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Connective Learning as Teachers' Approach to One's Own Professional Development: The Case of Poland

Abstract

Although the genesis of connectivism as a theory of learning in the digital age dates back to the early 2000s, in Polish pedagogy this concept remains relatively unknown, sparse in academic debates, and downright rare in empirical research. The main purpose of the article is to present the knowledge and opinions of Polish teachers regarding connectivism. To what extent do Polish teachers know the theory of connective learning? Which of its assumptions do they see as key? To what extent are they willing to apply these assumptions in practice as a path or tool for developing their own professional competences? These research questions were the basis for a survey, the presentation of which constitutes the backbone of this article. The research indicates a clear cognitive dissonance in the minds of the teachers surveyed: the gap between the perception of the potential values of connectivism and the ability/readiness to use its tools in their own learning. The summary of the text contains conclusions for in-service teacher training, which needs to be reorganized to include the most valuable connected

learning instruments so as to provide teachers with the skills necessary for successful self-regulated learning in the digital age.

Keywords: connectivism, connective learning, teacher professional development, in-service teachers, personal learning environment, social learning environment

Connectivism as a Theory of Learning in the Digital Era – Its Origins and Assumptions

Connectivism is an innovative perspective of analyzing the course and effectiveness of the teaching and learning processes, from both the theoretical and methodological aspects. Its creators are Canadian scientists George Siemens (2006) and Stephen Downes (2006; 2012). According to them, connectivism is a conceptual framework that explains learning as a network phenomenon entangled in a virtual system, requiring not only a different description of learning mechanisms, but also a different epistemology of knowledge and a new language (digital literacy). Philosophical and epistemological research (Verhagen, 2006; Kerr, 2007; Bell, 2011; Ravenscroft, 2011; Barry, 2013; Clara & Barbera, 2013) has shown that the basic principles of connectivism can be derived from the traditional epistemological paradigms included in constructivist theories. The lack of extensive research in this field, along with the selectivity and randomness of available studies has also been criticized (Kartensi 2013; Bell, 2011).

Connectivism is the concept of “learning online” or “building a learning community” that not only uses the modern digital resources of knowledge accumulated on the Internet, but also offers a “community of learning minds” as a forum for knowledge exchange, discussion, and a critical evaluation of existing educational resources/ideas. Therefore, connectivism assumes that human knowledge does not have to be all in one’s head, but that the knowledge needed to perform a specific task is available in devices and information resources. Information should be searched for, acquired, and collected, then processed, used, and applied (Gregorczyk, 2012, p. 8). Knowledge is perceived as sub-symbolic, its meaning resulting

from interaction and a set of connections, in which critical thinking is highlighted. It determines the knowledge, understanding, and use of the word. Teaching pupils how to think should be prioritized in any educational area at the early school stage. A school of *thinking* should be built, eliminating the school of *knowledge acquisition*. The theory of connectivism assumes that we base our decisions on a specific information resource that is constantly changing, constantly being filled with new information.

Connectivism as a theory revolutionizes thinking about learning and combines many learning theories. It grew out of the experience of conventionalism, a field that deals with the study of neural networks, artificial intelligence, and the theory of social networks – describing the development and spread of ideas in society. In its assumptions about the organization of teaching and ways of learning for yourself – by combining sources and making decisions about their quality – it refers to the earlier thesis of Andy Clark and David Chalmers (2014). In their opinion, the theory of mind is expanded to cover all the tools that are prostheses for the mind, replacing or improving its capabilities. In turn, Ray Kurzweil (2013, 2018) – an American futurologist – claimed that the human mind, shaped by evolution, develops linearly, while information technology develops exponentially. As a result, there will come a moment when it will be impossible to keep up with the escaping technique, unless it combines biology with technology to strengthen human capabilities through technological solutions (Benedyk-Rotkiewicz, 2010, p. 65; Baron-Polańczyk, 2014, p. 240).

