when we adjust teaching to each student's needs, where the aim is to help the effective learning of children.

According to didactics, there are the following types of differentiation: content, interest, tempo, level, the primary source of information search, result, order, structure, the teacher's time spent on students, learning style, group work (Papp, 2006).

We should apply those methods during differentiation, which ensures every student's effective and successful learning and knowledge acquisition. According to Ainscow (1993), in the case of differential development, the most effective teachers are those who:

– emphasize the importance of understanding
– give tasks that relate to everyday life and challenge students
– ensure the continuous progress in the children's work
– promote the diversity of learning experiences
– give choice to the students
– have high expectations
– create a positive atmosphere
– have a consistent approach
– recognize the student's efforts and performance
– organize rest to facilitate learning
– encourage the students' common activities and cooperation
– monitor their progress and provide regular feedback (Papp, 2006, p. 15).

Learners are mainly different from each other in terms of their intellectual ability, performance, motivation, creativity and other characteristic features. Thus the question arises, how do we promote the development of our students' individual ability? In the course of our research we considered learning motivation as one of the most important indicators that can be used in order to get to know the students. It is an

important task for the teacher to get to know the students in terms of their learning abilities, learning orientation and motivation. It is often remarked that teachers teach with all their words and gestures; if a particular look and gesture has a positive pattern for the students, and they start to be interested in the given subject or education material, then their learning might also be successful. The solution may be to develop the students' appropriate motivation, which meets the aims of their education and motivates the children. We distinguish two types of motivation: intrinsic (internal) and extrinsic (external) motivation; our aim is to ensure that external motivation is internalized. The quality of the learning activity is influenced by the learner's motivation, his or her established cognitive strategy and the learning environment (Réthyné, 2003; Lestyán, 2011).

Components of motivation

There are three major components of motivation: activation, persistence and intensity. Activation involves the decision to initiate a type of behaviour, such as enrolling in a psychology class. Persistence is the continued effort towards a goal even though obstacles may exist, such as taking more psychology courses in order to earn a degree although it requires a significant investment of time, energy and resources. Finally, intensity can be seen in the concentration and vigour that goes into pursuing a goal. For example, one student might coast without much effort, while another student will study regularly, participate in discussions and take advantage of research opportunities outside of class. Different types of motivation are frequently described as being either extrinsic or intrinsic. Extrinsic motivations are those that arise from outside of the individual and often involve rewards such as trophies, money, social recognition or praise. Intrinsic motivations are those that arise from within the individual, such as doing a complicated crossword puzzle purely for the personal gratification of solving a problem (Cherry, 2013, Wigfield – Eccles – Rodriguez, 1998).
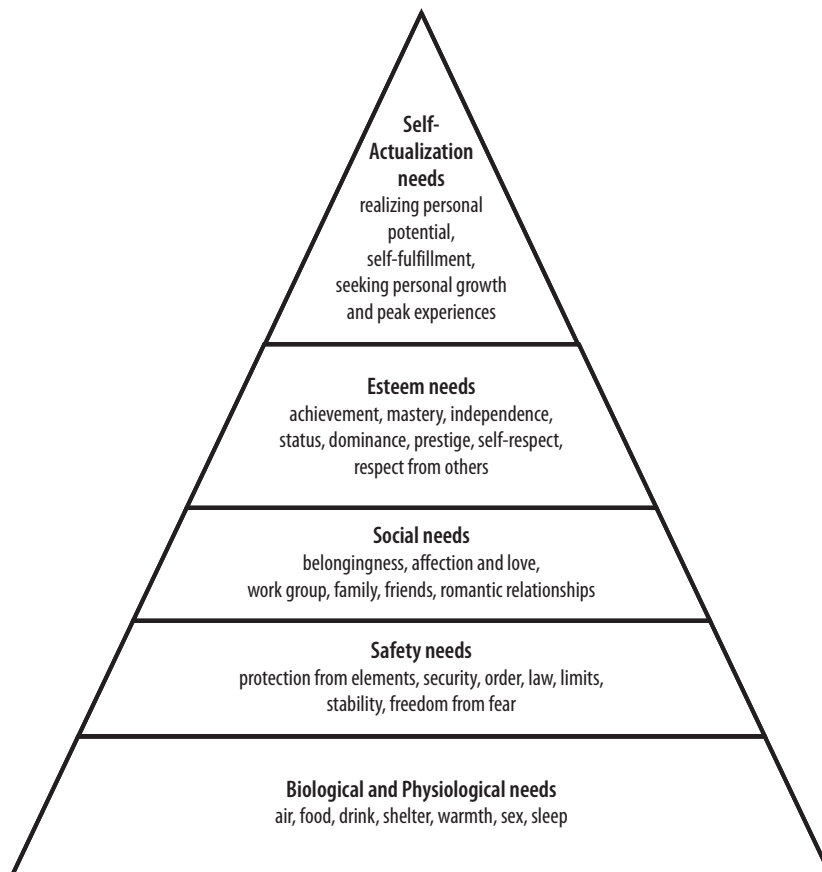
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Hierarchy of Needs

