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**TEACHERS' THINKING ABOUT CHILDREN'S COGNITIVE  
IMPROVEMENT AND DEVELOPMENT**

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## Introduction

The essence of teaching has not changed considerably, since the birth of the profession: the cooperation of teacher and children, with the aim of making children competent in life. The factual aims, the ideal ways to reach them and the expectations of teachers' and children's role change from time-to-time, consequently with the change of the world. In the last few decades special responsibility fell on schools, if they wanted to meet the requirements as time went by. "In modern societies, knowledge determines the developmental opportunities of the individual, as well as the pace of societal-economical progress." (*Csapó, 2007, p.11.*)

"One of the most important issues of Europe's pedagogical research is the method of transformation of school education, and the specification of teachers' new roles (*OECD, 1998*). Nevertheless, the attitude of renewal can only be embedded to the practical teaching very slowly. The main concept of schools' elemental and methodological reconstruction is the modification of teacher's thinking and pragmatic work." (*Hercz, 2002, p.251.*)

According to the international technical literature, it is unambiguous that within the research of teachers, the research of the thinking of teachers can be separated. It is known, that it is their thinking, their knowledge and their opinions that form their everyday practical activities (*Falus, 2001a*), as well as it is known that researchers consider a decisive portion of a multi-dimensional system, rather than a mechanical correspondence when they start their work. Throughout the years, several concepts emerged about the relationship between opinions and activity, in the previous decade researchers pointed out an interference between them (*Huberman, 1993; Richardson, 1996*).

The long-term aim of this research is to help trainings and extension trainings – within our range of possibilities – with the empirically revealed correspondences. Our work is concerned with the research of educational sciences, more precisely, with research on teachers and on their thinking. It is a fairly new field in Hungary, only a few researchers' attention was raised by it. Precisely examining the technical literature, comparative studies concerning personality, values or opinions of teachers working in various types of institutes and departments are very rare with the exception of some major researches (*Falus és mtsai, 1989, Golnhofer és Nahalka, 2001; Szabó, 1998*). Research, that would include kindergarten teachers - according to the aspect mentioned - to all teachers, their personality and thinking being compared to other teachers', has not been conducted in the last two decades, even though in order to be able to build up an educational process, the leader of all phases should be seen, in the shape of the educator.

The aim of our research is to get acquainted with the thinking of teachers, more precisely with the implicit theories, opinions and preconceptions concerning children's cognitive development, as well as to expand on the characteristic thinking of various teacher groups, and to compare the thinking of educators working in different types of institutions.

## Theoretical sources, interpretation frames of discussion

Research on educators as known today was born in the beginning of the XX. century, and accomplished itself in the 1950s, therefore the more significant researches had began only a little more than fifty years ago. Briefly it can be defined as: “The branch of pedagogical research, which examines the peculiarities of the educator profession, the living and working conditions of teachers, as well as their activities and trainings. One course of the research on educators tends to expand the specialties of the teacher profession, namely, the kind of special knowledge or proficiency represented by teachers.” (*Kotschy, 1997, p.168.*)

The concept of thinking of teachers often sounds strange to Hungarian educators. Its concept can be found in the language of science, but not in the ordinary pedagogy. The Pedagogic Lexicon defines it as the following: “A part of specific content and strategies of general reflective processes, in connection with the appearing problems and decisions in the activity of the educator.” (*Szivák, 1997. p.161.*)

According to *Floden* and *Klinzig* (1990) the proficiency of teachers is to be revealed by the researches examining their thinking. Therefore, the reflective models achieved can stand as the basis of teachers’ trainings. The monitoring of teachers’ thinking can affect teachers’ trainings in three aspects: it can serve as an elemental source, it can give methodological help, giving insight to the processes of teachers’ learning, and it can affect the educational policy.

In the theoretical part of the discussion, the research of teachers’ thinking is introduced as a stream of research on teachers. Having examined the national and international technical literature a dual problem occurred. Deposit copies of literature concerning the wider topic (research on teachers) of the dissertation were at disposal, fewer in the field of the research on thinking, and work that dealt with the thinking in connection with children’s cognitive development could hardly be found.

