PROSPECTS OF CONNECTIVISM IN LIFELONG PROFESSIONAL TRAINING OF EARLY CHILDHOOD EDUCATOR IN THE FRAMEWORK OF DIGITAL PEDAGOGY - PERCEPTIONS, ATTITUDES AND INTENTIONS

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Abstract:

The purpose of this study was to investigate early childhood educators' perceptions, attitudes and intentions towards the exploitation of principles of connectivism concerning their professional training. The sample of this study was 744 early childhood educators, both educators with gradual professional experience, as well as prospective educators (students). This study was conducted with survey methods and the data were collected by using a questionnaire, developed by the researcher, which was based on the theory of connectivism and was created for the purposes of this study only. At the end of the study was noted that there are generally positive attitudes and intentions, regarding connectivism, that coexist with a relative hesitation. Results indicated that significant differences do exist between early childhood educators and senior students regarding their New Technologies usage profile and work experience. The necessity for training early childhood educators was highlighted, so as they will be able to explore and exploit the potential of participatory web 2.0 to lifelong learning and professional development. Implications for further research were discussed.

Keywords: early childhood, education, educators, attitudes, digital pedagogy, connectivism, lifelong professional training

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1. Introduction

In this article and in the context of digital pedagogy (DP), which is pursued to redefine the concept of learning process through the use of technology (Croxall & Koh,2013; Howell, 2012; Kivunja, 2013; Stommel, 2014), the possibility of connectivism being exploited as a means of professional development of early childhood educators is examined. Given the importance of non-formal learning and tacit knowledge in professional work (Eraut, 2000), and taking into account the wide range of challenges and needs faced by early childhood educators in the implementation of their profession (NAEYC, 2017), we approach connectivism as a field that could support their professional development.

With the rapid development and increase in network technology, communication and interaction with others, the creation and sharing of knowledge is supported and facilitated more effectively. The rapid growth of the internet, in the particularly development of Web 2.0 has provided access to the views and opinions of a wide range of individuals opening up opportunities for new forms of communication and knowledge formation. This technological evolution has transformed the way people attain, use, and save the information. Information access has become increasingly mobile with smart phones and tablets providing immediate and simultaneous connections to news, social media, and other information tools. The Internet and web tool technologies have long allowed learners to interact, collaborate, and connect with information in such a way that "*learning landscapes are networked, social, and technological*" (Dunaway, 2011). The important number of data causes the necessity of new kinds of competencies, like being able to track, to connect and to deal with all this information critically. Modern society, with its rapid scientific and emerging technologies, has performed an exponential rise in accessible knowledge. Considerable capabilities are considered like critical thinking, trustworthiness, consequence, validity and information access. It is the shift from "Knowledge-Transfer" to "Knowledge Generating".

2. Theoretical framework

The spread and the capabilities of technology affect our way of thinking and lead us to look and re-think our approach to learning as a whole. It is pointed out that information nowadays constitutes a social activity, a new area which has yet to be addressed effectively by most information literacy instruction (Bell, 2010). With the integration of advanced technology in the educational process, learning cannot find an absolute

interpretation in theories such as behaviorism, cognitivism or constructivism. However, these learning theories were developed in a pre-digital era and are outdated. However, Siemens (2005) argues that behaviorist, cognitivist, and constructivist learning theories cannot explain theoretically the learning that resides in technology-driven networks of information or learning that happens within social and business organizations. With this as a basic argument, connectivism aspires to provide a learning theory that incorporates the networked nature of society including advanced technological tools that support this networked structure (Siemens, 2005). Supporters of connectivism argue that traditional learning theories are no longer relevant in a digital age where information and knowledge are dynamic, consistently has emerged as an explanation of learning in modern society. In this context, the approach of the theory of connectivism aims to re-consider learning within the scope of the networked social structure. Today has particular significance for learning, adds an additional parameter, the know-where (the understanding of where to find knowledge needed).

Social constructionism (Vygotsky, 1978) focuses on the importance of discussion in communicative technologies (Scardamalia & Bereiter, 2006). Constructivist-based technologies act as cognitive learning mind tools to scaffold, engage, and facilitate knowledge construction and reflective thinking (Jonassen, 2000). According to the approach of phenomenographic learning theory, educational media act as a go-between the world and the learner (Laurillard, 2002). The exploitation of technology in the education is considered as offering the perspective to open up new patterns of diversity and to make new kinds of learning possible (Marton & Trigwell, 2000).

