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The Role
of Metacognition in Education

According to the ideas that define the changes of the contemporary education in Poland, school should not be an institution focused only on teaching, but it also should develop the urge to learn in students, to help them in their self-development and self-realization. Apart from the teaching process, school should introduce independent seeking of knowledge and self-education to students (T. Lewowicki, 1994).

The high level of the metacognitive factor is favourable for the development of educational independence.

Metacognition including self-regulation of education is a subject of recent consideration and research and therefore it is worth examining more thoroughly.

This short thesis includes:

- the definition of metacognition
- the characteristics of the process of education based on self-regulation, including the classification of the methods and techniques of the cognitive process
- the role played by conscious learning and the learning strategies learned in class, in the self-development of the student.

Key words: *metacognition; self-regulation, the learning strategies.*

The Role of Metacognition in Education

According to the ideas that define the changes of the contemporary education in Poland, school should not be an institution focused only on teaching, but it also should develop the urge to learn in students, to help them in their self-development

and self-realization. Apart from the teaching process, school should introduce independent seeking of knowledge and self-education to students (T.Lewowicki, 1994). The main goal of education is the development of inquisitiveness, focused on seeking the truth, goodness and beauty in the world; the formation of the foundations, introduction to the process of self-education and the constant improvement of oneself. The high level of the meta-cognitive factor is favourable for the development of educational independence.

Metacognition, including self-regulation of education, is a subject of recent consideration and research. Meta-cognition is composed of two separate, but connected elements:

- the knowledge and convictions of cognitive processes;
- the regulation and control of the cognitive behaviour (self-regulation) (M.H. Dembo, 1997).

Meta-cognition refers to the knowledge, possessed by an individual, of his/her own cognitive processes and products, and all that is connected with it, for example the information or data important for the learning process. Metacognition is above all active cognitive monitoring and consequent regulation as well as the employment of those processes for educational purposes, usually used in solving some particular task or a problem. (J.H. Flavell, 1976; M.H. Dembo, 1997).

Meta-cognitive knowledge incorporates the knowledge about oneself as a learning individual (e.g., about preferences, strong and weak points, interests, learning habits, etc.), the knowledge about tasks (information about the requirements and the level of difficulty of a particular task), and the knowledge about learning strategies and how to use them.

The analysis and understanding of the circular thought cycle is important for the development of knowledge and the convictions about one's own cognitive process (e.g., the thought: "I will never learn mathematics because I am not smart enough;" emotion – "the aversion for the subject or the teacher; behaviour – "the student does not do his/hers homework and does not study;" the result – "failure in the subject;" thought – "I will never learn mathematics because I am not smart enough" and so on.), and its effect on the efficiency of learning. In this way students are able to learn how their psychic and intellectual activity functions (B.McCombs, J.Pope, 1997).

Lester and Gorfalo (1986) suggest that teachers are able to help students in the development of their metacognitive knowledge through asking questions that require reflection on their own thinking process and course of action: for example think about everything what you do when you do your exercises – why do you do all this? what can you do to do more exercises correctly? why? do you usually do it? (M.H. Dembo, 1997).

The second aspect of metacognition – self-regulation – guides the thought processes in learning situations. Under the term "self-regulation of the learning process" G.C. Kunz, V.Drewniak and F.Schott (1992, p. 288) understand "all goal-oriented, controlled and potentially reflective actions used by students to improve their learning ability". P.Simons and F.P. De Jong (1992, p. 333) define the self-regulation process of learning as the process where "students realize the education by themselves" and they mention six general categories of action, in which self-regulation can occur: preparing oneself for the learning process, the organization of the learning, cognitive monitoring, the assessment of achievements, the delivery of the return information, the guidance of motivation and concentration. (E.Czerniawska, 1999).

The investigation of the problem of self-regulation is very important, because according to research there is a connection between this process and the results of learning: the higher the level of self-regulation the higher the achievements in natural and school learning conditions (T.Bouffard, J.Boisvert, C.Vezeau and C.Larouche, 1995; M.Pressley, J.Borkowski and W.Schneider, 1987; B.J. Zimmerman, 1994; E.Czerniawska, 1999). On the other hand, the reason for learning results lower than expected , based on the standard capability tests, is the employment of less effective learning strategies (J.Borkowski and P.K. Thorpe, 1994; M.Ledzińska, 1996). Besides this fact, the students who regulate their own cognitive process blame others for their own problems less often and they less often consider luck to be the reason for success. They understand that success depends on the method of conduct and their hard work. This kind of thinking is the basis for the permanent internal motivation to learn and to make an effort and to be proud of one's achievements (B.Weiner, 1992; S.G. Paris and L.R. Ayres, 1997).

