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## SELF-REGULATORY COGNITION COMPETENCE, FROM A LEARNER'S PERSPECTIVE, IN A DIGITAL INFORMATION ENVIRONMENT

### Cognitive self-regulation – the concept

Self-regulation considered from the perspective of the structures of the *self* refers to the three areas of the self (actual; ideal; and ought) (Higgins 1987 or Higgins 1989; Higgins, Klein & Strauman 1985; Van Hook & Higgins 1988) recognized and described as a term in the field of psychology. According to the self-discrepancy theory, the learner seeks to reduce discrepancies between how he perceives himself or herself (self-actual – related to hopes, dreams, wishes, ambitions about oneself) and what he or she would like to be (self-ideal), or who he or she should be (self-ought – related to duty, obligation, responsibility) (Higgins 1985). For self-regulation it is important whether the learner assesses a given area of self from a personal standpoint or from others' standpoints, for example, from those of significant people (parents, friends, teachers, idols, creators and/or users of digital resources). Personal beliefs of the learner about the features he or she possesses, creating the area of the actual Self in his or her own eyes (actual/ought), and beliefs referring to the traits that the learner thinks are attributed to him or her by others, forming the scope of the actual Self in the actual/other eyes.

Representations of expectations, aspirations and traits that a learner would like to possess creates an ideal self in his own eyes (ideal/own). In turn, the representations of these attributes, which the person thinks that others would like him or her to have, falls within the scope of the ideal self, "in the eyes of others" (Bąk 2002; Młynarczyk 2006). Accordingly, the ought area of the Self is a set of attributes (representation of the sense of duty, responsibility, credibility, usefulness, including life, education, and others) that the learner should possess (I should "in my own eyes") or thinks they should have, according to others (ought Self "in the eyes of others"). The meaning of a given type of direction (standards) of the (ideal or ought) Self and the discrepancy of the (ought) Self depends on which of the directions dominate in the regulation processes (Wojdyło & Buczny 2011, pp. 375-376). Discrepancies in the scope of the actual and

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specific type of the standard Self constitutes cognitive structures and creates a kind of negative psychological situation having emotional and motivational consequences. Edward Tory Higgins (1997) went further in his discrepancy theory. Both the pursuit of the desired state and the avoidance of an undesirable state can be applied in various ways. In order to be able to evaluate the effectiveness of learning based on cognitive self-regulation, one should determine the effectiveness of its ideal model, to use the multiplicity of ideal efficiency based on it, as a measure for the assessment of real learning outcomes of this type. In connection with such a course of understanding the existing theoretical explanations and the intention adopted in this study, I focus on identifying self-regulation skills of the learner in the digital information environment with an intent to focus on the search for an answer to the question: What is the relationship between, I – a learner, and I – ideal (competent) in managing digital information?

### **The importance of information in the process of constituting self-regulatory skills**

Arguably the newest and most important channel of fast and extensive information distribution is the global Internet network. Although we are drowning in a flood of information, knowledge is precisely what allows us to find our way in the mass of thoughts. The distinction between knowledge and information would be quite uncomplicated if we could simply focus on critical thinking to transform information into knowledge.

Information is not only raw data but also a product of the actions thanks to which it can exist – namely shaping or organizing it into packages, which enable one to control, send and use it. This activity can be carried out in relation to both knowledge and non-knowledge. Thus, the distinction between knowledge and information is possible if we take into consideration the process in which knowledge is given the shape of information (*informalizing* knowledge). In the process of transforming into a durable good, the information obtains a material dimension that makes it possible to use it and it is easier to process it. In this way, it becomes a means of creating new knowledge. We cannot rely on something that we do not understand and that we are unable to assess, for example through the prism of social or economic utility. Information is precisely what is transformed, through appropriate processing, while knowledge is a reference product – where the construction or creation of knowledge is always based on some level of prior knowledge by transforming information. Although the production of knowledge results from a kind of transmutation of information, knowledge itself is further transformed into information so that it can be processed, and new knowledge can be generated. The multiplicity of data and information of an unknown origin causes confusion. The only effective verifier of information remains the common-sense ap-

proach to the knowledge-based approach. This takes place, *inter alia*, as a result of the learner's cognitive self-regulation.