The Hierarchy of Needs is a model in which Maslow attempted to capture these different levels of human motivation. It represents the idea that human beings are propelled into action by different motivating factors at different times – biological drives, psychological needs, higher goals. Now the hierarchical arrangement is not meant to imply that those who focus on higher needs are somehow "better" than those who focus on lower needs. It is not that kind of hierarchy. It is a hierarchy within you, within your day-to-day experience. It simply means that higher needs don't appear unless and until unsatisfied lower needs are satiated. If you are suffering from cold and hunger, for example, you just don't have the time or energy to worry about your self-esteem. Your entire being is focused on food and warmth. For this reason, the different levels also broadly correspond to different stages of life. The basic physical needs at the bottom are predominant in infancy; safety needs come into focus in early childhood; belonging needs predominate in later childhood; esteem needs predominate in early adulthood and self-actualization only really comes into focus with mature adulthood (Maslow, 1943, p. 370).

At once other (and "higher") needs emerge and these, rather than physiological hungers, dominate the organism. And when these in turn are satisfied, again new (and still "higher") needs emerge and so on. This is what we mean by saying that the basic human needs are organized into a hierarchy of relative prepotency (Maslow, 1943, p. 375).

The two lowest levels of the pyramid are important to the physical survival of the organism. Then, once we have our basic physical and safety needs sorted, we feel more ready to share ourselves with others and accomplish things in the world. Most people can readily identify with these common levels of motivation. Maslow held that as we come to feel satisfied with our accomplishments and sense of social worth, we take another step. He referred to this urge as self-actualization. It is very similar to the process Carl Jung referred to as individuation, which tends to kick in during mature adulthood. Self-actualization is different from all the previous needs. We do not feel spurred into action by a sense of deficiency ("Must find food…,"

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                    /\
                   /  \
                  / Self-\
                 /Actualization\
                /   needs    \
               / realizing personal \
              /      potential,      \
             /    self-fulfillment,   \
            /  seeking personal growth  \
           /    and peak experiences     \
          /-------------------------------\
         /         Esteem needs            \
        / achievement, mastery, independence,\
       / status, dominance, prestige, self-respect,\
      /          respect from others           \
     /-------------------------------------------\
    /               Social needs                  \
   /        belongingness, affection and love,      \
  /  work group, family, friends, romantic relationships\
 /-----------------------------------------------------\
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Figure 1
Hierarchy of needs, ST = Self-Transcendence (Maslow, 1943, 375 p.)

