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Teachers' Learning Processes of Information Competences in the Network Society – Proposed Theoretical and Methodological Solutions

Abstract

Dynamic changes characteristic of modern societies, especially those involved heavily in technological transformation create special conditions for adaptation of the network environment to the needs of education. The introduction to this article discusses contexts of the issue as a precondition resulting from the threat of digital divide of teachers. Then, the paper includes considerations on the conditions of the constitution of information literacy as a result of the revision of theory and practice. It proposes a process of examination of teacher information literacy in the digital environment in the perspective of hermeneutic methodology. Conclusions provide the proposal to include research on the development of teacher information literacy in the process of the network society formation.

Keywords: *information literacy, network society, learning process, educational programme*

Introduction

Considering the theoretical determinants of teacher information literacy, this paper focuses on *information* as a psycho-physical phenomenon and considers information education in terms of cognitive psychology (Clarc, Lockhart, 1972).

Teachers' learning process of information competences in the network society is highly contextualized. Its basis lies in a critical theory considered in the socio-cultural context. This can be presented in the form of the regularity of the elements presented in Scheme 1.

Scheme 1. Highly contextualized learning process
of information literacy of teachers

| The learning process of information literacy in the network society | ∧ | Individual, environmental and school learning contexts | → | The learning process of information literacy competences in the network society |
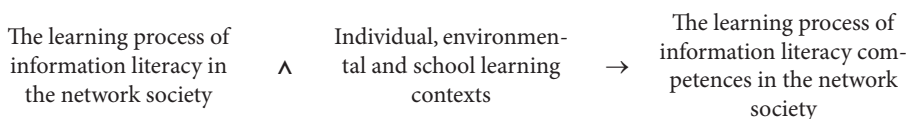
In relation to the concept of information literacy used by English literature, among other things, terms such as: 1) information literacy – understood as the ability to recognize, process, evaluate, create information and a number of other activities related to information (Taylor, 1998; Brevik , 2000; Bruce, 2002; Potter, 2004; Taylor, 1998); 2) media literacy – referred to as a range of skills to acquire, analyze, evaluate and create messages in a variety of forms (Celot, Lopez, Thompson, 2009; Martinson, 2009; Perzycka, 2004); 3) information literacy and communications technology ICT literacy – the use of digital technology and social networking tools for communication (Ellis, 2001); 4) digital literacy – the ability to read and understand multimedia texts and hypertext (Tapscot, 1998); 5) information skills (Erstad, 2010; Mills, 2010). In Polish literature, there is information literacy proposed by Perzycka and discussed in the article: *Struktura i dynamika w społeczeństwie sieciowym* (Structure and dynamics in the network society), Szczecin, 2008.

The inspiration for the development of the prolegomena to the conditions for teachers' learning process of information competences in the network society were primarily different theoretical (Bruner, 1978; Bruce, 1998; Tadeusiewicz, 2002) and methodological assumptions (Gnitecki, 2005), as well as the author's in-depth characteristics of the determinants of teacher information literacy in Poland (Perzycka, 2004, 2008). It was shown in the research procedure, including: 1) planning to solve problems using digital information, 2) searching for digital information, 3) selecting digital information, 4) creating digital information, and 5) sharing digital information.

From a scientific perspective, this paper is based on a principle which states that the educator oriented in ideas of pedagogy does not need any maps as he is given a route that he follows. A situation in which an educator uses two approaches is more complex; he has to face the problem of making decisions within a dichotomous structure as he interprets the available concepts of education in the form of opposing possibilities. He is separated from other ideas that do not fall within the two-part structure, and in this sense he does not focus on obtaining the orientation of the whole issue, which makes the map a not very useful item also for him (Rutkowiak, 1995, p.13).

Teachers' information literacy is placed in the context of the *network society*. So far, there have not been any documents of efforts to clearly define the two concepts well enough to be able to highlight significant differences between them. Therefore, it is worth referring to an explication method used in this paper to clarify these concepts. An explication method leads to the clarification of relations between the name, the sense and the meaning, where the name will explicitly invoke its meaning (Pawlowski, 1986, p. 99). It aims to explain the meaning used in everyday speech or science, so its ambiguous or not clear content becomes clear (Gnitecki, 1994).