However, reaching a high level of self-regulation is dependent on gaining experience in learning situations (T.Garcia and P.Pintrich, 1996; D.Schunk and B.Zimmerman, 1994, E.Czerniawska, 1999) due to its complexity (P.Alexander, 1995; P.Winne, 1997; E.Czerniawska, 1999). Nonetheless, it is possible to practise self-regulating processes, above all in the conditions of the school environment (M.Boeckaerts, 1997; F.De Jong, 1990; E.Czerniawska, 1999).

Most of the scholars dealing with this issue during the 1980s and 1990s were of the opinion that schools in Poland do not teach the process of self-regulation. When asked about the source of their knowledge about the learning strategies, students very rarely mentioned teachers (E.Czerwińska, 1995; M.Ledzińska, 1988). That might have been the result of the organization of the educational process inappropriate or unfavourable for the development of the self-regulating process. Presenting all necessary information in class, intercepting the control over the

course of the cognitive process by the teacher, hinders students from making independent activity attempts. A teacher who sets goals and methods of reaching those goals and verifies the results as well as evaluates them, takes over the responsibility for the regulation of his/her students' activities and encourages them to the passive attitude toward their own cognitive process (E.Czerniawska, 1999).

Recently, this situation has begun to change in Poland. It is connected with the reform of the educational system as well as with the increasing popularity of new methods among teachers and the availability of the special literature on this subject (e.g., J.Konoblauch, 2000; B.Oleszlager, 2007; B.Kubiczek, 2009).

According to S.G. Paris and L.R. Ayres (1997, p. 28), education based on self-regulation is based on "conscious and well-considered efforts of the student, made to achieve certain goals." They are defined by functionality, individual approach and independence. According to B.J. Zimmerman (1989) the cognitive process can be called self-regulated if students participate in the class and their participation is based on the metacognitive as well as motivational and behavioural principles. S.G. Paris and D.R. Cross (1993) consider the union of understanding, motivation and the individual attitude that is "fusion of the will and abilities," as the essence of a self-regulation-based education. The reason for this is that in this situation students explore their own learning process before, during and after solving a problem or a task (S.G. Paris and L.R. Ayres, 1997).

It is very important that students have the knowledge of the learning processes and that they make a conscious use of them. Learning strategies are the means used by students to learn something (P.Bimmel, 1995). One can imagine the psychological structure of learning strategies as an association of a condition with an action: if my goal is to learn x I will do y. F.Bereźnicki (2001) classified the following as learning methods: receptive methods (observation, using the spoken language, using textbooks as help in learning thanks to a "literal method of remembering" as well as "not literal method of remembering"), heuristic methods, research (using discussions, learning through solving problems, learning through research), expressive and exercise methods.

The activating methods, i.e. the ones that are favourable for teaching students the learning methods, were extensively described by B.Kubiczek (2009). As methods and techniques of learning she mentions mainly: mind mapping, educational projects, the checklist, the leading text method, planning from the past, the techniques of creative thinking, puzzles, and a running dictation.

In case the student is gaining education by using the learning strategies, his/her cognitive process is more effective. He/She knows not only what he/she should

learn but also how to proceed in order to learn – to learn in a way that is convenient for him/her and that would lead to the goal of learning a particular thing.

The control of one's own cognitive process by making a decision about using specific learning strategies leads to an increase in motivation and self-confidence, as well as it increases the independence and responsibility for one's own learning (P.Bimmel, 1995).

Parallel to the studies and research into education based on self-regulation, the importance of the student's influence on the process of learning (e.g., W.Puślecki, 1996) as well as the participation of the student in the process of learning (e.g., B.Wojciechowska – Charlak, 1985, 1991; J.Kujawiński, 1998a, 1998b), is being mentioned more and more often. The common decision-making about the particular components of education is according to W. Puślecki (1996) based on the right of the student to select or suggest the means to be used to solve particular problems, methodology of teaching, organization of work, the assessment of achievements, homework and the way of learning certain things, the selection of classmates for solving particular problems and the initiating of the educational situations connected with his/her cognitive or existential needs.

The influence of students on the process of education is also connected with the withdrawal from the adaptive educational doctrine and the application of the critically creative doctrine, (T. Lewowicki, 1994) the formation of the clearly task-oriented approach, and the design of the educational opportunities and situational approach (R. Więckowski, 1989).

If students are able to guide their own education, they have the opportunity to choose goals and to satisfy their need for a challenge, that means they can perform interesting tasks with a level of difficulty adequate for them. Besides this, students are able to have a crucial influence on their own education, thanks to which they are constantly motivated and responsible for the results of their education. Students regulating their own educational process know which procedures they have at their disposal, they understand how those methods operate, when they should use them and why there is a need for their employment. (Lipson, Wixon, 1983; S.G. Paris and L.R. Ayres, 1997).