"Must make friends…"). Rather, we feel inspired to grow, to explore our potential and become more of what we feel we can be. Maslow called self-actualization a growth need while all the rest are deficiency needs. For Maslow, the level of self-actualization reflects the fact that human beings are not simply biological machines. As we mature and become more aware of ourselves, we are increasingly driven by a sense of personal meaning and purpose. Many people are under the impression that the hierarchy of needs ends there. This is not the case. For while studying people who operate at

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the level of self-actualization, Maslow noticed that many of them frequently have, and deliberately seek, some other type of experience - something extraordinary. Maslow termed these peak experiences. They are profound, life-altering moments of love, understanding, happiness, bliss. They are moments in which one feels radically more whole, more completely alive, more aware of truth, beauty, goodness, and so on. Self-actualizing people have many such peak experiences and eventually feel inspired to actively seek them, extend them and stabilize them. Hence, Maslow added the goal of self-transcendence as the final level, the capstone of the pyramid. This desire goes beyond our ordinary human level of consciousness and results in n experience of oneness with the greater whole, the higher truth, whatever that may be. The earliest and most widespread version of Maslow's hierarchy (based on Maslow's earlier work) shows only the first five levels. A more accurate version of the hierarchy, taking into account Maslow's later work and his private journal entries, shows six motivational levels, with self-transcendence at the top (Koltko-Rivera, 2006).

Types of motivation

Kozéki Béla distinguishes three types of motivation dimensions. The first one is the affective (emotional) dimension; this is the dimension of identification from the motivating effects. The teacher can be seen as a positive model for the learner and the child feels that the teacher likes and helps him/her. We should mention the positive relations with peers, which helps effective learning. Unfortunately, this can also be a negative sign, which indicates aggression and confrontation. The second dimension is the cognitive (mental) dimension. From the point of view of teaching and education, it indicates the efforts of co-operation and the teaching of separateness. It can manifest itself in both positive and negative forms. The positive form indicates open-mindedness, honesty, self-expression in the learner's personality; the negative form indicates inhibitedness, the tendency of permanent avoidance. The third dimension is the effective (behavioural, volitional) dimension. This expresses the effectiveness of

education. In this dimension, the teacher's role is to reflect what the learners acquired in the first and saw in the second dimensions observed for the good of the children. In this system, the teacher has an important role in terms of demonstrating consistent, exemplary behaviour and attitude (Kozéki, 1990). During our research, we paid particular attention to motivating factors, the intention, which makes somebody do the activity and ends when the aim is achieved. The level of demand that we expect from ourselves and the third dimension is the stimulus of the motivating factor. The purpose of education is to make learning attractive. In order to do this, we paid particular attention to make learning fun and raise interest. Learning performance and motivation interact with one another. We also took note of the following tasks because of their individual characteristics:

Stimulus by the curriculum: the variety of tasks, creating problems that need to be solved, the application of several kinds of work; *Moral stimulus:* the development of duty, responsibility, separateness, to encourage initiatives; *Emotional stimulus:* democratic atmosphere, tone, to ensure experiences; *Creating a state of mind that is ready for learning:* interest in the curriculum, formulation of learning objectives (Lestyán, 2011).

Competency and technology

Today's education system emphasizes competency-based development, the requirement of which is that at school the development of skills and abilities of the students will be carried out (motivation, concentration, memory, reading comprehension, logical thinking, problem solving, language skills and situation awareness). IT tools can be involved in several areas that stimulate the development of algorithmic thinking, in that they are communication, motivation, information, educational, learning and development pedagogy tools. The computer can be both a teacher and student. As a teacher it can present (teach) the course content, ask comprehension questions (examine), practice, play simulations, document the progress, create statistics, and it can serve as an information source. If the computer takes part in the process of development of

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the student, then the child sets the learning environment, transforms the existing tools; in addition, he/she can create programs to a given problem. We can say that information technology may be a motivating, developing, measuring tool. Those children, for example, who have computers at home, have some kind of computer skills when they get into primary schools. These students can not only develop their knowledge of IT but also their other abilities and motivation. IT uses several symbols; it helps self-study. We should use the opportunity that most children are happy to sit down in front of the computer, therefore the development of abilities can be achieved under playful circumstances; through this we can create a learning environment for schools, which offers the opportunity for the self-exploration of knowledge. In this case, we should attach computer-driven education not only to information technology lessons but also to other subject areas. Children's development not only in school, but even with e-learning methods is also feasible. In this case, parents have a very important role to play. This may appear in the form of management, praise, supervision and encouragement as well. The exaggerated use of information technology can be fraught with danger. We should pay attention to the children's social contacts, relations as well (they become alienated from their peers, they become lonely, they find many unknown chat partners on the internet etc…). On the basis of this, it is very important to examine their approach to the computer, their motivation, learning style, what are their weak and strong sides, what would be the most appropriate learning strategy and how the enrichment of the course content, the application of information technology skills and abilities can be incorporated into the development process (Szabóné, 2011).