The following possible aspects emerged during the construction of the summary on the technical literatures: (1) research paradigms, (2) inter-disciplinal nature, (3) vertical – horizontal dimension, (4) geographical – cultural dimension. Instead of trying to completely introduce the tendencies and processes, they are only illustrated, while the conceptual basis of the dissertation is introduced in detail. Results, theories and concepts which affected the research are of high priority.

In the elaboration of the theoretical frames of the discussion, cognitive pedagogy served as the source. Under this expression, the specific scientific idea (*Csapó, 1992*) and in a wider sense the specialty of pedagogical question of cognition is meant. The approach of our work was highly influenced by *István Nahalka*’s constructive pedagogical studies (for example: 1997/b), studies published about the research of teachers’ thinking and its methodological background by the pedagogy research group of ELTE (*Falus, 2001/b; Golnhofer and Nahalka, 2001*), and out of foreign writers, *Bruner*’s book (2004).

## Dimensions of research and assumptions

Our aim throughout the research was to reveal teachers' thinking about children's cognitive development and improvement, interpreted in the system of cognitive pedagogy. The assumptions were set to include topics that could serve as the cognitive pedagogic background to the recognition of children's image, topics such as teachers' thinking about knowledge, about the change of knowledge and the conditions of it, and the individual differences of knowledge.

The empirical research embraces *two main questions*:

- How do teachers think about children's cognitive improvement and development? What opinions and preconceptions do they have?
- Do the images of children and teachers show such characteristic features, which enable us to differentiate between various teacher groups?

*Assumptions of the research*:

1. *Teachers' thinking about children's cognitive improvement and development show group specific features*, properly differentiated from each other, their child image differs focusing on cognitive improvement.
2. The theoretical basis of *teachers' thinking about children's development* is slightly eclectic; the various theories characterize it jointly. The judgment of the significance of influencing factors of children's cognitive development is realistic. In their child image the interpretation of individual differences is wide ranged, but in the various phases of education the consideration of cognitive features is dominant.
3. *Teachers' thinking about children's cognitive improvement* is characterized by the belief in the possibility of improving. Cognitive improvement does not play an important role in their aims.
4. Thinking about the *practical side of teaching's cognitive improvement*, teachers' assessments reflect rather the external expectations, while the pragmatic realization of their thoughts (opinions, principles) reflects their thinking.
5. The professional self-image and specialist-image of the *educator, as the leader of children's development*, shows typical features of the different groups. The professional self image is more dependent on the school's internal than the society's external evaluation. In the process of their professional socialization, the organized effects are not considerable.
6. In their *pedagogical knowledge*, the learnt features formed a unified system, but the views concerning the various elements of knowledge differ according to the various groups of teachers. The usage of the terminology of cognitive development causes problems for a segment of teachers. All those activities that connect teachers with the study of education affect their professional erudition.

## **Methods and tools of research**

An empirical study was made, with the help of an inductive and relation-revealing strategy. Data was collected by individual questionnaires, and processed with SPSS program.

The first data collection of our six year old study was made in the academic year of 2000/2001, while the second in the 2006/2007. A total of 1504 people's responses were evaluated. In the first phase, 666 teacher of Fejer County answered, while in the second, 838 from 80 settlements (2.5% of all settlements) of the 19 counties of the country.

In the first phase, 5 groups of educators were examined: kindergarten teachers, primary school masters and teachers and teachers working in vocational secondary schools and grammar schools. In the second phase, only teachers working in schools were examined, to enable us to more precisely concentrate on the main aim of the research, to the thinking about children's development and teaching, and to compare these to the activities practiced.

## **Results of the empirical study**

The aim of the research was to get acquainted with teachers' thinking on one special field of teaching: teachers' thinking was studied about children's cognitive improvement and development. The images of children, and professional self-images of teachers in connection with our study were meant to be portrayed. Their views, preconceptions and opinions about themselves, children and teaching were revealed, but keeping children's cognitive improvement to the fore. Some features of their professional socialization were pointed out, to answer the question, to what extent is teachers' personality affected by organized forces. Concerning the importance of their practice, the most important was to point out the connection between their pedagogical knowledge and their thinking about children's development.

Our aim was to differentiate the thinking of the above mentioned five teacher groups. Wanted to find out whether their child- and teacher-images show any characteristic differences that could be traced back to the different teacher groups.