The Learning Environment as a Virtual Ecosystem

The 21st-century teacher needs to be a *new-age* educator, a competent professional taking up numerous educational challenges, able to meet all innovative challenges, open and flexible, and looking for solutions in which both the analog and digital worlds complement each other. The right path in this situation, as noted by Katarzyna Borawska-Kalbarczyk (2017, p. 158), is to find didactic homeostasis between linear, word-based learning and hypermedia learning, using digital means.

In the “information age” and the era of building a “knowledge society,” teachers of early childhood education in Polish schools are required to prepare students to cope in a world that is opening up to new and increasingly mobile areas, in which reality becomes as important as the virtual world. Connectivism as a learning theory is open to such challenges and is a response to cultural realities; it allows full individualization and unlimited choices; it creates an environment for competent and active analysis and the processing of specific information; it promotes emancipation. The school as a social institution should ensure the creation of a space – an inspiring virtual territory – that will become the training ground for skills, creativity, learning, and getting to know each other.

The learning environment primarily means building a kind of support for learners, giving them opportunities to develop and seek answers to their changing reality, and being a synergistic learning platform that consists of three components: physical, which includes the school space and its equipment and infrastructure; social, which takes into account relationships between the participants of the educational process, which are a source of inspiration and mutual motivation; and virtual, which refers to modern information and communication technologies that provide access to tools and digital resources. J. S. Brown (1999: 34) defined the learning environment as an ecosystem of learning, an open, changing, complex system that is characterized by a variety of elements and the dynamics of its relationships and connections. The metaphor of an ecosystem in the interpretations of J. Nowak (2015, pp. 7–8) and Dumont et al. (2012) allows a much broader view of the learning process, including interacting and building relationships with the material and social world. The role of the learning ecosystem is to connect participants and resources in a broad educational environment through collaboration, publishing, reflection, and development. The teacher creates the opportunity to participate in social networks, which become a tool for establishing contacts, exchanging thoughts, actively creating content, working on joint projects, and systematically communicating. The networks that one can connect into can be small and local or extensive and global (Siemens, 2006; Downes, 2006, 2012). Knowledge is perceived here as

a fluid, dynamic process flowing through people's networks and their artifacts. When it flows, it becomes part of the network; it is open to many interpretations and changes. According to connectivists, knowledge is found in networks. They describe the learning community as a hub that is always part of a larger network. Hubs emerge from connection points found in the network. The learning process is cyclical; everyone connects to the network to find and share new information.

Maciej Tanaś (1997, p. 165) pointed to many dimensions of development which might be supported by modern technology. These include the involvement of the emotional and motivational spheres, multi-sensorial learning, interactivity, simulation, communication skills, visualization and multiplication. The virtual learning environment is an interdisciplinary element of the educational process in which the modern teacher of early childhood education should find themselves, while the learning space within and outside the classroom becomes a source of various educational impulses and cognitive conflict. In social practices, it is understood as the correlation and interaction of four elements: the learner (who?), the teachers (with whom?), the content (learn what?), and the objects, equipment, and technology (learn where and with what?). The organization of learning itself follows three principles: "whatever," "whenever," and "wherever" (Kołodziejczyk-Polak, 2011). Education in this case is permanent and holistic, allowing the freedom to choose the content, space, time, place, etc.

The Subjective Dimension of the Learning Environment in Connectivism

Connected learning is a new challenge for teachers. This is personal, practice-based learning that emphasizes recognition and responses to specific phenomena in which individual knowledge covers the network. Being a teacher is not only a profession, but a specific active lifestyle that is manifested in an innovative pursuit of self-development and self-discovery; it is a constant attitude of astonishment, motivating others to seek answers to questions about the purpose and meaning of implementing

new technologies in education. It is also creating one's own cognitive world of reflection by perceiving problems, formulating questions, investigating, considering, and developing multidirectional interests, experience, subjectivity, and favorable conditions for developing skills and acquiring new competences.