Nowadays playful information technology is more common, just as the application of Logo- pedagogy as well as the application of Cohen pedagogy, which emphasize the involvement of computers in the educational, teaching and learning processes. The digital teaching materials can also appear in the classroom, at home or in a playful way in the children's everyday life. In the case of digital, interactive, multimedia teaching materials, it is very important that they should include new, interesting,

initiative solutions of the topic for the user. Through programmed education, the student interprets and uses the received information, while the program gives new knowledge and tasks and evaluates the responses. Logo-pedagogy is based on playful information technology; it creates such an environment for the children that they can access new knowledge unnoticeably, without any compulsion. The teacher not only manages the work but also works with the children. One of the main advantages of this pedagogy is that the end result is always a separate, individual piece of work (drawing, animation, audio, text, etc). Besides the accurate, disciplined use of the computer, there are also possibilities to find other solutions; and even if there is an error, they can acquire new knowledge. The logo environment can also be used to teach disabled children. In terms of the effects of this pedagogy, in the case of children positive changes were shown in the areas of creativity, logical thinking, analytical thinking, task setting, and self-confidence. Cohen's pedagogy considers it important to develop the children's abilities; the information technology tools should be involved as education aids. One of the most important principles is that the world of the alphabet should appear in the kindergarten (the software, which is based on these principles, the fairy-tale world); its teaching materials should be wholly connected to the children's daily routines. This method increases the effectiveness of the global, synthetic-analytic teaching of reading; as a result, the children's creativity will develop (Kőrösné, 2009; Szabóné, 2011).

Several educational programs and multimedia applications are available for teachers to support their work. These educational programs are: Tiny Village, Talk Master, Letter Magic, Playhouse 1–2., Mano Series, Fairy-tale land, etc. – they are mainly used in primary schools. The Internet is also a tool that can easily be applied in teaching activities by those who have user-level knowledge in information technology. Many web pages can be found, which help the differential development of students (especially primary school students), where several games and activities are available not only for underperforming students but also for talented students. We shouldn't forget about computer programs such as Paint, Word etc… For the development of problem solving and algorithmic

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thinking, the use of Paint, Dragon for Children, PowerPoint, Comenius Logo, can be a good idea – using these programs the students can practice drawing, the proper use of colours and the mouse, the writing-up of tales, text interpretation. For the development of highlighting, situation awareness, spelling, text comprehension, the practice and knowledge of letters, numbers, problem-solving, the use of a text editor as well as the use of the keyboard can be available. The development of counting, the order of operations, mathematical logic, algorithmic- logical thinking can be solved either by using a calculator or a spreadsheet program (Excel) on the computer. If we want to develop analysing, problem-solving-, algorithmic-, logical thinking, situation awareness, educational programs, the activities of interactive whiteboard functions, and the Internet are also very suitable. One of the new opportunities for the development of talented children is the use of interactive whiteboards. A lot of educational software can be bought from course-book publishers, and they are free to download from the Internet (for example interaktivtabla.lap.hu) but the teacher can also create exercises with easy to use programs (such as Paint, Power Point). Those who are experts in information technology can not only search for the above mentioned possibilities on the internet, but they can also create educational software, animations, logical games, development tasks. One advantage of tasks found on the Internet is that children can create them at home and other teachers can apply them in the classroom. Apart from e-learning teaching, the opportunity for learning can be given. The Internet also provides an opportunity to solve specific tasks such as collecting information, electronic libraries and search programs. If we want to develop the children's algorithmic thinking and problem solving, there are search related tasks, such as finding unknown words and phrases and reading them aloud, searching for biographical information, stories about historical people and events, celebrities, answering related questions orally or on a worksheet. With the help of the instructional program prepared in Power Point, we can develop the children's learning independently (Szabóné, 2011).