The results of our empirical study were introduced in three chapters: In the 3rd *chapter* the main features of teachers' child-images were systematized in connection with children's cognitive development. Teachers' thinking about the factors constituting to children's cognitive development was examined, and according to their opinions, we tried to take consequences concerning the main features of their thinking about children's cognitive development. Later, their preconceptions concerning children's individual differences were studied, which helped us to create assumptions concerning the appearance of individual differences of students in teachers' thinking.

In the following part, educators' preconceptions concerning their students were studied in the face of the two extremes of children's mental capabilities, namely through the meaning of smart and stupid students. Finally, the concept of students' successfulness was examined, and the reasons teachers believed to affect the success or failure of their students.

In the 4th *chapter* teachers' thinking about children's cognitive improvement was looked at. The role of cognitive improvement was determined in the aims of teachers and institutions, and the relationship between them was examined. Later, teachers' thinking about the change in children's knowledge was shown. The question of children's capability of improvement was shown with all those variables taken into account that relate to the topic. We found out the connection between the knowledge of cognitive improvement's modern ideas and the importance and usage of them in practice.

In the 5th *chapter* we consider educators as the leaders of children's cognitive improvement. Those elements were drawn out of the research, which helped to illustrate both the professional self-image and specialist-image of those teachers who encourage the growth of children. The differentiation of the later two notions was necessary, to separate the personal and professional content properly. Some features of professional socialization, teachers' knowledge and erudition were studied. Finally, one aspect of teachers' self-image was introduced and its relationship to their child-image.

The results, relations and ideas of teachers' child- and teacher-images (both self- and specialist-image) will be systematized according to the two main themes of our assumptions.

### **Differences between the thinking of various teacher groups**

*Thinking about children's cognitive improvement and development*, significant differences appeared between the various teacher groups (the only exception was concerning the judgment of cognitive improvement's system of aims).

In sum, we could notice primary school masters' outstanding professionalism, the belief in children's improvement and the practical application of methodological culture, the characteristic attitude of grammar school teachers determined by traditional elements as well as by modern pedagogical features. Unique features determine the teachers of vocational trainings (mainly appearing in the first phase of the research), however teachers of 5-8. grade seem to have the least group concerned characteristics. The first phase of the research proved the assumption dealing with the differences of teachers' thinking, but served with new and surprising results as well. On one hand, the thinking of the two extremes of the educational system determined by the public thinking (primary school masters and grammar school teachers) many times stood near to each other, while on the other hand the supposedly similarly thinking kindergarten teachers' and primary school masters' thinking many times differed significantly. The difference between teachers' thinking was mainly significant between the different groups of teachers (and institutions), their thinking about children's capability of improvement and

cognitive development did not depend on their duty, qualification, number of years spent in the profession or on their participation in extension trainings.

The results of the second phase also clearly support the presence of a group-based typical thinking. On most examined fields, a significant difference can be found, which will be detailed in the next paragraph. In this phase, often the different thinking of males and females was present beyond the difference in educators' groups, and many times the difference in thinking appeared concerning beginner and expert teachers as well.

According to the research, the *child-image* of teachers is typical according to the group they belong to, nevertheless the groups cannot always be described precisely only through the results. Out of all groups, mostly the primary school masters' thinking seemed to lie on unified pedagogical bases with a lot of optimism. Their thinking differed many times from other groups', for example they thought of pedagogical knowledge as the most important feature of a teacher, they assigned high importance to the personal effect of the teacher (in planning, confirming and asking), and they also thought of the coherence of the teacher's verbal and non-verbal effect and the permanent preparation to classes very important. They were the most optimistic concerning the possibility of children's improvement.

The different thinking of the primary school masters appeared in the second phase of the research as well, but not as sharply as in the first one. The difference was clear in questions concerning the belief in children's improvement, the professional knowledge or the usage of modern methods: primary school masters' thinking was the mostly child- and improvement-oriented.

The thinking of teachers of 5th-8th grade many times was very similar to the thinking of teachers teaching in vocational grammar schools, but in the questions studied, often different replies arrived, therefore we can conclude that this group's thinking can be the least unified. An interesting experience here is that their thinking significantly differed from even those teachers' that worked in the same institute, under the same pedagogical aims and concepts. Their thinking about children's successfulness stood as an exception.