In order to explain how self-regulatory knowledge about oneself and the world is shaped, the first step is to describe the process of transformation from information to knowledge. In the cursory studies which I examined, I encountered the basic complexities in defining these concepts and related activities. Information is explained as a notification about something, communicating something, a message, an instruction (Mały Słownik 1997, p. 265). Information and message have been treated as synonymous, because they can be applied interchangeably, although in such a situation it is a great simplification (Flakiewicz 2005, p. 15). Both information and message belong to the language of reality.

In science, information is usually associated as a number describing specific events or situations due to the systemic origin of information. In the humanities, including education, information is associated rather with a specific content contained in the text, image or music.

Information in cybernetics is defined differently, especially in the quantitative information theory of Claude Shannon and in the communication issues by Warren Weaver (1949), developed by Wilbur Schramm (1954), George Gerbner (1956), Bruce H. Westley and Malcolm S. MacLean (1971), Roman Jakobson (1960). Information processing is assumed as a process of analyzing the original data according to predefined rules and making, on this basis, a certain synthesis of output data sets that have desirable properties from the point of view of the task undertaken (Słownik Języka Polskiego 1997, p. 788).

Claude Elwood Shannon created the basics of quantitative information theory used in computing, where the basic unit of information is a bit. The bit corresponds to the amount of information contained in the answer to the question that can be answered yes or no. The bit values are assumed to be binary digits 0 and 1. Here we find bitwise computing, in which the simplest definition of the term "information" is understood as „a measure of the uncertainty of an event occurring from a finite set of possible events" (Turski 1979, p. 13). The information is provided on the basis of communication based on a monologue.

A different approach to information can be found in the infology theory (initiated by Gall, Broca). This theory aims to explain the meaning of information in terms of use and research, explain information ownership, analyze user requests addressed to information and search for methods and means to provide information about requests formulated by the user developed in the Scandinavia by Sungren, Langefors, Ramstroem (Stefanowicz 2010, pp. 29-31). Depending on the adopted classification and areas of research, authors often cite contradictory definitions; if we accept the informative in-

terpretation proposed by Bo Sundgren, who understands information as the content of a message composed of data, we should define it through the prism of three concepts such as: “data”, “information” and “communication” (Sundgren 1973, pp. 41-47; Stefanowicz 2016, pp. 101-108). The referenced approach to information includes taking action after obtaining a specific information, and bypassing the decision-making process, yet in the ordinary meaning, information is a factor that reduces the scale of ignorance about a given phenomenon and enables making the right decision or more efficient operations.

In Poland, Marian Mazur (Lechowski 1987, pp. 7-20) was a precursor in the work on information. He showed that there are six ways of faithful informing and analyzed all possible types of information distortions. He also explained the understanding of information, the meaning of information, the content of information and many other phenomena. However, he did not explain the issues concerning the quality of information in terms of its value. In the context of this study, two approaches to information can be identified. The first one is called objective and derives from physics and mathematics. Here information means some physical or structural property of objects. The second one considers a subjective or cognitive approach. Information is what the mind is able to process and use for its own purposes.

The most complete systematization of the information theory, taking into account the digital environment of its occurrence, was made by Janusz Gnitecki. He analyzed information education in the context of the transformation of civilization. He explained classical quantitative research that is associated with bitwise computing and binary logic. Moreover, he explained classical qualitative research based on the interpretation of the meaning and meaning of phenomena in connection to a changing context. He described bit education, the assumption of qubit education and the concept of subelement education. He pointed out that the primary types are quantitative – dependent on the possibilities and limitations of bitwise computing, and secondary qualitative ones, derived from the interpretation of information. In his analyses, the rationality of the message gains importance. Knowledge arises as a result of dialogue, at the interface between the exchange of views and ideas. (Gnitecki 2007, pp. 106-108; Thompson 1995).