Children eagerly make use of the library and other sources; they look for help from their teachers, parents and classmates. Learning in small groups, allowing for the development of cooperation between students is favourable for the process of education (S.G. Paris and L.R. Ayres, 1997).

Students that regulate their own process of education do not only posses the knowledge about learning but they plan this process on their own. The consideration about their own achievements, strong and weak points, and the ability to

control and correct the results of their own work is essential in this case. The forms of participation in the educational process were described by B.Wojciechowska – Charlak (1984, 1991). Those forms allow students to regulate their own education process by participation in the class, but also they stimulate motivation and initiative, they help in the development of independence, they are the cause of the increase in responsibility for the education results and for the development of learning skills.

Students' participation in the educational process depends on their performing such activities as planning, preparation, conducting and evaluation of a lesson.

Students' participation in the process of planning a class consists in establishing individual as well as collective tasks according to the goals and the subject of the class; the detailed programming of task realization methods as well as different forms of using them during the class. It is possible to establish permanent groups, which students could join according to their interests, and temporary groups as part of students' preparation for classes. Students in those groups would need to prepare data, didactic aids or information to be used during one or a few classes. Incorporating students in the process of conducting a class can have many different forms, for instance, the teacher sets a subject of the class and presents the main problem of the topic which needs to be resolved; while the students analyze the situation, they formulate and present detailed problems, independently formulate conclusions and suggest the content and the form of homework. On the other hand, participation in the common evaluation of the results of their work can be expressed in the evaluation of the effort put into the preparation of the class, the intensity of the participation in the class and students' behaviour (B.Wojciechowska – Charlak, 1984, 1991). Introducing processes such as self-control, self-evaluation and self-correction to students is also a very important aspect. S.G. Paris and P.W. Winograd (1990) indicated two necessary elements for the self-regulating cognitive process, those are: the capability of self-evaluation and the ability to control one's own behaviour. According to R.I. Arends (1998) if the process of education should be successful, it needs to be accompanied by constant analysis and reflection.

Self-evaluation is the assessment of one's abilities (J.Reykowski, 1975), the recognition of one's value (J.Korczak, 1978), the methods of the classification of their own work by students, allowing them to recognize if the goal of education has been reached (S.G. Paris and L.R. Ayres, 1997). In the broad sense, it is the critical reference to oneself and one's behaviour, in the narrow sense it refers only to the evaluation of one's work (J.Poplucz, 1985). According to Lipson, Wixon (1983; S.G. Paris and L.R. Ayres, 1997), self-evaluation consists also of students' knowledge of different learning methods.

Self-evaluation is, beside self-control and self-correction, one of the components of students' self-controlling and self-correctional acts (J. Poplucz, 1985).

Self-control includes: attention of the student during the task performance, revision of the task for the self-control reasons, the analysis of the task questions and assumptions, the comparison of the task components with given patterns, identification of mistakes and gaps (J. Poplucz, 1985). In the self-control methods A. Nowicka-Chachaj (1993) includes also the intuitive methods (the repetition of the learning process) and the analytical methods (verification according to a given pattern, verification according to a pattern in a given place and verification according to a self-developed pattern). Z.Wolańska (1986) presented many education measures, e.g.: flash cards, cards for identifying words, slide rule for creating syllabi and words, etc.

Self-evaluation consists of counting all mistakes and gaps, their division into important and minor ones, comparison of the number of mistakes and gaps with the grade scale and evaluation – giving a grade. Self-correction, on the other hand, includes: admitting the possibility of correcting mistakes and filling in gaps, correction of the task and verification of the corrected task (J. Poplucz,1985).

Helping students to realize the properties of self-control and self-correction results in more successful work; work which is more motivated, disciplined, more thorough and longer lasting. Students learn that they are able to control their actions and it gives them the opportunity to be able to search for better means of education.

Self-correction should be conducted in a student-friendly environment. The student should not be afraid of admitting to mistakes. Mistakes should be considered by the teacher as well as the student as a momentary, easy to overcome setback and not as a failure.

In the self-regulation based education, besides the self-evaluation made by the students, what is equally important is also the cooperation between the teacher and the student in order to analyze the strong and weak points of the student's work. In such cases teachers should employ constant, multidimensional and descriptive evaluation (S.G. Paris and L.R. Ayres, 1997). In the methods that stimulate the student's reflection on his/her own cognitive process we can include: portfolios (folders of the student's systematically collected works, which can illustrate individual achievements, progress, and the student's conduct), reviews and inventories, class registers and lists as well as consultations (S.G. Paris and L.R. Ayres, 1997).

The self-regulating cognitive process makes it possible to gain knowledge of how a student can develop thanks to his/her hard work and the knowledge about his/her abilities in order to have an influence on his/her life – to know him/herself.