The approaches described above and almost all educational studies today draw attention to the role of differential development, but the

proper studies on the effects of differential development have yet to be undertaken. The present study demonstrates one segment of those research sequences with which we want to assess the effects of differentiated education on learning motivation (Lestyán, 2011).

Analysis of research results

Our research was conducted in seven schools. It took place in several villages in the country, 351 upper school and primary school students took part in the developmental classes. In order to test the effectiveness of the examination, we did a control that had a sample of 351 students.

In this study, we present the results of the motivation survey. The measurement was conducted over a four-year period. It shows a comparison between the input and output results.

We used Kozéki-Entwistle's learning motivation questionnaire as a survey. Questionnaires were filled out in groups. The framework of the questionnaire:

– Following dimension.
– Inquiring dimension.
– Performing dimension.

The results of the questionnaire were processed in the SPSS statistical system. In this study we would like to present the results of the motivation questionnaire since the motivation of students refers to the relationship between students and their learning, and the knowledge of those students can have a ppositive impact upon the teacher's job.

The pilot (developmental) group input and output scores can be seen in Table 1 and Table 2.

We can see from the average differences between the two groups that the pilot group experienced a greater degree of development. The developed group has a significant ($p < 0.05$) difference in each case, which could be the result of the development activities.

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**Table 1. The motivation scores of the pilot group
in the case of Test input and Test output**

Motives N=351	Pilot group Test input		Pilot group Test output		average difference	t-value	sign.
	average	stdev	average	stdev			
Emotional Warmth	25.14	4.178	26.30	3.139	1.16	-9.820	.000
Identification	23.61	4.261	24.43	3.559	0.82	-6.666	.000
Affiliation	23.19	4.878	24.44	4.114	1.25	-8.424	.000
Independence	22.03	4.207	23.17	3.714	1.14	-9.289	.000
Competence	22.90	4.245	24.05	3.340	1.15	-7.972	.000
Interest	21.88	4.773	24.52	2.809	2.64	-13.317	.000
Conscience	23.98	4.684	25.49	3.115	1.51	-8.278	.000
Need for order	23.54	4.509	24.87	2.846	1.33	-7.322	.000
Responsibility	22.76	4.320	24.93	2.925	2.17	-11.835	.000
Need for Pressure	14.49	5.800	15.31	5.490	0.82	-7.714	.000

**Table 2. The scores of the motivation groups
in the case of Test input and Test output in the pilot**

Motive groups N=351	Pilot group Test input		Pilot group Test output		average difference	t-value	sign.
	average	stdev	average	stdev			
Following	67.79	10.906	75.17	8.633	7.38	-7.416	.000
Inquiring	67.79	10.906	75.29	6.992	7.50	-10.875	.000
Performing	71.44	11.322	75.29	6.992	3.85	-8.857	.000

The control group input and output scores can be seen in Table 3 and Table 4

Table 3. The motivation scores of the control group
in the case of Test input and Test output

Motives N=351	Control group Test input		Control group Test output		average difference	t-value	sign.
	average	stdev	average	stdev			
Emotional Warmth	25.50	3.684	26.15	3.287	0.65	-2.593	0.010
Identification	24.25	3.954	24.90	3.672	0.65	-2.273	0.024
Affiliation	24.57	4.025	25.32	3.731	0.75	-2.625	0.009
Independence	22.62	3.939	23.46	3.622	0.84	-3.015	0.003
Competence	23.77	4.009	24.47	3.763	0.70	-2.509	0.013
Interest	22.48	4.453	23.39	3.945	0.91	-2.992	0.003
Conscience	24.71	3.944	25.48	3.242	0.77	-2.806	0.005
Need for order	23.86	3.757	24.55	3.489	0.69	-2.719	0.007
Responsibility	23.56	4.000	24.25	3.514	0.69	-2.463	0.014
Need for Pressure	15.30	6.596	16.41	6.262	1.11	-3.334	0.001

Table 4. The scores of the motivation groups
in the case of Test input and Test output in the control group