M.Castells (2008) created his own systematic theory of the network society, emphasizing the impact of the Internet on human beings. In Polish literature, T.Goban – Klas (2004) used the concept of the *network society* in relation to the transmission of human relationships. The network takes a form of media, the content of which is information, and the essence is communication. The adjective *network* identifies each member of the community using information technology, but it is also an integral part of this society. On the Internet, it is possible to see the diversity of applications, due to the collective contribution of its users. On the other hand, the Internet is primarily a tool, and its users are using it in connection with their work and private life. Despite its linguistic ambiguity, the concept of the *network society* seems to be a term which describes the nature of what has been presented in the context of teachers' information literacy competences far more accurately.

Theoretical considerations

The core of research is to give the information education the key characteristic and to develop theoretical and practical frameworks for teachers' information literacy competence development in the network society. The creation of these frameworks is possible as a result of: 1) clarification of terms and explanation of key concepts, 2) building of a theoretical basis for teachers' information literacy competences in the network society, 3) determination of methodological consequences arising from theoretical assumptions, 4) establishment of the theoretical and methodological assumptions of research, 5) use of the theoretical and methodological assumptions for the analysis and projections of diverse experiences of teachers in the field of information literacy.

The determination of a theoretical basis of the learning process should be referred to as an adequate theory of learning (Lewowicki, 1984; Perzycka, 2008).

Moreover, such a theory should be considered in terms of contemporary formative change, i.e., in the modern, postmodern and neomodern discourse. These three aspects of formative change have far-reaching epistemological and research consequences. Therefore, it is worth recalling assumptions of the theory: 1) structuralist, 2) poststructuralist, 3) pragmatic, post-pragmatic and neo-pragmatic. Referring to the inspiration contained in the publication, it is possible to talk about suggesting theories: 1) a certain pattern of change in the teacher (post-structuralist, associative and pragmatic theories), 2) a change in this pattern (post-structuralist, post-associative and post-pragmatic theories), and 3) advocating a new pattern of change (neo-structural, neo-associative and neo-pragmatic theories). This may lead to radical changes in the conduct of empirical and hermeneutic research on the development of teachers' information literacy in the network society.

Methodological considerations

In order to assess current capabilities of teachers' learning about information literacy in the network society, it is proposed to conduct quantitative and qualitative research. In order to specify the conditions of development, the research process can use a specific intermediate context, including a hermeneutic perspective, focusing on: the causes of the formation and determination of the status and prospects for the development of teacher information literacy in the network society. These are proposals for modifying agents (stimulants or inhibitors), which are major components in teachers' learning processes of acquiring information literacy competences. The proposed system consists of the following elements: 1) a set of events Z, including the sum of the conditions for the development of teachers' information literacy skills, as individual variables expressed in the language L of teachers' educational activity, 2) a subset of individual predicates (properties and relations) $P_1, \ldots P_k$, which are denotations of individual variables (determinants of literacy development), 3) the functions $F_1, \ldots F_n$ as actions performed on individual variables from the set Z (theoretical predicates and observational predicates and their expression in the units of a measurement scale using the appropriate indexes and scales), 4) fixed individuals $a_1, \ldots a_r$ including the names of objects, people and institutions; it is the highlighted area of the theory of pedagogy and information education (Perzycka, 2008). This can be written as follows: $D=(Z; P_1,\ldots P_k; F_1,\ldots F_n; a_1,\ldots a_r)$. What is noteworthy is the determination of individual variables, the correct implementation of the theoretical and observational predicates and expression in units of the measuring tool scale.

In addition to modifying agents (determinants of development, i.e., the conditions for changes in teachers' competences), the in-depth examination of the learning process of information literacy must also take into account the main agents, namely the source of changes in teachers' competences, and the same change in teachers. In this way the teacher's learning process of information literacy becomes highly contextualized, in which it is necessary to clearly identify: 1) the sources of changes in the teacher, 2) the conditions for change, and 3) changes in the teacher.

Research on teachers' learning process of information literacy skills acquisition in the network society can be conducted in at least four ways: 1) as a basis for conducting evaluation studies on the state of teachers' information literacy skills, 2) as a methodological basis for conducting correlation research (it concerns the agents differentiating teacher information literacy), 3) as a basis for ex post facto research (often referred to as experimental studies carried out after the occurrence of the facts focused on the study of agents that were successful), and 4) as an experimental research project. The first three types of research result directly from the a priori adopted theoretical and methodological assumptions, and can be widely applied. In order to develop the accurate research instruments of these aspects (which was noted before), there should be a link between the language of theory (teachers' information literacy in the network society – the theoretical predicate) and the language of observation (observation predicate variables tested, which are expressions for denoting states of studied agents which can be seen directly or indirectly). If theoretical predicate is denoted by $U(X)$ and observation predicate by $S(X)$ – (set of variables, indicators), a logical sentence $\wedge X[S(X) U(X)]$ is a real and wanted link between an observation predicate and a theoretical predicate.