Connectivism has shifted the importance from the notion that learning occurs solely within a person, to emphasise the importance of connections between various sources of information, or nodes. This kind of nodes structures an always-expanding and developing knowledge network (Siemens, 2005). Connectivism can be thought of as a successor to established learning theories (Bell, 2010). Connectivism has been discussed as a pedagogical approach to information literacy instruction (Transue, 2013) and has been acknowledged as a potentially more relevant learning theory because of its emphasis on thinking about information in a networked society (McBride, 2012). Connectivism is a theoretical framework which views learning as a network phenomenon influenced by emerged technologies and inherent tension of socialisation (Siemens, 2006). While cognitive theory views knowledge as schema or symbolic mental constructions, and learning as a change in learners' schemas, connectivism views knowledge as sub-symbolic with meaning arising from interaction of sets of connections rather than single symbolic units (Downes, 2012). It is a suggestion of how the process of learning changes in context with social media and social Network

Technologies. It is a proposal of the learning culture that is required today to meet the requirements of a world which becomes more closely and quickly connected and dependent on networks in all aspects of work and private life. Connectivism integrates principles from chaos, network, and complexity and self-organization theories, underpinned by the epistemology of connective knowledge, pedagogy, and theories of innovations in technology (Siemens, 2005).

Siemens (2005) taking into account the technological basis of how we interact as a society, proposes the theory of connectivism as a new approach to learning in a digital age (Downes, 2005; Siemens, 2005).

Connectivism as a theory has emerged through the field for e-learning environments and it is one of the most prominent of the network learning theories that have been developed for these environments. This theory is based on the pre-existing idea, according to which special emphasis is placed on collaboration between learners as a way of improving learning outcomes and motivating greater engagement with learning (Johnson & Johnson, 1994). Siemens (2005) propose a learning approach, based on the technological developments in the field of communication, which allows for constant adaptation through always current information accessible through connections. Learning occurs through the construction and traversing of networks. Participation in network activities results in the creation, removal or adjustment in strength of connections. Learning emerges from the connections that are formed during network activity.

According to the theory of connectivism, learning can be developed through tools which support and enable social and participatory practices such as user-generated content, sharing, peer critiquing, aggregation, and personalization among learners.

Collaborative learning with technology embraces the use of digital, mobile, and networked devices within a group of learners. As collaborative technologies are considered some kind of online collaborative environments that provide features for collaborative problem solving (Scardamalia & Bereiter, 2006).

In computer-supported collaborative learning, the focus is on learning through collaboration with other learners via social interaction mediated by advanced technological tools that support this networked structure (Stahl, Koschmann & Suthers, 2006). It is a type of learning based on the fundamental principle of multidimensional interaction between learners, between learners and tutors, and between a learning community and its learning resources (Goodyear et al, 2004).

Connectivism claims that knowledge is distributive, as it consists of networks of connections resulting from experience and interactions between users, societies,

organizations and the technologies that link them. Networks are connections among various entities such as experts, databases, blogs, colleagues, and websites. According to the perspective of connectivism knowledge is generated in and through learning networks.

In connectivism the starting point for learning occurs when knowledge is actuated by learners connecting to and participating in a learning community. Learning communities are defined as ''the clustering of similar areas of interest that allows for interaction, sharing, dialoguing and thinking together'' (Siemens, 2005).

It is argued that the use of collaborative and social tools to enhance connections, such as using tools like YouTube, Twitter, wikis, blogs, management systems, and podcasts to deliver online instruction provides learners with the opportunity to learn autonomously, but then share new knowledge with peers (Mallon, 2012). Software such above which are socially oriented, enable learner collaboration and stimulate the learning process (Churches, 2008).

According to the theory of connectivism, learning is a process that is built on conversation and interaction within one's personal network and that has developed from being a transfer of content and knowledge to the production of content and knowledge (Downes, 2009). With the advent of web 2.0 learners are able to create personal learning environments (PLEs) (Milligan, 2006 & 2013), which allow for the production as well as consumption of learning resources. It is argued that the forums focus on constructivist knowledge-building pedagogy, while they can support to built on the original work with the computer-supported intentional learning environment (Scardamalia & Bereiter, 2006).