Self-education in teacher development is an integral element of the innovative education process; it is considered to be purposeful and subject to one's own control acquisition and the modernization of knowledge (Wenta, 2003, p. 104; Batorowska, 2012). The contemporary teacher according to connectivism undertakes a number of challenges and tasks that determine the quality of their work, in which they critically reflect on the teaching/learning methods, techniques, and strategies being used, develop independence and sensitivity to values, use resources, and initiate an attractive virtual climate. The teacher creates a completely different picture of the learning process – which does not set time/ space restrictions and assumes the role of a leader guiding the students through the maze of knowledge, motivating and supporting them in coping with psychological problems related to information overload and the inability to deal with them (Donderowicz, 2014, pp. 159–160). To teach means to propose a model and experience, while to learn means practice and reflection. Entering the world of creating one's own "I," the teacher learns active system thinking, creative action, specific knowledge construction, innovation, communication on the Internet, connecting to online resources, and looking for ways to practice IT competences. These processes evolve towards a meta-learning that exposes self-learning. At the same time, preparing for continuous self-education in areas saturated with interactivity, they enter the "magic digital partnership" and create a "stage of mutual attention" (Tomasello, 2002; Nowak, 2015; Kruk, 2018; Batorowska, 2012; Czaja-Chudyba & Muchacka, 2016; Karbowniczek, 2013) that contains cognitive potential, which is activated during the interaction, constituting the material for constructing knowledge structures and generating new behavior. Its traditionalism replaces connectivism and constructivism. By creating a personal territory of culture and learning in an original and ingenious way, it creates a network of activities in which

it participates, develops specific interests, and systematically broadens the field of experience. Designing various exercises and practical tasks *immerses* one in an authentic digital environment by interacting with it (Downes, 2012). Teachers get messages by connecting with pupils on the networks. Here they exchange information, thanks to which they acquire new connectivistic competences, which are a set of skills necessary in didactic and educational work in light of the increasing access to information and its sources and resulting from the need to assess its veracity, validity, and reliability and to understand and use it legally and ethically. They seek, collect, and use information obtained online for education. Innovation, creativity, and independence become a multi-intelligent signpost to the cyclical enrichment of digital competences. Early childhood education teachers including connective learning in their practice may consider the following suggestions: follow blogs which introduce innovations thanks to information technologies; experiment with internet services and tools that enrich the teaching/learning process in integrated classes; encourage the use of networks to obtain scientific, critical, and selective resources; offer scaffolding and support; create opportunities for reflection; use, publish, and share resources via blogs, websites, wikis, photos, and videos; create flexible, lean environments with an authentic context (e.g. using problem-based materials and case studies to build shared resources) and share them with best practices; use media effectively; create online communities through the media, promoting connectivity and commitment to, cooperation with, and development of professionalism; and introduce new world models (Bell, 2009; Goldie, 2016, p. 1066; Cheston, 2013).

The Social Dimension of the Learning Environment in Connectivism

Connectivism as a learning model takes into account the mutual relationships of people connecting and cooperating in a network. Its semantic determinants are social networks and communities (leading to

a portable, variable identity); interaction network (creating target groups); autonomous learning centers; the diversity of networks (multiple views and technologies); and a network as an open phenomenon of interconnection and interactivity (Downes & Siemens, 2006). The diversity among the participants of this network, its openness, and its ability to ensure interaction between them mean that they can use their potential. The learning process means joining the network – interacting with other teachers, ideas, resources, and events. The network works to connect dispersed groups and individuals into an integral community. They form a variety of interactive relationships. By transforming “Me” into “We,” we build a social network, develop space and an active field of cooperation, and use tools to jointly create and edit associative networks, project notes, and final works, allowing for a non-linear presentation. Teachers should demonstrate the ability to connect to specific nodes or information resources, be able to search for useful knowledge, and maintain and strengthen connections. In this model, the idea of a “partnership for real learning,” knowledge sharing, common creation, partnership, contact, and communication is generated between educators. The task of everyone who wants to learn something is to participate jointly in the creation and flow of knowledge. Participation and partnership require reflection on the social and cultural contexts in which information is used (Batorowska, 2012, p. 37). Participation, in turn, is focused on joint discussion, problem-solving, and discovery of meanings. In the context of collectivist assumptions, an active and creative teacher using the network requires the presence of other teachers, creating a community in the process of developing creative thinking. Co-existence with each other – proactive, joint, and cooperative learning – should be focused on creating meanings and not on accepting them in a ready form. Thanks to this, a way of thinking can be designed using new media, which in turn helps ideas be developed and helps perspectives to change. According to Bruner (2006, p. 103), Kochanowska (2018, p. 158), and Pole (2017, p. 38), a culture of mutual learning based on a community of learners is important. Members of the community are involved in solving problems; they awaken metacognitive thinking, or an awareness of what they do, how they do it, and why they do it.