As a result of qualitative analysis, Gnitecki proposes the definition of the term “information” as the understanding of “the basic good of contemporary culture; a specific commodity of mass consumption; the basis of contemporary philosophical and pedagogical reflection in conditions of anorexia (lack of hunger for information) and bulimia (chronic hunger for information); a source of reflection allowing to reveal a world marked by contradictions; reproduction and description of data facts; projec-

tion and, prior to that, a description of given facts; interpretation and understanding of data and given facts” (Gnitecki 2007, pp. 25-26). In this approach, information adopts a temporal dimension (simultaneously past, present and future), which is important from the perspective of using digital resources, which also have a non-temporal dimension. This is important in shaping human cognitive self-regulation in the conditions of digital information.

Too much focus on information compared to knowledge reveals the extent to which the spread of economic models has changed our attitude to knowledge. Too closely focusing on information here and now means that we may overlook its context, which helps to understand what this information means and/or will mean and therefore why it is now, here and now, important or not important. The information is processed thanks to the knowledge that the learner possesses and as a result gives other information or new knowledge. We must choose and decide which information we will use. Valuation criteria and motives that shape information awareness show a close relationship with social variables: material conditions (tools and programmes), information practice (adopted patterns of informational behavior) and information systems of a given society in a given historical period.

As a result of cognitive development, human knowledge is transformed into wisdom, and the result is a deeper understanding of concepts, their meanings, mutual relationships, interactions and integration. The most important seems to be the formation of responsible critical thinking along with sensitivity to perspective. This is nothing but “the ability to practice wisdom” (Kwieciński 2002, p. 41). It combines high cognitive skills with the capacity for moral judgment. Not only the ancients valued wisdom. Zbigniew Kwieciński expresses it as a condition of responsibility, and responsibility as the basic manifestation of wisdom (1997, p. 23). The contents of this responsibility according to the aforementioned author are: values, knowledge and skills, development and happiness as well as the ability to undertake individual activities but also team work skills. In terms of competence issues, Wojciech Pasterniak and Gnitecki (2001, p. 14) (2001, p. 14), refer to superior skill. Before we acquire this skill, however, we must first rise from ignorance to **self-knowledge through informational activity**. Learning cannot only be aimed at adapting information to the existing reality, but should promote the creation of self-knowledge in a new reality, including the digital one. At the same time, the perception and thus the utilization of the new – digital reality will depend to a large extent on understanding the existing tendencies in the development of this reality and understanding the relationship of this reality with one’s own learning: perception of oneself and the world (Perzycka 2008, pp. 32-37).

### **Suggestions of self-regulatory skills to get to know a learner in a digital information environment**

At the level of activating already possessed knowledge, the learner can discover/develop his own model of using teleinformatic goods. Such a model may include four activities: 1) informing learners, who are able to effectively acquire information (also digital); 2) communicating learners, that is, able to communicate with other people, also via digital channels and effectively using the obtained information (also digital); 3) learning learners, i.e. acquiring knowledge from various sources, including digital ones, about learning processes; 4) creating learners – creating information, knowledge (products and information services, including digital), serving the social needs of communicating and learning people. In the above-mentioned knowledge acquisition proposal there is a hierarchical superimposition of further learners' competences. For example, a communicating learner uses the knowledge of an informing learner, while the learning learner uses the knowledge of a communicating and learning learner. Moreover, the creating learners use the knowledge of a communicating, informing and learning learner. This type of hierarchical acquisition of knowledge based on sustainability, asymmetric coherence, transfer and participation (Gnitecki 2005, p. 112) may show a certain order of the learning process based on cognitive self-regulation. One cause can lead to many effects, and each effect can have many causes. Unambiguity can also be the ambiguity of relationships between the causes and effects of educational interactions. Such heterogeneous states arise (Kazimierz Wenta (2011) calls them chaos, Wiesław Andrukowicz (2016) – differently), I have temporarily called the hierarchy of information validity in accordance with the order: 1) information (exchange), 2) communication (recognition), 3) learning (understanding), 4) creating (comprehension).

The combination of a learning process based on a learning model based on self-regulatory cognition and the order of operations on information in digital reality proposes the self-regulatory skills of learning digital information, these are: 1) self-information skill; 2) self-communication skill; 3) information self-determination skill; 4) informational self-awareness. For Maria Czerepaniak-Walczak it can be said that "skill is a conscious, tangible, satisfying, though not unusual, level of efficiency that conditions effective behavior (action) in some field" (Czerepaniak-Walczak 1997, p. 87); in the context of the analysis and also in the area of information management. Skills are observable by others and repetitive, so they are not, as the author writes, a one-off act as a result of enlightenment, inspiration, intuition, etc. (Czerepaniak-Walczak 1999, p. 46). So what are the manifestations of their occurrence?