Through collaborative technology, learners can create and share views using multimedia and can contribute theories, models, or reference material. As a case in point, the tool of forum provides resources for scaffolding, feedback, and revision and keeps track of advances in group knowledge, as the participants produce online learning notes reflecting their understanding of the topics readings and discussions. Also, the members that participate query and challenge each other's ideas and make advances to the discourse (Thota, 2015).

It is supported that communities of inquiry that include cognitive, teaching, and social presence or communities of practice that view learning as social participation, they have a positive contribution to the learning (Garrison, Anderson & Archer, 2000; Wenger, 1998).

Knowledge is inherent in networks and it can be stored in a variety of digital resources and it is treated as a process, fluid and dynamic flowing through networks of humans. Knowledge resides within networks, without any individual necessarily

possessing it, and it can be stored in a variety of digital formats. According to connectivism is considered that knowledge is not a static "thing" that exists, but rather is a relationship that exists within complex networks (Downes, 2007).

Siemens (2005) focused his approach on some learning trends such as: "*Learning is a process that occurs within nebulous environments of shifting core elements – not entirely under the control of the individual*" (Siemens). Knowledge is, what grows and enhances while individuals and societies enhance through and in networks (Downes, 2012). It is proposed learners to develop capacity to identify, navigate, and evaluate information from their learning networks. This learning theory emphasizes the learner's ability to navigate the information "the pipe is more important than the content within the pipe (Siemens).

Learning takes place over a lifetime and in many cases work and learning are interlaced. Informal learning is an increasingly important process in the learning of people, is done through communities of practice, personal networks, and through completion of work-related tasks.

In the connectivist model, the learning community is described as a node, which is always part of a larger network. Nodes emerge from the connection points found on a network. Nodes may also be organizations, libraries, web sites, journals, databases or any other sources of information (Siemens).

Connectivist learning implies that information rests in nodes of networks (where nodes are sources of specialized information, human or otherwise) and knowledge itself has adapted to these circumstances as it resides in the network itself, thereby enabling continuous learning in formal and informal settings (Siemens, 2005).

Connectivism derives from principles such as the focus on student-centered learning and from individual learners to socially situated and real-world contexts, or the shift from an emphasis on information delivery to communication and from passive learning to inquiry-based and interactive engagement (Shelly, Gunter & Gunter, 2010). Connectivism privileges connections made in networks via emerging technologies to support actionable knowledge and to accelerate a shift in education so that it is less hierarchical, more learner-centered, more widely communicated and more far-reaching. In connectivism the starting point for learning emerges when knowledge is actuated by learners through their participation in a learning community, as it defined as "*the clustering of similar areas of interest that allows for interaction, sharing, dialoguing and thinking together*" (Siemens, 2005). Connectivism suggests that learning occurs within a shifting personal network of information sources and emphasizes the learner's ability to make connections between those sources (Siemens, 2005). Knowledge is evolving ever more rapidly, informal and continual learning within context becomes more important

due to more frequent career changes, and knowledge needs to be made available at the point of need (Siemens, 2005).

The theory of connectivism is based on the assumptions such as knowledge is emergent, disseminated across information networks, and is inherent in multiple individuals as well as the acquisition of knowledge is the result from the interactions and the diversity of views and opinions within networked communities of learning. Technology releases learners from the cognitive process of storage and retrieval the information, provides them with instantly emerging knowledge, and makes them able to reveal the interconnections in differing fields of knowledge. Connectedness is confirmed through socialization, as learners through exploiting collaborative technology enable conversation and interaction, they create and share meaningful digital content and they are actively involved in the learning process. A basic parameter is the assumptions of that informal and lifelong learning are significant parts of the learning experience that includes work-related tasks.

Basic arguments for the theory of connectivism are listed below: In many cases the knowledge and learning inherent in the confrontation of views and in diversity of opinions. Learning is a process of connecting specialized nodes or information sources. Learning may be located in non-human appliances. The ability to know how to learn is more important than what one knows. For lifelong learning, it is important to nurturing and maintaining connections. Capacity to find out connections between fields, ideas, and concepts, is crucial for learning. The ability of decision-making is a kind of learning process. Accurate, up-to-date knowledge (currency) is the aim of all connectivist learning activities.

Connectivist learning environments are characterized by: openness to every perspective is instigated diversity of viewpoints, allowing individual autonomy to learners to interact and to contribute to the formed knowledge and the ever interactive knowledge production.