Interaction learning creates a community of online learners and serves as a source of impulses to develop an intellectual disposition and a context for building members' social identities. Teachers help each other by cooperating with community support groups, expressing their views, discussing, negotiating, and presenting specific understandings of the world. By confronting them with others' interpretations, they show a variety of perspectives coming from the different perceptions of others. Their minds become common social constructs. They develop in the network in the context of social interactions, but also through interactions. They join the community of communicating minds – active minds which seek dialogue and discourse with others.

Research Methodology

The main purpose of the research was to explore teachers' knowledge and opinions about the possibilities of using connected learning theory as a tool for planning and stimulating one's professional development. The following research questions were formulated:

1. What do teachers know about connectivism as a learning theory?
2. How do they assess the values and threats related to the use of connected learning in educational practice?
3. What aspects of connected learning theory do they use in their own self-learning practice?

To collect teachers' opinions, an online questionnaire was constructed, consisting of 21 semi-open questions. For the purposes of this article, only the first part of the survey was used. A total of 89 in-service teachers from two different academic centers in southeastern Poland completed the questionnaire. Over 46% of them were secondary school teachers; a further 38% were primary school teachers, 25.8% kindergarten teachers, and 20% teachers of adults.

Research Results

Knowledge of the assumptions of connectivism

Over 57% of the surveyed teachers declared that they knew the assumptions of connectivism. However, only 14% use them in their own educational practice. Over 42% of respondents do not know the theory, including 32.6% who declared a willingness to read its assumptions and 10% who did not feel the need to make any changes in their own professional practice. In answer to the question of what principles of collectivism they consider the most important, the surveyed teachers selected the following:

- the possibility to enrich and update one's knowledge by searching for new information (over 64% of responses)
- the ability to create independent, multidimensional knowledge by juxtaposing/combining various opinions (over 49% of responses)
- the ability to connect to information resources/nodes on the network, which significantly relieves human memory and allows one to "take knowledge" with one, hidden in a small mobile device (another 49% of responses)

Interestingly, only one third of the surveyed teachers perceived the subjective dimension of online learning as a process that requires independent decision-making (independent planning and monitoring in the course of knowledge acquisition, setting goals, controlling effects, etc.). Even fewer – only 21% of respondents – were aware of the social dimension of learning as the ability to create and maintain connections with other participants and to build a community learning from each other.

Perceiving the value of connectivism as a theory of learning

To diagnose the teachers' perception of the values and threats of connectivism, three questions were asked:

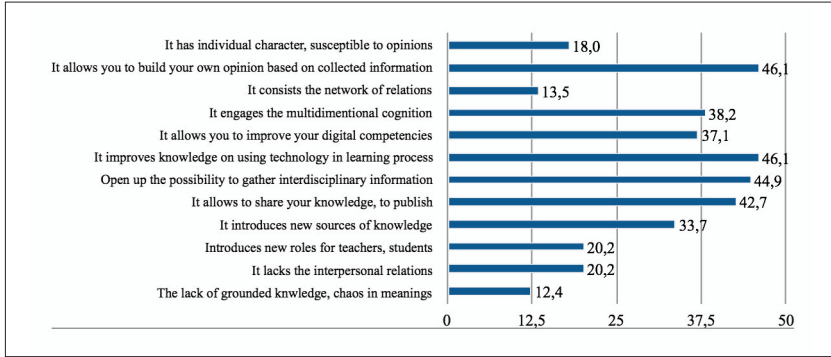
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- What is personal online learning?
 - What meaning does personal online learning have for a learner?
 - What determines the importance of such learning?