Motive groups N=351	Control group Test input		Control group Test output		average difference	t-value	sign.
	average	stdev	average	stdev			
Following	75.15	8.337	76.38	7.688	1.23	-2.066	0.040
Inquiring	69.71	9.236	71.32	8.292	1.61	-2.541	0.011
Performing	72.96	9.227	74.28	7.990	1.32	-2.046	0.041

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Table 5. Pilot and Control group average difference

Motive groups N=353	average difference Pilot	average difference Control	t-value Pilot	sign. Pilot	t-value control	sign. control
Following	7.38	1.23	-7.416	.000	-2.066	0.040
Inquiring	7.50	1.61	-10.875	.000	-2.541	0.011
Performing	3.85	1.32	-8.857	.000	-2.046	0.041

If we look at table 5, it can be seen that the pilot group's average differences between all the dimensions are greater than in the control group, apart from "need for pressure".

The first table shows that the pilot group's average difference of interest (between input and output) is 2.64; in contrast, the control group's is only 0.91. We believe that this large difference is due to the use of the IT tools and tasks students performed in the development process.

It follows from the foregoing that if we compare Test input with Test output, there was a significant change in 3 important motive groups (Following, Inquiring and Performing) in the pilot group. In the Following dimension the averages increased by an input of 7.38 in the case of Test input (67.79), compared to the average of Test output (75.17).

In the case of the Inquiring dimension, the average increased from 67.79 to 75.29; that is, a 7.5 increase. In the case of the Performing dimension, the average increased from 71.44 to 75.29; that is, an increase of 3.85.

In the control group, when compared to the pilot group, there was no similar significant change in these three dimensions. In the Following dimension the average increased by 1.23 from the Test input (75.15) to Test output (76.38). In the Inquiring dimension, the average increased by 1.23 (69.71, Test input; 71.32, Test output). In the Performing dimension the average was 72.96, in the case of the Test input, while it was 74.28 in the case of Test output, which showed a 1.32 increase.

According to our assumption, if we manage to maintain motivation at a high level, it will promote more efficient and effective learning.

Conclusion

There is a big difference between the students regarding the extent to which they take part in the teaching-learning process. Besides different individual abilities, we also observed differences in motivation. Motivation is surprisingly important in the learning process as it supports the development of cognitive activities and thinking functions, and obtaining information. Learning and ability development cannot be particularly successful if students do not have the appropriate approach to learning. The teacher's personality, his/her methods of becoming acquainted with children and his/her differentiated techniques assist the students when it comes to performing according to their abilities. Motivation should encourage the learner to want to make efforts in order to learn the curriculum in accordance with his/her abilities.

Our research results support the assumption that knowledge of motivation promotes the development of students with different abilities.

The computer and the tasks, which are solved with the help of computers, are based on an algorithm; this is why it is very adaptable to many fields of Developmental Pedagogy (cognitive skills, talents support etc.). On the other hand, this motivates the children, because most of them like computers. Both the positive changes of the test results and teachers' opinions demonstrate that it is worth using computer tools in the development process. Of course, there is a wide variety of effective methods for the development of the learners' skills. In our article, we emphasise the possibility that the basis of ability development is the computing environment. It is not necessary to be an IT professional to apply the present information technology opportunities; any teacher can use the Internet, the computer in his or her work. However, we must take care of how we apply technical appliances, as they themselves are neither good nor bad; their effect only depends on the user, so the teacher's role is very important, and he or she will play an important role in ensuring that the effects of information technology are positive.

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Abstract

One of the main tasks of education is the appropriate motivation of students. The authors present their investigations in the field of learning motivation, which are the elements of significant research; they examine how differentiated education affects learning features. They apply pilot and control groups to follow the effect of differentiated development over the years. One can directly apply their research results into educational practice. This present study focuses on motivation, which is one of the constituents of this research sequence. For the development of these areas, the authors looked for tools that can be used when working with 10-14 year old students, which help to motivate them and raise their interest. The authors raise the issue how and in what manner digital tools are suitable for the motivation.

Keywords: differentiated development, IT tools, motivation

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