### **1. Self-information skill – the learner collects information**

Many years ago, there were studies on techniques for fast learning and effective problem solving. We know the studies of, for example, Alfred Adler (1998), Harry Lorayne (1999), Tony Buzan (1999, 2000), Zbigniew W. Brzeźkiewicz (2000), and many others. However, scientific discoveries in the area of cognitive sciences have indicated the importance of activity in the learning process. To communicate with each other, neurons must release neurotransmitters and neuropeptides (chemical substances, e.g. glutamate or gamma-amino butyric acid). When something new appears in the student's surroundings, something that will trigger interest, neurotransmitters will release self-knowledge (Żylińska 2014, pp. 45-64). Interest in the learning material depends on how the synapses are stimulated, so that the learner is encouraged to learn. The brain always asks what is taught and often follows its subjective criteria, so it is important to recognize what you want to learn, or what the purpose of education is. At this level of learning, it is not difficult to draw a homogeneous educational model for all learners. It is at this level that the learner gathers information (Żylińska 2014, p. 19). All the time one must remember that it is learners who are the organizers of their learning process. They gather information that they think is important, that they need to satisfy their curiosity or to do a task – this forms the complex.

### **2. Self-communication skills – the learner recognizes information**

Man is primarily a discoverer and then the creator of reality. Through insight into ourselves, we discover talents, abilities, possibilities – we do not create them. Through insight into other people, we discover in them: talents, abilities, possibilities both positive and negative – we do not create them. We discover in us and in others what already exists and existed at the moment of “discovering” activities. We recognize the potential of the learner. Therefore, it should not be surprising that there are no educational effects. Focusing only on the transmission or sharing of information can lead not only to perceiving the world in a narrow and deceptive manner, but also to a more quantitative rather than qualitative view. It can also lead to something that can be called tunneling design – an ill-conceived way of design, in which learners become victims. Living in the age of information, we can sometimes feel like a passenger in a car that is being driven by a driver suffering from tunnel vision. Such a condition cuts off the peripheral parts of the field of view, allowing us to see the goal that we want to reach in education, but not much else. If the learner focuses enough on information, he will be able to reach the goal directly, but he will expand the field of view with context, origin, history, common knowledge, and social resources. Peripheral phenomena are not as insignificant as they would seem. They give a valuable balance and a better perspective

for the information that we have been directly given. In the end, it turns out that what lies on the periphery helps us to extract something meaningful from the information on which we focus our attention so much. In such a world, the learner is expected from network resources to live on a specific diet consisting exclusively of information. If there are any concerns about the information, the answer will be at most providing even more of it (Seely & Duguid 2002, pp. 2-5). There is nothing more wrong. The increasing information resources of the global network do not make the learner have more knowledge and hence become smarter. Therefore, one needs knowledge and skills to understand the information. Communicating with information is a special process of learning information that is multidimensional, multilevel and multi-faceted.

### ***3. Information self-determination skill – the learner understands the information***

Reading, writing and calculating skills are the basic skills that learners should acquire in basic education. These are skills, without which it is hard to imagine adult modern life. The enormity and access to information forces the learner to possess a much more advanced skill than the ability to combine letters into words and words in sentences. Competence of understanding is not enough. Learning from online resources needs knowledge and wisdom in order to understand and use digital information. The future of artificial intelligence is not only advanced computers. Researchers are striving to build a super-intelligent global body composed of people and computer systems. In the United States, research is being carried out on the project of artificial intelligence, it is called Total Information Awareness – TIA. It consists of creating a gigantic computer network, the purpose of which is to be a revolutionary change in the ability to detect, classify and identify foreign terrorists, as well as enable America to use effective strikes ahead of acts of terror. In order to survive, humanity must create more and more intelligent digital tools, for this, one needs powerful and sophisticated computing power (DARPA, <https://www.darpa.mil/events>).