Defining the essence of personal online learning, the respondents highlighted three main aspects (Fig. 1):

- A. the technological dimension of such learning, which not only enriches the user's knowledge about modern technologies (46% of responses), but also allows personal digital competences to be improved and which are the basis for effective functioning in the modern world (another 37% of responses)
- B. the quality and multi-perspectivity of knowledge acquired in this way: the ability to develop a personal opinion on a topic by comparing various opinions and compiling information from various sources (46% of statements), the interdisciplinarity of acquired knowledge (another 44.9% of responses), the multi-faceted nature of knowledge (38% of choices), and the ability to access sources of information not available in traditional school teaching (33%)
- C. the ability to share knowledge and achievements with others, to appear on the Internet, publish one's own ideas, and thus build a positive image of oneself (42.7% of statements)

Interestingly, only a small group of teachers emphasized the social, communal dimension of the online learning environment, understood as establishing relationships and contacts that are important for learning and being part of a community that negotiates meanings and works out common solutions to everyday educational problems (13.5% of responses). An equally small group perceived online learning in negative categories as posing a threat due to social isolation (20% of responses), chaos of meanings, or lack of authority and consolidation of knowledge (12%).

**Figure 1. Answer to the question,
“What is personal online learning? Choose 4 answers.”**



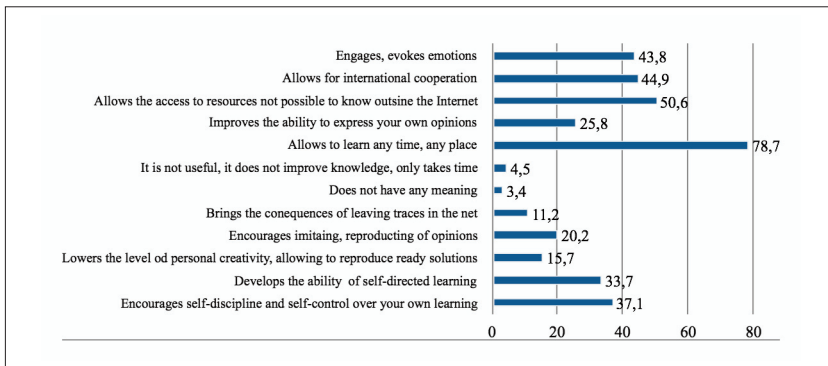
The teachers' perception of the importance of improving their professional competences through online learning confirmed such understanding (Fig. 2). Only 8% of the respondents questioned the value of such learning, claiming that it has no significant meaning in their life (3 people) and can only be a waste of time (4 people). The vast majority of respondents focused on the positive aspects of online learning, highlighting in particular:

- the sense of freedom associated with the use of network resources, thanks to which one can learn at any time or place (over 78% of responses)
- access to information that could not otherwise be obtained (50.6% of responses)
- the possibility of cooperating with teachers from other countries (almost 45% of responses), although in another question they admitted that they very rarely use such a possibility
- the emotional engagement awakened by being on the Internet (over 43% of responses)
- independence in thinking and learning, which connectivist learning entails – in the opinion of the surveyed teachers, this type of learning requires self-discipline and self-control (37% of responses), develops the ability to self-regulate one's own learning

and independently manage its course and evaluation (33.7% of responses), and perfects the ability to independently form opinions and create one's own resources on the Internet (25.8% of responses)

Only one fifth of the surveyed teachers noted potential threats related to learning based on the collectivist paradigm, indicating that it can promote copying, reflection-free reproduction of existing resources, best practices or other people's opinions (20% of respondents), limits personal creativity (15% of answers), and leaves traces on the network that can later be used against a learner (11% of responses).