The difference between teachers' thinking within one type of institution was often greater than it was between teachers of different institutions. Sometimes kindergarten teachers' and grammar school teachers' or vocational grammar school teachers' opinion was the same, other times the primary school teachers and workers of vocational training agreed.

### **Teachers' thinking about the development of children**

According to the results deducted from the study of *thinking of children's development*, we can verify that excluding one sub-point, our assumptions were correct. The *theoretical basis* of teachers' thinking was affected by various concepts at all cases, within the groups' system of opinions we found both internal and external differences.

The extreme differences in individuals' thinking appeared within groups as well. The tendencies seemed to be identical in both phases of the research.

Opinions were divided concerning the effects of inheritance and surrounding atmosphere to development. In sum, the importance of the surroundings' developing effect was stressed, but the difference between the teachers' groups appeared again. Mostly primary school masters rejected the role of inheritance, while grammar school teachers accepted it. It is interesting to note, that the ratio of those believing in the decisive role of inheritance was equal (app. 20%) in both groups. Significant differences were found in the different types of institutions, primary school masters and teachers working in vocational trainings were more concerned with the developing effect of the surrounding atmosphere.

The question whether children's development is continuous or discontinuous, resulted in contradiction. When evaluating the opinions, instead of considering the deeper meanings, probably only the conspicuous meanings were taken into account.

In the judgment of children's development, the cause of discrepancy in the thinking about improvement and receptiveness, was the more traditional thinking of grammar school teachers, while, on the contrary they placed the most importance on diligence and effort.

Concerning selection, contradiction was experienced again; two views of the same content but composed differently were evaluated significantly different.

In sum, educators hope for the improvability of children, but the ratios are thought-provoking: one third of the sample studied shows optimistic attitude, but according to some certain opinions of 15-25% of respondents, it is probable that they do not believe in children's improvability.

*Factors contributing to cognitive development* were thought to be realistic, but that was a mistake. On the top of the hierarchy of factors in teachers' thinking, stood their own influence, the scientific experiences were not taken into consideration for none of the respondents. In the judgment of factors influencing children's cognitive development, significant differences appeared in the different groups of educators.

*Having examined the individual differences of children*, we obtained a wide range of results. The system of teachers' thinking became easy to understand from the general model obtained: the characteristics of children were divided according to personality dimensions and the contribution in the learning-teaching process. From the results we can conclude that the influence of personality dimensions decrease in teaching as children's age progress, while the influence of the characteristics of the learning-teaching process increases. In the later, teachers of all three types of institutions mostly consider cognitive features, after them come the affective features in kindergartens, and the social ones in schools.



The patterns made of the differences of students' characteristics followed similar schemes in the two phases of the research, the most important element was the activity, interest and motivation of children, then followed the intelligence, attention and quick and logical understanding. We can conclude the dominancy of cognitive elements in this case as well, but differently depending on the group of teachers. Primary school educators consider cognitive features important within children's personality dimensions, while grammar school teachers consider the features of learning process more important. In grammar schools the affective atmosphere, in vocational trainings the social atmosphere is significant (in the second phase of the research).

The results derived from the association of the *two extremes of mental abilities*, the concepts of 'smart' and 'stupid' also showed significant differences between the teacher groups. The obtained ratios are also interesting, but furthermore, the preconception in the background can always be traced back: primary school masters consider general knowledge important, while other primary school teachers just as teachers of vocational grammar schools believe in the importance of previously acquired knowledge. Another typicality is that talented students of grammar schools are supposedly in possession of inherited knowledge, while students in vocational trainings are talented if they possess acquired knowledge.

During the evaluation of children's successfulness, the characteristics of the different teacher groups can clearly be isolated from each other.

## **Teachers' thinking about children's improvement**

### ***Capability of improvement, change in knowledge***

As a basis of the research, it was stated that teachers believe in the possibility of children's improvement. This question was examined from several views in both phases of the research. On the whole, we can declare that our assumption seemed to be correct in the second phase, when the question was examined more thoroughly, from various aspects.