(J. Korczak, 1978). Helping students to learn about themselves is considered to be the main condition of preparing them for making the right choices in their life (M. Kostka, D. Słowicka , 1991), also those concerning education.

Furthermore, self-regulation of the cognitive process is connected with the development of the potential abilities of an individual, his/her interests through participation in many forms of activity connected with gaining knowledge, with self-realization (Z. Skorny, 1989). The most important condition of self-realization, which is one of the most important human needs, is the feeling of being in control of the conducted action which presents the possibility to make choices and decisions about one's fate (R. Ingarden, 1972; Z. Skorny, 1989).

Bibliography

Arends R.I. (1998). *Uczymy się nauczać*. Warszawa: WSiP.

Bereźnicki F. (2001). *Dydaktyka kształcenia ogólnego*. Kraków: Wyd. Impuls

Bimmel P. (1995). Lernstrategien im Deutschunterricht – Funktionen und Vermittlungsfragen. *Fremdsprache Deutsch*, Sondernummer.

Czerniawska E. (1999). Samoregulacja uczenia się – aktualny stan wiedzy. *Psychologia Wychowawcza, 5*

Dembo M.H. (1997). *Stosowana psychologia wychowawcza*. Warszawa: WSiP.

Grochulska – Stec J., 1995: Rozszerzanie granic możliwości rozwojowych człowieka. In M.Feiner (Ed.) *Alternatywne teorie i praktyki wychowawcze*. Kraków: Wyd. WOM,

Konoblauch (2000). *Sztuka uczenia się*. Warszawa: Vocadio,

Korczak J., (1978). Jak kochać dziecko, i in. In A.Lewin (ed.), *Pisma wybrane*, Warszawa: PWN,

Kostka M., Słowicka D., (1991). Samopoznanie dziecka w pedagogice Janusza Korczaka. *Edukacja i Dialog, 33*

Kubiczek B., (2009). *Metody aktywizujące. Jak nauczyć uczniów uczenia się?* Opole: NOWIK,

Kunz G., Drewniak V., Schott K. (1992). On – line and off – line assessment of self – regulation in learning from instructional text. *Learning and Instruction, 2*

Kujawiński J., (1998a). Metody edukacyjne nauczania i wspierania edukacyjnego w klasach początkowych, Wyd. nauk. UAM, Poznań

Kujawiński J., (1985). Samokształcenie w edukacji wczesnoszkolnej. *Życie Szkoły*, 6

Kujawiński J., (1998b). *Współdziałanie partnerskie w szkole*. Poznań: Wyd. Eruditus.

Ledzińska M., (1988). Wiedza uczniów o strategiach pamięciowych a jej związek z osiągnięciami w nauce. *Psychologia Wychowawcza, 31*

Ledzińska M. (1996). Wybrane problemy w studiach nad Metapoznanie. *Psychologia Wychowawcza, 2*

Lewowicki T. (1994). *Przemiany oświaty*. Warszawa

McCombs B.J., Pope J.E., (1997). *Trudny uczeń, jak go skłonić do nauki*. Warszawa: WSiP,

Nowicka-Chachaj, (1993). Samokontrola uczniów. *Edukacja i Dialog, 45*

Oleszlager B., (2007). *Jak uczyć uczenia się?* Kraków: Impuls.

Paris S.G. , Ayres L.R. (1997). *Stawanie się refleksyjnym uczniem i nauczycielem*, Warszawa: WSiP.

Paris S.G. , Cross D.R. (1993). Ordinary learning. In G. Bisanz, R. Kail (ed.) *Learning in childern*. New York: Spinger Verlag,

Poplucz J., (1985). Samokontrolne i autokreatywne czynności uczniów, *Nowa Szkoła, 7(8).*

Puślecki W. (1996). *Kształcenie wyzwalające w edukacji wczesnoszkolnej*. Impuls: Kraków

Więckowski R., (1989). Współczesne problemy teoretyczne pedagogiki wczesnoszkolnej a zagadnienie kształcenia nauczycieli. *Ruch Pedagogiczny, 1*

Wojciechowska-Charlak B., (1991). *Efektywność współudziału uczniów w procesie dydaktyczno-wychowawczym*. Warszawa

Wojciechowska-Charlak B. (1984). Formy współudziału uczniów klas I–III w procesie dydaktyczno-wychowawczym. *Życie Szkoły, 448*

Wolańska Z. (1986). *Umiejętność samokontroli i samooceny w nauczaniu początkowym*. Białystok: Wyd. Filii UW w Białymstoku

Skorny Z., (1989). Samorealizacja a uczestnictwo w działaniu. *Ruch Pedagogiczny, 3*

Zimmerman B.J. (1989). Models of self – regulated learning and academic achievement. In B. Zimmerman, D. Schnuck (ed.) *Self – regulated learning and academic achievement.* New York: Spinger Verlag,