Figure 2. Answer to the question, "What does personal online learning mean for a learner?"



Teachers were also asked what, in their opinion, determines the importance of online learning. Here, the largest group of respondents pointed to the diversity offered by the network – the ability to view a problem or issue from many different perspectives (almost 60% of responses). Interestingly, this time, the surveyed teachers paid much more attention to the social dimension of the learning environment offered by modern technologies: for over 50% of respondents, interactivity and reciprocity of connections are of particular value, as are the abilities to establish close relationships and to create target groups interested in specific issues. The openness of the network and access to free content on a wide range

of issues were also very important (42.7% of responses). Interestingly, 9% of the teachers surveyed could not answer this question.

The use of connectivism in self-education

To check the extent to which teachers apply the principles of collectivist learning in their own lives, the participants were asked two questions: Which of the following online learning methods do you use in your own self-education? What activities do you do during online learning?

The forms of online learning used by the respondents turned out to be somewhat superficial; they do not fully use the opportunities offered by connectivism. The answers to the first question revealed that the vast majority of respondents stop at simply browsing the Internet (almost 70%; Fig. 3). Only half of the respondents use organized education in the form of e-learning courses, while even fewer (9%) take blended-learning courses. Over 47% of the surveyed teachers actively participate in social networking sites such as Facebook, Instagram, or Twitter, while another 44.9% systematically run or browse blogs or video blogs (21.3% of responses). Slightly over one fifth of the respondents value and willingly use chatting or video chatting. Only 15% of teachers have tagged content found on the Internet. Only one person indicated that they use the Internet to check current scientific research results for the needs of work, and another two people use scientific scripts and other materials published by universities. Four people do not use any of these forms of online learning.

Figure 3. Answers to the question, “Which of the following forms of online learning do you use in your own self-education?”

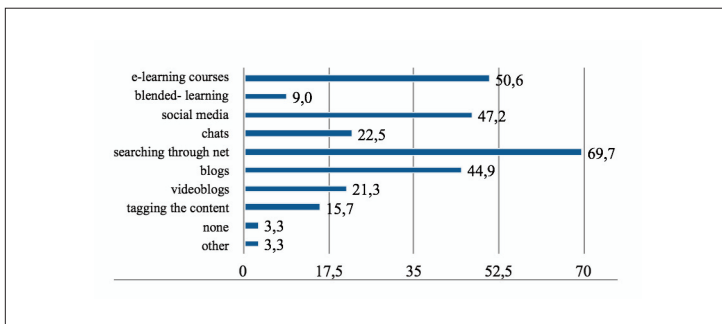
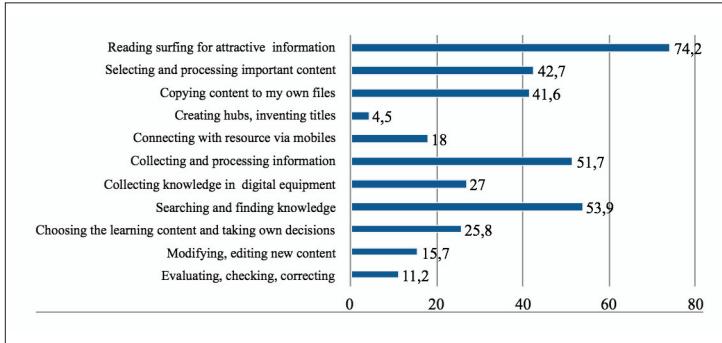


Figure 4. Answers to the question, "Which of the activities of connective learning do you perform while expanding your own knowledge?"