Activities that are being developed in a connectivist environment are governed by these principles: aggregation of resources, correlation of newly acquired knowledge to pre-existing knowledge in order to relate new knowledge to earlier developed knowledge through reflection on resources and experience (relation), creation of artifacts to show learning, the sharing of knowledge with other learners (Kop, 2011).

Learners in the context of connectivism are required abilities as to synthesize and recognize connections among fields, ideas, and concepts, to find and evaluate current, accurate, and up-to-date knowledge, and the ability of self-determination of the learning process (Kop, 2011).

Connectivism is a theoretical approach that aims to encourage self-directed and collaborative learning among learners. Through this process, learners become active contributors to their networks as they use tools to share their own research and knowledge (Transue, 2013). The learning process is cyclical, learners connect to a network to find and share new information, modify their beliefs in terms of their new learning then reconnect to share their new understandings and find further information. There is no interruption, no time when learning is finished and working starts. Periods of leisure, work and learning will combine and alternate and knowledge is no longer only expert knowledge that is collected and transferred, not a static thing but a dynamic process. Lifelong learning is a prerequisite to social participation. A connectivist approach to learning should be emphasised to the learner as a creator of information and suggested that knowledge development is a cycle with each individual creating a personal network which feeds into organisations and institutions, which in turn feed back into the network consequently in this way expanding learning networks (Siemens, 2005).

Recent considerations, dealing with learning in clouds, tend to speak about a new culture of learning which is shifting its focus from teaching to learning with a focus on how to learn to learn. Typical elements of this culture of learning are, lifelong learning, Peer-to-Peer-Learning, changed roles (tutor, facilitator), the attribute 'open' (to share and participate) and situated learning. It is now accepted that lifelong learning requires skills such as the ability to access relevant information and exploit the resources offered by the views and opinions of others (Flynn et al, 2015).

According to this theory, knowledge comprises of networked relationships, and learning comprises the ability to construct, traverse and to successfully navigate through these networks (Dunaway, 2011). The substance of knowledge is considered to be the recognition and interpretation of patterns of connections that arise. Knowledge is viewed as personal, as individuals may interpret the same concept differently.

Necessary skills required to generate knowledge, are the making of abstractions and inductions/classifications, profound understanding, developing and creating new knowledge and reflecting on finding solutions, dimensions which cannot be seen as separated from each other, as they are mutually dependent on each other (Peschl, 2010).

3. Questions

Our research is designed to detect attitudes, practices and intentions that are unconsciously adopted by pedagogues of pre-school age, which can support their professional development within the framework of the principles of connectivism.

As typical research, questions are defined: Are pedagogues familiar with the basic principles of connectivism? Do educators consider the principles of connectivism compatible with their professional needs? Are educators receptive to their intentions, regarding the principles of connectivism in the context of their professional development and training? Are all of the above mentioned influenced by some variables such as those of their demographic characteristics and their degree of familiarity with new technologies? Does the approach of the above aspects change when they refer to the pedagogues of the future?

4. Method

The sample consisted of 774 subjects. Six hundred in-service early childhood educators who teach in preschool centers in/around Thessaloniki (in Greece) and one hundred and seventy-four early childhood educator attending a bachelor degree at the Department of Early Childhood Care and Education of Alexander Technological Education Institute of Thessaloniki in Greece. The period of data collection ran from February 2016 to February 2017. A thousand two hundred questionnaires were distributed and 774 were returned (response rate 64.50%).

Demographic characteristics of the sample (years of teaching experience/year of study, years of computer experience, and access to a computer at home) are shown in Table 1. The instrument via which we investigated educators' and students' views and intentions about connectivism and their professional development and training is a questionnaire, the compilation and validation of which is based on the principles of the theoretical approach of connectivism. The questionnaire consisted of 43 questions. The first 6 questions included demographic characteristics, 13 questions related to their degree of familiarity with practices that would be consistent with connectivism, and 24 questions asked from educators and students to rate their views and intentions on a 5-point Likert type scale (strongly agree, agree, I am not sure, disagree, strongly disagree) on features related to the culture that the theory of connectivism requires from participants in learning networks.

The intrinsic consequence of the statements of the questionnaire was calculated by the alpha reliability and according to the results the value of Cronbach's alpha coefficient was 0.79 (acceptable value) related to the studies of reliability analysis (Cronbach, 1990).

Educators and students were asked to rate their views and intentions on a 5-point Likert type scale (strongly agree, agree, I am not sure, disagree, strongly disagree).