*The belief in children's capability of improvement* was low in the first phase of the research, while the ratio of those, not believing in the possibility was very high. The difference in teacher groups appeared both in the belief of the capability of improvement and in the acceptance of modern views; primary school educators seemed to be more positive, while kindergarten teachers and grammar school teachers had rather negative opinions. Latter groups had a more traditional thinking, which caused the rejection of newer views and methods.

In the second phase of the research, educators' belief in children's capability of improvement – based on somewhat different views – showed a significantly higher value (an average of two integers rise on a five-scale range), but a similar tendency appeared amongst the educator groups: a significant difference between the more optimistic attitude

on the primary school educators' side, while a more negative opinion amongst grammar school teachers.

Amongst features that have an effect on the belief in the capability of improvement, 68% in the first, and 50% in the second phase could be identified. In the first phase, a connection between teachers' professional self-image and their scientific-image was found, while in the second phase, a relationship between teachers' child-image and the opinions that form this image was revealed.

Teachers agreed in the matter of *optimal time of improvement*. They uniformly stated that children can mostly be improved in their kindergarten and primary school ages. The ratio of those rejecting the capability of improvement in grammar school years is approximately 10-15%, varying according to the groups of educators.

According to the technical literature we can assume that cognitive improvement does not play an important role in teachers' aims. Our statement was proved: it did not appear in leading positions of schools' evaluation forms. The individual values of educating always seemed to be more important than the values of the school as a whole, and the low order of rank of the improvement of mental abilities was common for all groups of teachers. Nevertheless, concerning some aims, differences appeared. The fact that teachers consider aims less important might cause difficulties in the practical work of institutions.

The deliberateness of the thinking about the aims of cognitive improvement was of high priority. Out of the aims directly in connection with cognitive development (improvement of mother tongue, mental, study and individual skills), teachers agreed in the evaluation of mental abilities, but the other three aims were judged differently. Educators of primary schools thought of the improvement of mother tongue and study skills important, while the educators of young children (up to the age of 11) gave a high importance to the improvement of individual skills.

Concerning the *change in children's knowledge*, the opinions significantly diverged according to the traditional – modern dimension. The degree of acceptance highly depended on whether a known, a habitual or a new element was evaluated. It seems that kindergarten teachers have the most traditional way of thinking concerning these views, as opposed to the primary school masters, who seem to be the most modern ones – even though educators of grammar schools were expected to be in this position. Concerning the contextual elements, both individual and group-based characteristics appeared, only the positive judgment of the importance of affective factors was unified.

Having examined the practical side of cognitive improvement (which will be shown from another point of view in the next paragraph), we arrived to the analysis of traditional versus modern thinking.

Having examined the practice of cognitive improvement (what will be looked at from a different point of view in the next paragraph) we arrived to the analysis of traditional versus modern nature of thinking. The cluster diagram – made upon the opinions concerning the activities prior to, and during classes - examining the connections of teachers' thinking, separates mainly the principles of improvement and activities, then on both branches, the traditional and modern elements. On theoretical level, many teachers

think they apply modern principles, while in their activities, mostly traditional principles are present. However, the relations between frequencies and contents contain contradictions: the ratio of those declaring to apply cognitive pedagogic principles is much higher, than of those who do carry out such type of preparing activity.

### *The technique of improvement*

In the first phase of the research, certain elements of teachers' thinking showed contradiction and lacked content. For example, the previously declared individual ability to improvement conflicted with the importance of the knowledge of children's preliminary knowledge. Can abilities of children be improved if their preliminary knowledge and educating atmosphere is not known? Naturally, they can, probably because the pedagogical patterns and experiences (Csapó, 1992, Falus, 2001a) help, but in order to increase effectiveness, children should be known „scientifically”. (Quotation marks are necessary, in the lack of a more suitable term.). Not the original meaning of scientific quality is meant under this term, rather a more common scientific characteristic, in which the simplified scientific results are transported to practice, to create a more conscious, planned and professionally grounded improvement of children.

Out of all views in connection with the improvement of cognitive abilities, the view stating the importance of making children to act needs to be highlighted. Kindergarten teachers thought it important, but as the ages of children progressed, the number of educators on the same opinion as kindergarten teachers decreased. Due to the increased material in 1-4. grade, making children act by themselves is only frequent in the first grade teachers' thinking. Our experience from school visits and conversations at extension trainings is that a very short time is spent for such activities even at this age, as the aim of teachers is to get children acquired with as much knowledge as possible, as quick as possible, for various reasons.