In turn, the fourth type of research requires building a model stimulating and supporting the development of teachers' information literacy skills in the network society, taking into account the main (the main independent variables – ZNg) and control (ZNk) agents and dependent variables (ZZ). The system of relations between variables can then be written as follows: $ZNg + ZNk = ZZ$, where the main variables are the system of integrated educational events $(Ziii(x))$, independent control variables $(p_1(x), p_2(x),\dots p_n(x))$ are control variables modifying the influence of the main variables, and the dependent variables are variables obtained as a result of the use of integrated states – teachers' information literacy in the network society $(Wiii(x))$. Accordingly, the system of relationships between variables in the experimental studies can be written as follows: $Ziii(x) + (p_1(x), p_2(x),\dots p_n(x)) = Wiii(x)$. In view of the fact that the systems of integrated events are the

main component of the information education program, the control agents, in turn, form a hierarchical scale of modifying agents (stimulators and inhibitors), and the dependent variables are the effects of the program use, and therefore the symbolic content scheme can be represented as follows (Scheme 2):

Scheme 2. The information education program focused on teachers' learning information literacy skills acquisition in the network environment

Information education program	∧	Modifying agents	→	Effects of the program

The proposed research allows for recognizing the relationships that exist between the applied empirical method (diagnostic survey) and the hermeneutic method (interpretation in differentiated contexts). In scholarly literature there are at least three relationships of that type (Gnitecki, 2007). The first is to reject the empirical method for the hermeneutic one or vice versa. The second is to apply them in an integrated manner, and the third is to place the hermeneutic method over the empirical and praxeological ones.

Use of the hermeneutic research perspective can be realized in two ways. The first is based on formulating a theoretical problem (concerning the meaning and significance of teachers' information literacy skills in the network society) and specific problems. The second is to understand the meaning and significance of studied phenomena – at the stage of their clarification – explication of the variables tested and an in-depth interpretation of test results in conjunction with the diverse individual and social context.

If hermeneutic research is to be placed over empirical research, it is essential for the researcher to gain adequate hermeneutic knowledge (Gnitecki, 2007). Following the methodological assumptions on the state (essence and existence) of teachers' information literacy skills in the network society, it is possible to reconstruct the field of pedagogy and information education using a procedure of esoteric implication (Wisniewski, 2003, pp. 389-427). Esoteric recognition of the concept of explanation by clear specification shows the cognitive function of clarification – seeking mechanism (Globler, 2008, p. 119). Esoteric implication (Im) is used to modify specific questions, where a theoretical problem (Q) will be an implying question and specific questions (Q*) will be implied questions. Such conduct will be possible through theoretical and practical knowledge (X). In such reasoning the field of hermeneutic questions is called D, and it can be defined as follows: D=<Im [Q,X,Q*]>. The formulated main problem and specific questions can be used to conclude not only in the field of research questions, but also in

the preparation of the research process. The correct formulation of theoretical problems and specific questions is half of the success of the research process. The remaining half will be the development of accurate research instruments, as well as reliable and in-depth analysis of the results of quantitative and qualitative research methods. This approach to this research is an important contribution not only to the issues of determining the conditions for teachers' information literacy skills acquisition, but also to the broader contexts of justifying the consideration and acceptance of conditions in the network society (Reichenbach, 1938).

Conclusions

The actual creation of the theory for teachers' information literacy skills acquisition in the network society requires the development of training programs to stimulate and support the development of information literacy skills and the transition from the stage of diagnostic and explanatory research to the research of the projective, experimental and verification nature. To make this possible, it is necessary not only to be able to use the classic model of objectivist research, but primarily the constructivist and neo-objectivist model of research. Identification and description of diverse and intricate external and internal agents and conditions for teachers' learning process of information literacy skills in the network society allows for the actual determination of the direction of the teacher's training in media and their pedagogical applications. Since the role of the teacher in preparation for the valuable and educationally useful application of digital information in the learning process is still the teacher's primary role, it is important to recognize the potential stimulators and inhibitors of the formation of the network society.

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