Statistical analysis of data was performed with SPSS 21.0 package which includes indicators of descriptive statistics while at the level of inferential statistics was applied the analysis of variance with one factor (one way ANOVA) and also was attempted the statistical analysis procedure of clusters (cluster analysis), namely the K-means cluster method. The level of significance for correlations was p<0.05, while in cluster analysis the reference of 2 distinct groups.

For the construction of the questionnaire, semi-structured interviews were conducted with 6 educators. These included questions that emerged from issues that were addressed in the bibliographic review and concerned views and intentions about principles and instruments governing the theory proposed by the connectivism.

Prior to implementing the actual study, a pilot test was conducted using a small number (n=7) of educators. Upon the conclusion of the pilot test, these educators were excluded from the final study sample. The pilot test was conducted in order to assist in the development of an appropriate questionnaire to be used with the educators to check the procedures, language and the degree of understanding, so that certain basic parameters are determined to render possible the final shaping of questions for the questionnaire.

5. Results

Demographic characteristics of the Participants: Of the 774 participants, 99% were female and only 1% were male. A 39.6% of educators were high school graduates and a 60.4% were higher education graduates. In the sample were also included 174 senior students of Alexander Technological Education Institute of Thessaloniki, University of Applied Sciences, in Greece.

In terms of their educational level, 75% of them graduated from higher education with four-year studies (32.2% from universities and 42.8% from university of applied science), 10.5% received their first degree through two-year studies and 14.5% were high school graduates. The sample also included 174 senior students.

According to age distribution of subjects, 18.9% were 20-25 years old, 19.4 were 25-34 years old, 20.9% were 35-44 years old, 27.4% were 45-54 years old and 13.4% were over 50 years old.

In terms of professional/teaching experience, 24.3% had 0-5 years experience, 19.9% had 6-10 years experience, 13.6% had 11-15 years experience, 8.8% had 16-20 years experience, 11% had 20+ years experience, and 22.5% do not had no experience as were senior students.

Table 1: Correlation of Familiarity with use of new technologies in the two groups

	Senior Stud.		Educators		Analysis of variance (ANOVA)		
	Mean	S.D.	Mean	S.D.	df	F	Sig.
Q1. Degree of familiarity with ICTs' use	3.76	.967	3.28	1.021	772	.121	.000
Q2. Frequency of ICT use	3.30	.953	2.62	.852	771	2.940	.000

Table 1.1: Correlation of Familiarity with use of new technologies and Demographics

Factor	Degree of familiarity with ICTs' use	Frequency of ICT use	Age	Educational level	Postgraduate studies	Years of prof/teach experience	Sex
Q1. degree of	-.310*	-.015	-	-.376*	-.012	Q1. degree of	-
Q2. Frequency	-.317*	-.072	-	-.382*	-.011	Q2. Frequency	-

 * $p < .05$.

Generally, students' attitudes, intentions and perspectives are more positive in dealing with new technologies, compared to the pedagogues working in the early childhood education centers, as it results from analysis of variance (ANOVA) at the level of p≤0,05. It is noted in Table 2 that senior students exploit more the Internet, relying on searching for information about their subject (Q14 & Q8), using YouTube digital material (Q7), while communicating through Facebook and E-mail (Q3 & Q4). However, across the statistical sample, more advanced communication tools, such as Skype and Twitter are used to a limited extent (Q5 & Q6, Table 2). Also, in general, the potential of web 2.0 does not seem to be exploited, as subjects do not have so much active participation on the internet, since they barely post content on the web and rarely participate in online discussion forums (chating) on issues related to their profession (Q9 & Q16, Table 2). This weakness in the interaction (two-way use) of the internet is an issue that should be included in some future training for pedagogues. Also, at a limited level is their experience of participating in asynchronous and distance E-Learning (Q10, Table 2).