In the second phase of the research, teachers' techniques of cognitive improvement were studied, with the help of preparations to teaching and the principles and methods used during teaching. The results proved the validity of our assumptions; a significant difference was shown between the importance of principles and methods, and their practical implementation. The averages of values were notably higher in the theoretical agreement as they were in the case of practical implementation.

Examining more deeply the relation between improving activities and methods and the personality of the teacher, which could be seen according to their thinking about pedagogical knowledge, four – affective – elements of this connection were related to the frequency of the cognitive pedagogic principles: openness, flexibility, determination, considering improving work important, and a cognitive element, the knowledge of how to improve various things.

Focusing to the *technique of improvement*, several relations should be highlighted. Though the traditional-modern dimension the results turn out to be somewhat contradictory: contrast lied between primary and grammar school teachers, concerning traditional and basic principles (primary school teachers more often carried out such an activity), modern, cognitive pedagogic preparing activity was also done more frequently amongst primary school teachers. The significant difference in the thinking of various teacher groups showed the diversity of primary school masters' thinking and methods of

teaching. Three-quarters of the differences between groups deviated in a positive way. Most of the time, cognitive pedagogical methods were applied by primary school masters.

## **The teacher, as the leader of children's improvement**

### *Professional self-image and specialist-image*

The differences of educator groups appeared less significantly in their professional self-images, but quite remarkably in their specialist-images. Furthermore, the difference between educators was best seen concerning the mission of educators and the knowledge of their roles.

Their belief and opinion about children's improvement was diverse according to their own influences. The classical and ideal image of teaching could only be realized in the primary school masters' thinking. They truly believe that professional consciousness, planning and high professional knowledge highly determine their students' cognitive improvement.

The most optimistic child-image was of kindergarten teachers. They hoped most in the capability of improvement of children, and blamed no external cause for the possible failures. Values, which are needed at all stages of education for a harmonic improvement of children, are of high importance in their teaching.

The other end was represented by the teachers of vocational trainings. In their thinking neither did the child-orientation nor the belief in their role dominated, they were thinking as specialists, who work according to their best knowledge in their profession. They generally assigned the failures of their students to external factors, and did not consider teachers' knowledge of high importance in children's cognitive improvement.

The different specialist-images of the various teacher groups appeared during the research of professional socialization as well. Their opinions about the sources of technical knowledge differ from many points of views. As an exemplar, all groups chose a teacher working in the same group as they do.

*As a result of the research, we can state* that the thinking of different groups of teachers significantly differ both in their professional self-image and specialist-image, and their child-image. Their views of their profession show characteristic features not only depending on the group they belong to, but on the length of time spent in their career, and on the type of settlement they live in.

As a highlighted element of teachers' professional self-image, their satisfaction was examined on various fields. They are not satisfied with their societal and financial appreciation, and only moderately satisfied with their achievement in their professional ambition and pedagogical aims. Having examined the constituents of their professional self-image and image of prestige, it is clear that they are in interaction with each other: although the judgment of their societal prestige and financial situation is very negative, the realization of their professional aims and ambitions resulted in a overall better valuation, than what could have been expected from the average of the elements.

Therefore, the influence of features within the institution (relationships, atmosphere, etc.) is more important than the external judgment.

When examining the professional socialization, teachers' thinking of its sources was explored, and then the evolution of their teacher- and child-image was studied. Having evaluated the sources of professional socialization, special attention should be given to the result that states that one-quarter of the respondents think of pedagogical knowledge as a natural endowment. Especially primary school masters and grammar school teachers think this way; every third respondent of their groups. Therefore, the ratio of those rejecting the possibility of learning the profession is very high. Probably they join organized courses and vocational trainings with a rejection in their minds towards the possible effects of them. 16% of respondents thought of higher education as a source of their knowledge (84% partially), on a 5-scale range the obtained average was 3.3, while the extension trainings got 2.4.