Currently, the creation of an information website or your own website on the Internet does not require special knowledge and skills. All you need to do is know the basics of HTML or learn how to use platforms that support web development or shared programs. Sometimes, to express your own thoughts or promote your work, you do not need to know anything, just sign up for discussion forums, create your own blog, sign up for Facebook or other social networking sites, send your movie productions to YouTube, paste the presentation to SlideShare and become a full-fledged participant in the digital space. There are many service websites and new ones are still being created, all of them respond to already articulated needs or are ahead of them. The relationships that take place between interest groups are different: B2B (Business to Business), B2C



(Business – to – Customer), C2C (Consumer to Consumer). All of them do not need to be recognized, they need to understand what to understand in order to use them in a valuable way (Bednarek-Michalska 2007, p. 54).

Valuation of information services is very difficult. The criteria for evaluating the resources of websites change as individual elements of the assessment are selected individually by the user of this website. The assessment of the content (text information as well as image and sound information) of the site is conditioned by the knowledge we have about the information that forms the content of this web page.

The evaluation of digital information is done in a similar way to that which is transmitted in a traditional form, especially if we consider the content rating. The differences lie in the form of the message, and the form primarily results from the use of the hypertext WWW system to provide information. It also significantly affects the quality of knowledge. Both the methods used to assess the pages and the evaluation criteria are very diverse, depending on by whom, for whom and at what level the assessment is to be made. When starting the assessment, one should always consider what the purpose of the assessment is, which criteria are relevant at a given moment, and only then can we start the analysis of individual elements that should be reviewed within a given criterion. Knowledge about valuing information is very important, for several reasons. First, the assessment of the reliability of information is difficult, because information services are often underdeveloped and not updated, and therefore unreliable. They provide incorrect information, which in turn equips learners with the wrong knowledge. Secondly, it is difficult to assess the usefulness of information because of its essence and knowledge of the learner. For different people, the same information has a different value. Thus, the difficulty in reaching the information desired by the learner is due to the knowledge of the learner about the conditions of information resources. The creation of criteria for the evaluation of digital information sources has been undertaken by many researchers. The two best known classifications were developed by Smith and Clausen. In Poland, Bożena Bednarek-Michalska dealt with this problem. The researchers deal with the assessment of information quality from the perspective of electronic library services. Maybe because librarians have always chosen, collected, stored and provided information. Using their suggestions, you can evaluate each website by evaluating its quality. Some elements are a priority, such as the author, update, credibility, completeness of information, graphics and correctness. Most often, however, the selection of the criterion for evaluation results from the individual needs of the recipient of information and their expectations. Without understanding what the information is and what its quality is, it will not be possible to verify it. Knowledge about standards, e.g. W3C (Technical Report 2016) may be helpful.

In the learning process, the learner experiences himself as a whole – individuality, but in the educational activity is associated with fragmentation and aspect, especially in the environment of digital information. Martin Heidegger and Hans – Georg Gadamer described this state as a pre-understanding, and they recognized it as the main task of hermeneutics (I take it as a way of explaining the phenomena discussed). The way in which I approach the learner is a special understanding, called an understanding method. According to the method so understood, the researcher (I also mean myself) of the educational reality should be open to not only pedagogical and psychological knowledge but also knowledge from theological, philosophical, sociological and legal sciences etc. However, some risks related to this should also be borne in mind (old and new mentality) (Vandenberghhe 2017, pp. 1-12).

#### **4. Information self-awareness skill – the learner creates information**

I have mentioned wisdom before. Wisdom is the beginning of all good and the highest good, and in the words of Gnitecki (1999) – it is the highest state of consciousness. As a result of the undertaken considerations, wisdom is accepted “as having knowledge appropriate for a given state of the world, a given social situation, a given articulation of the human condition” (Kwieciński 1997, p. 22). It seems that an important element of such wisdom is a creative attitude to life, where creativity means involvement in everyday life and is understood as a stimulating value of reflection on one’s own development. Wisdom requires, firstly, a large amount of information (gathered in various resources) and knowledge of relationships, and secondly, a penetrating compassion and experience. In it, we achieve an ideal state, which is characterized by the achievement of perfection by recognizing, understanding, accepting and respecting the natural and material law (Kwaśnica 1995, p. 22).