Table 2: Practices of using the internet (Q3-Q10 & Q14-Q16)

	Senior Stud.		Educators		Analysis of variance (ANOVA)		
	Mean	S.D.	Mean	S.D.	df	F	Sig.
Q3. How often do you use Facebook?	3,60	1,261	2,40	1,238	771	,892	,000
Q4. How often do you use the e-mail?	2,97	,902	2,55	1,194	771	48,604	,000
Q5. How often do you use Skype?	2,11	1,090	1,84	,981	770	2,406	,121
Q6. How often do you use Twitter?	1,20	,600	1,22	,590	770	,356	,551
Q7. Do you use material from YouTube in your work?	3,75	1,035	3,03	1,202	768	3,862	,050
Q8. Are you looking for information related to your job on the Web?	3,89	,979	3,57	1,136	769	16,102	,000

Q9. Do you upload digital material online (e.g. photos, videos, text, etc.)?	2,26	1,220	2,15	1,154763	3,591	,058
Q10. Have you ever been involved in online distance learning/training?	1,18	,570	1,59	1,040771	95,697	,000
Q14. Google information about your job?	4,42	,827	3,80	1,164769	31,784	,000
Q16. Do you participate in online discussion forums (chatting) on issues related to your profession?	1,45	,870	1,62	,909 768	3,366	,067

Table 2.1: Correlation of practices of using the internet and demographics characteristics

Factor	Degree of familiarity with ICTs' use	Frequency of ICT use	Age	Educational level	Postgraduate studies	Years of prof/teach experience	Sex
Q3.	,489*	,644*	-	-,083*	,075*	-,479*	-
Q4.	,582*	,478*	-	,100*	-,228*	-,303*	,006
Q5.	,404*	,291*	-	-,042	,028	-,215*	-
Q6.	,211*	,190*	-	-,128*	-,022	-,058	,016
Q7.	,518*	,548*	-	-,026	-,012	-,363*	,005
Q8.	,421*	,397*	-	,089*	-,037	-,265*	,013
Q9.	,326*	,409*	-	-,119*	,021	-,121*	-
Q10.	,120*	,099*	,072	,028	-,129*	,185*	,026
Q14.	,515*	,375*	-	-,010	-,024	-,444*	-
Q16.	,260*	,316*	-,042	-,084*	-,091*	-,049	-

* p < .05.

It seems that students get information and material from blogs to a higher degree than do educators, without, however, participating interactively in development of their content or creating their own blogs, while rarely posting comments on the websites they visit (Q11, Q13 & Q17, Table 3). More generally, participants declare that they are looking for information about topics of their interest from specific websites, while not using the collaborative features provided by wikis (Q15 & Q12, Table 3).

Table 3: Degree of familiarity with communication and social networking tools (Q11-Q13) & Adoption of sharing and interconnection practices (Q15-Q17)

	Senior Stud.		Educators		Analysis of variance (ANOVA)		
	Mean	S.D.	Mean	S.D.	df	F	Sig.
Q11. Do you know about Blogs on the internet which concern pre-school education?	3,24	1,126	2,75	1,165	771	1,279	,258
Q12. Do you know about the Wikis?	1,75	1,144	1,65	1,114	771	1,245	,265
Q13. Do you have a Blog with topics related to preschool education?	1,98	,131	1,93	,250	770	27,909	,000
Q15. Are you Googling for information about your work?	3,45	1,023	3,39	1,154	768	3,334	,068

Q17. Leave comments on posts?	1,31	,680	1,48	,772	767	14,219	,000

Table 3.1: Correlation of degree of familiarity with communication and social networking tools
& adoption of sharing and interconnection practices and demographic characteristics

Factor	Degree of familiarity with ICTs' use	Frequency of ICT use	Age	Educational level	Postgraduate studies	Years of prof/teach experience	Sex
O11.	,587*	,444*	-	,051	-,164*	-,320*	-
Q12.	,336*	,235*	-	-,061	-,146*	-,155*	-
Q13.	-,129*	-,115*	,055	,065	,122*	-,049	-
Q15.	,415*	,299*	-	,000	-,076*	-,229*	,025
Q17.	,187*	,263*	,027	-,207*	-,023	,031	-

* p < .05.

The blogosphere of pre-school education is being exploited more than students who rely on it to find solutions for their work (Q18, Table 4). Overall, the participants believe that collaboration at work could improve the obtained result, an attitude that is much more noticeable to students (Q18, Table 4). By extension, they seem receptive to working with colleagues, exchanging ideas and experiences, while they find helpful feedback from others about their own work (Q21 & Q22, Table 4). However, the intention for cooperation does not seem to apply through the way they utilize the internet, as they do not seem to share their experiences on the web, and they are involved to a limited extent in discussions about their work (Q35 & Q34, Table 4).