The established professional self-image and thinking is hardly influenced by the organized socializational source, as extension training. The more than five hundred respondents valued the efficiency and successfulness of these quite negatively. They hardly influenced the deliberate and planned work, or the formation of opinions: their views concerning child-image, themselves and their pedagogical role hardly changed.

The results of the spontaneous effects of professional socialization can be important, should not be left out in the formation of our opinion about teachers' thinking. The existence of an own child, him or her going to kindergarten or school, changes the thinking of teachers. 30% of the respondents' child-image was modified when their own child went to kindergarten, and 40%, when their children went to school. Generally, entering kindergarten had a weaker effect, but teachers' expectations, teaching methods and professional interest altered more at this stage. The image about children's thinking and teachers' scales of values changed similarly at both stages. One-third of the sample had their teacher- and child-image and their relationship towards children transformed when their child entered school.

Teachers' self- and child-image was connected through the evaluation of their satisfaction. We learnt that the evaluation of the realization of professional ambitions and pedagogical aims are in a tight connection, and are in a significant mutual effect with the judgment of students' successfulness. The prestige-image does influence teachers' child-image to a certain extent: their influence was seen both in the cases of believing in students' capability of improvement, and in the satisfaction with them. An interesting relation is that a big portion of teachers is not satisfied with their students' results, they consider themselves as the most influencing factors of children's development, but they blame 'external' factors for failures.

### *Pedagogical knowledge, technical language*

Elements of *pedagogical knowledge* appeared as an easily understandable structure in teachers' thinking. The mechanical model built into the cluster diagram proves the systematic nature, where the theoretical and technical elements of knowledge are separated severally. The obtained four layers of knowledge: (1) methodological

knowledge, (2) professional erudition, (3) general conditions of teaching, (4) the first two of the actual conditions of teaching consider the theoretical elements of knowledge, while the second two the technical ones. Within the layers the theoretical and technical elements are separated again. When judging the importance of the fields consecutively the theoretical aspects were preferred over the technical ones. This result contradicts the results obtained from other points of the research, which could have two explanations. This case the situation stated in the 4th assumption is present, teachers responded according to the supposed expectations, but they might seriously think of theoretical knowledge as the more important one.

Opinions of teacher groups significantly differed concerning the judgment of knowledge, and the importance of some fields. In the first phase of the research, primary school masters gave the highest value to the importance of all fields of knowledge, and the role of professional erudition (was equally high with the kindergarten teachers). When examining the importance of knowledge, a reverse tendency in decrease was seen as compared to the increase in children's age and the latent prestige of teacher groups. The thinking of primary school masters significantly differed from the thinking of grammar school teachers, furthermore, from all groups concerning the importance of professional erudition.

In the second phase of the research the high average value of primary school masters remained (except of the evaluation of the importance of professional erudition, as all groups valued it high), but it only differed from the other groups in the knowledge of general conditions of teaching, in one case their thinking only differed from teachers of 5-8. grade, and in only two cases from grammar school teachers'. When evaluating the various elements, the typically negative opinion of grammar school teachers could be differentiated. As it was mentioned before, in this phase, we approached to the pedagogical competence. Having interpreted the elements according to József Nagy's personality-model (1996), teachers valued the elements of cognitive, personal and special competence of the greatest influencing ones.

A significant difference could be seen in the between teacher groups in the judgment of the importance of various fields of competency: primary school masters valued cognitive competency the highest out of all teachers, while grammar school teachers valued personal- and special competency less important as others.

Therefore, the question of pedagogical knowledge is the field, where the *topicalities of the system of teachers' training* can be found. It is probable, that the results occurred to the influence of higher education, since the younger the child a teacher has to teach, the more pedagogical and psychological foundation is needed and the higher the importance of institutional activities. In some types of trainings, teacher aspirants can learn the techniques of the profession, scale of values, attitude and all the classical knowledge of the profession.

The basis of our conclusions is the results derived from the first phase of the research concerning the valuation of features of child-image and pedagogical knowledge, where the thinking of kindergarten teachers and primary school masters is unique, with optimistic and positive features. Consequently, a similar tendency was seen in the second

phase of the research, since the more optimistic thinking of primary school masters can be separated many times.

Another result to consider is that 8% of teachers' professional exemplars come from higher education, 6% from post gradual courses, therefore even if not significantly, but higher education does have an example setting influence.