Education requires full understanding, because in the education process there are so-called interpersonal acts. Any reference to technical laws should be a critical reference. In the traditional approach, the variables that differentiate the education process are learning conditions. In the proposal to develop self-regulatory competences, cognitive and learning conditions are a differentiating category – digital information environment. Understanding and interpretation are two complementary elements, which in turn lead to understanding. I treat the language of the description as a symbolic communication tool. Information serves as a symbol in it, in which content (meaning) and meaning (value) is contained (coded) (Gnitecki 1996, pp. 23-24). The recognized meaning provides the horizon of further understanding. In the process of creative cognition, all material and immaterial, intellectual and intuitive forces should be taken into account in order to get through to what is external, sensual. Education by choosing

a detailed methodology, constructs the reality of the learner to make it understandable. What methodology should it be? Is it based on self-regulating cognition?

## Conclusion

What constitutes a breeding ground for the development process is the mastery of new knowledge, skills, behaviors and their understanding. "It must be remembered that a man may want to be what he is not yet, or not want to be what he is like" (Tischner 2000, p. 75).

The time in which we live is a time for education integrated with information technologies – digital technologies. I treat this text as a voice in the discussion, a voice in the search for optimal learning conditions in the environment of digital information sources. I am convinced that knowledge about the mechanisms regulating cognition is a significant contribution to the learning of the learning subject – the learner, especially in digital information conditions, and can be an idea/inspiration to develop a learning model in a network based on self-learning learning.

Consciously or subconsciously, everyone wants to know what makes them unique and how to use this uniqueness. In many research centers around the world, research is being carried out on common differences in the work of the brain and the work of the mind, because like the weather, they have a huge impact on our lives. Their work affects our everyday life, both private and professional.

The state of our knowledge about ourselves and our minds shows us how much we still have to discover. Have we done everything to prepare for life in the world of new technologies?

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#### **SELF-REGULATORY COGNITION COMPETENCE, FROM A LEARNER'S PERSPECTIVE, IN A DIGITAL INFORMATION ENVIRONMENT**

**SUMMARY:** In the conditions of the emerging knowledge society, the importance of information and knowledge as strategic resources of society increases. In the field of continuing education, methods are sought for their effective management. Information and knowledge management is a fundamental change in the way of thinking, which is followed by more and more entities conducting educational activities of adults. Therefore, the aim of this study is to show the self-regulatory skills of self-cognition and self in the world in the context of information.

In the first part of the text, the contexts of the cognitive self-regulation of the learner are outlined. Next, the conditions of learning in the perspective of knowledge about learning processes and information management are discussed, in order to identify and present the propositions of self-regulatory skills based on information. The second part proposes four groups of skills indicated for learning in the digital environment in relation to self-regulation of cognition.

**KEYWORDS:** education, competences, self-regulation, information.

#### **KOMPETENCJE SAMOREGULUJĄCE POZNANIE, Z PERSPEKTYWY UCZĄCEGO SIĘ, W ŚRODOWISKU CYFROWYCH INFORMACJI**

**STRESZCZENIE:** W warunkach tworzącego się społeczeństwa wiedzy rośnie znaczenie informacji i wiedzy jako strategicznych zasobów społeczeństwa, a na gruncie edukacji ustawicznej poszukuje się sposobów do ich efektywnego zagospodarowania. Zarządzanie informacjami i wiedzą to fundamen-

talna zmiana sposobu myślenia, po którą sięga coraz więcej podmiotów prowadzących działalność edukacyjną ludzi dorosłych. Dlatego celem niniejszego opracowania jest pokazanie kompetencji samoregulujących poznanie siebie w świecie w kontekście informacji.

W pierwszej części tekstu zostały nakreślone konteksty samoregulacji poznawczej osoby uczącej się. Następnie omówiono warunki uczenia się w perspektywie wiedzy o procesach uczenia się i zarządzania informacjami, aby na tej podstawie wyłonić i zaprezentować propozycje kompetencji samoregulujących poznanie opartych na informacjach. W drugiej części zaproponowano cztery grupy umiejętności wskazanych do uczenia się w środowisku cyfrowym w odniesieniu do samoregulacji poznania.

SŁOWA KLUCZOWE: edukacja, kompetencje, samoregulacja, informacja.