Table 4: Exploitation of communication networking tools and social media
(Q18-Q22 & Q34-Q35)

	Senior Stud.		Educators		Analysis of variance (ANOVA)		
	Mean	S.D.	Mean	S.D.	df	F	Sig.
Q18. Consider your colleagues' blogs useful?	3,29	1,190	3,09	1,178	770	,474	,491
Q19. Do you think that communicating with your colleagues would improve the outcome of your work?	3,96	,982	3,69	1,029	770	1,917	,167
Q20. Do you work collaboratively with your colleagues?	3,61	1,035	3,73	1,061	771	,197	,657
Q21. Do you share your ideas with colleagues?	3,39	1,029	3,60	1,115	772	1,478	,225
Q22. Do you consider the opinions of others about your work useful?	3,71	,931	3,62	,933	766	,149	,700
Q34. Do you engage in digital discussions on child education issues, or more generally on issues related to your profession?	1,99	1,017	2,02	1,063	769	,478	,490
Q35. Do you share your experiences on the web? (Share them with others on a blog or discussion forum)	1,61	,818	1,73	,996	771	2,975	,085

Table 4.1: Correlation of exploitation of communication networking tools and
social media and demographic characteristics

Factor	Degree of familiarity with ICTs' use	Frequency of ICT use	Age	Educational level	Postgraduate studies	Years of prof/teach experience	Sex
Q18.	,322*	,290*	-	,059	-,082*	-,116*	,012
Q19.	,161*	,166*	-,028	,024	-,058	-,130*	-
Q20.	,155*	,100*	,017	,019	-,109*	-,034	-
Q21.	,117*	,045	,020	,019	-,082*	,020	-
Q22.	,123*	,124*	-,015	-,019	-,067	-,063	,002
Q34.	,192*	,299*	-,049	-,124*	-,002	-,032	-

$* p < .05.$

Concerning the intentions regarding their participation in the principles and practices of connectivism, in the context of their professional development, positive attitudes are found in the sample as a whole. They declare that they are positive and could be involved in sharing the material of their work, while they would accept and make positive use of creative commentary on their work (Q25 & Q28, Q24, Table 5). They would participate in E-learning in the field of their professional development (Q26 & Q27, Table 5). Despite the positive position of senior students in the topic of the promotion and dissemination of digital material that reflects activity in the kindergarten, it is noted that educators already working are skeptical on this issue (Q23, Table 5). Also, as a whole, in our sample there is a caution regarding the usefulness of forming a professional profile on the Internet (Q29, Table 5). Senior students are more positive about the view that social networking tools can help them to counseling parents, a position which is more cautiously adopted by educators with professional experience (Q30, Table 5). However, in the sample overall, it seems that they would not replace face to face communication with internet in order to inform parents about the education of their children (Q31, Table 5). In addition, the intention for a more regular and organized professional networking within a professional community is generally adopted to a moderate degree and is more widely accepted by students (Q32, Q33 & Q26, Table 5). It is also noted that for the realization of the above intentions is not considered by the teachers that expertise and special training in computers is required (Q37, Table 5).

Table 5: Intentions to principles and practices of coexistence in the context of professional development (Q23-Q33 & Q36-Q37)

	Senior Stud.		Educators		Analysis of variance (ANOVA)		
	Mean	S.D.	Mean	S.D.	df	F	Sig.
Q23. Would you upload digital material that shows distinguished activities from your daily program in the kindergarten (digital material, pictures or videos)?	3,00	1,102	2,60	1,264	772	19,707	,000
Q24. Would you accept creative commentary on your work, and would you review your work according to your feedback?	3,32	,962	3,18	1,041	771	,136	,712
Q25. Would you share remarkable teaching material with other colleagues?	3,87	,979	3,75	1,009	772	3,769	,053
Q26. Would you participate in a training program that would cover specialized topics for early childhood education?	3,66	,926	3,82	,985	768	,370	,543
Q27. Would you participate in a training process that you could choose the main topics of the seminar?	3,97	,902	3,90	,996	772	2,766	,097
Q28. Would you recommend material or material resources to your colleagues?	4,02	,867	3,94	,992	769	4,173	,041
Q29. Would you create a professional profile online to enhance your professional development?	2,46	,997	2,50	1,184	770	9,602	,002
Q30. Would you use social networking tools (such as Facebook, mail, blogs) to advise parents? (E.g. by exchanging experiences with parents and colleagues, by participating in discussions on specific topics, by contacting teachers or other specialists?)	2,97	1,036	2,82	1,053	772	4,125	,043
Q31. Would you communicate with parents and inform them online?	2,30	1,104	1,97	1,106	772	,396	,529
Q32. Would you share your concerns about your work with colleagues through the internet?	2,59	,974	2,38	1,101	769	3,936	,048
Q33. Would you participate in a professional networking community for early childhood education on the internet where you would exchange views, experiences and resources for your work?	3,10	,995	2,84	1,179	772	12,441	,000
Q36. Would you participate in an organized discussion group with your students' parents (e.g., Facebook, a blog or forum), which would be aimed at parenting and educational issues?	2,58	1,211	2,11	1,103	771	7,975	,005
Q37 Do you think that to support all of the above is not easy and you need special training in the use of technologies?	2,60	1,225	2,73	1,252	772	,005	,944