Professional erudition, more precisely the *technical literature and the usage of technical terminology* is an important element of teachers' knowledge. Our assumption stating that this causes several problems for teachers proved to be correct. In the two phases of the research, various basic terms of cognitive improvement are defined together with teachers. In the first phase, the terms of knowledge and ability are studied, while in the second, learning and competency. The preliminary knowledge appeared in both phases; therefore the results of the opinions chosen were studied. In the second phase, the content of thinking and knowledge was derived through a problem-solving activity. We threw light upon the deficiencies of contents and contradictions in the usage of terminologies that characterize teachers. In detail, the differences in concepts and interpretations between teacher groups, show general tendencies, such as a more punctual knowledge of technical language of grammar school teachers and primary school masters.

Despite our assumptions, no influence on professional erudition could be seen of those organizational forms, which connected teachers with the representatives of the science of education. No connection was seen between the participation in professional innovation and professional knowledge. Even though, every fourth teacher participated in some kind of innovation, only every third respondent was familiar with researchers, and only 10% of these meet the requirements. The question may rise: do the scientific results reach practicing teachers; do they read those books and studies that intend to address them (as well)?

When introducing the characteristics of the sample, skills were highlighted, in order to be able to consider: well- qualified teachers formed the sample, who tend to improve their technical knowledge, but at various stages of the research surprising uncertainties and mistakes showed in their knowledge of professional terminology and basic terminology of cognitive improvement. It is thought-provoking that professionally well-educated practicing teachers have problems with the understanding of basic terminology.

### **Possible ways of utilizing the results**

In our discussion we examined teachers' thinking about children's cognitive improvement and development. Due to the complexity of the examined topic and to the limited possibilities of the study, the results obtained can only cover a portion of the field examined. Nevertheless, the obtained results show such ways and tendencies that could serve as a starting point of the renewal of teachers' education, extension trainings and further researches.

It is inevitable that thinking of various teacher groups differ characteristically from each other. Mostly all points of research showed significant difference in thinking. The main



features of child- and teacher-images could be seen, and so did the fields that would require further researches.

The research should be continued in order to explore whether teachers are aware of the characteristics of children's thinking and their processes of development, and with the effects of their work on children. The exploration of the causes of results would be interesting, and the further identification of characteristics of the various teacher groups, which could be utilized in their trainings.

Some sub-results show the necessity of exact and quick problem solving. It is obvious, that a portion of teachers do not believe in the possibility of improvement of children, which will restrain their technical work. Therefore, it is necessary to consider the transformation of their thinking, as an important task of trainings.

A significant problem - mostly of grammar school teachers - is the improvement of children. Although they highlight their own role in children's improvement, in their thinking and opinions many times we came against contradictions. Grammar school teachers think of children's learning abilities as an important factor of children's successfulness, but in their system of aims it is not shown, probably because they are not prepared for their improvement. The methodology of the improvement of abilities or the teaching of learning is a defectiveness in teachers' trainings.

Our research also revealed that the one of the most important factors of the transformation of public education, the thinking of teachers cannot be changed with the current system of extension trainings. Nowadays, the transformation of teacher training is in the centre of attention, but the unsuccessfulness if the system of extension trainings is not revealed. The real influence is hardly measurable, since it mostly appears in everyday teaching of teachers' activities. During the organization of extension trainings, teachers' thinking and opinions should be taken into consideration, in order to create such types of trainings that relate to the main characteristics of the teacher groups.

Relying on the measurement tools of this research, we plan to conduct such a questionnaire that can be used to reveal opinions of students entering their pedagogic studies or trainings. Questionnaires alone do not provide enough information about individuals; therefore other complementary methods will be required in the practice. Our opinion based on the results obtained is in harmony with opinions of researchers of our time, namely that the aims of trainings should be determined more precisely, their efficiency should be increased and measured, since „even in public education and teacher training, the new pedagogical and methodological culture based on the perception of learning can only succeed, if the teachers in activity and the educators in teacher trainings possess a decent knowledge in this field.” (Golnhofer, 2003. p.106.). Without the transformation of teachers' opinions and preconceptions, the functioning of a new school insisted by the *OECD* (1998) is hardly imaginable.