The activities that the surveyed teachers perform while acquiring and expanding their own knowledge belies a certain superficiality in the meaning of connective learning (Fig. 4). The vast majority of respondents stop at reading news websites and browsing interesting content (74% of responses). Only slightly more than half (53.9%) actively look for new knowledge or necessary information. Interestingly, the dominant activity in teaching/learning turned out to be simply collecting the necessary information, i.e. copying, saving, and transferring content to one's own files (41.6% of responses), as well as saving information on mobile devices (27%). Much less frequently, the respondents indicated attempts to actively process and transform content found on the Internet:

- only 42% of the respondents admitted that they critically assess the quality of information found and select the most important and valuable information
- another 25.8% emphasized the need for independent thinking and decision-making when selecting reliable sources and information while learning online
- only 15% of the respondents creatively modify the content they find, by shortening, editing, or reformulating it
- 11% see the need to check and verify content

Interestingly, relatively few teachers connect to network resources in mobile devices such as phones and tablets (18% of responses).

Conclusions

The research shows that the respondents still had relatively limited experience with the practical application of the principles of joint learning and that their opinions and beliefs are unstable and based largely on colloquial knowledge – weakly crystallized, sometimes internally contradictory, emotional, and often not very logical. It seems that Polish teachers find it very difficult to navigate the dynamic world of digital media. A teacher, in this universality of access and simultaneous invasiveness of communication technologies and media, should show information vigilance and should have a wise, active, and critical way of using resources electronic knowledge that may be useful to their professional development. The key in this regard seems to be the ability to critically analyze resources, perceive problems and existing threats, think independently, and recognize mechanisms of influence and manipulation to allow an appropriate level of critical awareness. The surveyed teachers are fully aware of this, but only at the theoretical, declarative level. At the same time, however, they experience a deep cognitive dissonance, intuitively sensing a gap between what they theoretically know about connective learning and how much they can use its tools. The analysis of the empirical material identified two regularities in the teachers' beliefs:

- A. The surveyed teachers focus rather on the individual and technological dimension of online learning, but treating knowledge resources in a passive, superficial way. They are passive consumers of content on the internet, rather than creators. Only when they use social media is a more active attitude triggered, as the respondents treat this as a forum for publishing their own creations. Generally, they understand the role of independent thinking and information alertness as well as the need for a reflective and critical approach

to network resources, but – as they admit – they neglect this independence in their own learning, instead mainly searching and saving content, copying ready information and patterns of activity, rarely processing them critically, transforming, or adapting them to their own needs. The likely reason for this is a lack of epistemological awareness: as Downes points out, the ontological assumptions of connected knowledge are somewhat different than in existing learning theories. The knowledge found on the Internet is not only dispersed, encoded in the network of interaction, but also – by definition – not only from authorities. Justifying its legitimacy requires different mental actions than in the positivist model. “The idea of truth devolves into an account of perspectives and points of view. Having a reason for action is not a matter of argumentation or deduction, but rather one of comfort, familiarity, and an inner sense of balance, the sort of instant awareness we would characterize of an expert” (Downes, 2012, p. 10). This multiperspectivity of knowledge makes it difficult for teachers – when self-learning is not easy to critically analyze many contradictory perspectives, information, attitudes, or interpretations of events – to know who is right, who can be considered an expert.

- B. As Downes (2012, p. 11) argues, “connectivism learning is a process of immersion in an environment, discovery, and communication – a process of pattern recognition rather than hypothesis and theory formation. Learning is not a matter of transferring knowledge from a teacher to a learner, but rather the product of the learner focusing and repeating creative acts, of practicing something that is important and reflecting on this practice”. The respondents underestimate the social dimension of online learning – understood as the possibility of creating groups/communities of people interested in a particular topic, exchanging materials, and arguing and discussing a specific issue in order to give it personal meaning. This is likely due to the fact that the respondents did not have experience creating such learning communities during their vocational preparation; they did not have the opportunity to gain the necessary tools and to awaken the need

to be part of such a community. Theoretically, they know that the Internet offers such a possibility and they intuitively sense its educational value, but they do not use it themselves.

To sum up, the respondents were aware of the huge potential of community, flexible, and creative learning that the Internet opens up to modern people, but they do not use most of its potential because they do not know how.

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