Table 5.1: Correlation of practices of using the internet and demographic characteristics

Factor	Degree of familiarity with ICTs' use	Frequency of ICT use	Age	Educational level	Postgraduate studies	Years of prof/teach experience	Sex
Q23.	,142*	,255*	-	-,004	,068	-,093*	-
Q24.	,158*	,126*	-,052	,022	,035	-,114*	-
Q25.	,106*	,061	,062	,153*	,031	-,015	-
Q26.	,030	-,032	,085*	-,050	,025	,054	,004
Q27.	,080*	,086*	,083*	,010	,039	-,071*	,005
Q28.	,144*	,071*	-,021	,086*	-,066	-,041	-
Q29.	,207*	,194*	-	-,040	-,074*	-,045	-
Q30.	,163*	,260*	-,042	-,030	-,021	-,027	,022
Q31.	,223*	,330*	-,038	,002	,020	-,098*	-
Q32.	,193*	,252*	-	-,071*	-,011	-,082*	-
Q33.	,245*	,288*	-	-,050	-,051	-,119*	-
Q36.	,192*	,299*	-	-,059	,040	-,153*	-
Q37.	-,357*	-,186*	,187*	-,023	-,032	,222*	-

* $p < .05$.

To see the correlation of variables "Degree of familiarity with ICTs' use" and "Frequency of ICT use" overall in our sample, and the correlation of variables of Demographic characteristics with regard to statements of subjects, in the subset of the pedagogues already working, on the one hand the statistical technique of the correlation between two variables (Crosstabs) is applied, according to Pearson's x2 criterion, and measures to link the strength of the correlation the index (r) (at level r≥.30 and p≤0.05) And on the other hand, is applied the direction of the relation the sign of the index (r).

According to the results of the survey the age of educators seems to affect the familiarity they have with new technologies (r=-.310), with younger educators stating that they are more familiar. In consequence younger deal with new technologies and more often (r=-.317). The effect of the above variables is increased when they are correlated with years of teaching experience (r=-.376 and r=-.382, respectively).

The variable of "age" seems to affect even more the way they operate new technologies, when correlated with years of their teaching experience. Regarding the practices of using the internet, the younger educator use more often the Facebook (r=-,479, Table 2.1, Q3), communicate more regularly via e-mail (r=-,303, Table 2.1, Q4), and while working on issues of their work, they exploit to a greater extent material from the YouTube (r=-,363, Table 2.1, Q7) and they are looking for specific information on the internet (r=-,444, Table 2.1, Q14). Also the youngest educators are more consulted about the blogosphere that is concerned with preschool education (r=-,320, Table 3.1, Q11).

With regards to the variables "degree of familiarity with technology" and the "frequency of use", it is noted that, while these are associated with usage practices (Q3, Q4, Q5, Q7, Q8, Q9, Q14, Q15 & Q18) and knowledge about new technologies (Q11, Q12, Q15) (Tables 3.1 & 41), however they are not correlated to their intentions regarding the prospect of exploiting principles of connectivism (Table 5.1). This observation supports the position that accepting and exploiting the principles of connectivism is more about the general "culture" of educators than their familiarity with new technologies.

Noteworthy is the observation that familiarity with new technologies is associated with the belief that the use of the principles of connectivism does not require specific training (r=-357, Table 5.1, Q37).

Both the views and intentions of pedagogues of pre-school children do not appear to be strongly influenced by the variables of level of education or post-graduate studies (Table 31, 4.1 & 5.1).

Although the variable relating to professional experience is inversely related to Internet exploitation practices (Q3, Q4, Q7, Q14, Table 2.1) and the exploitation of the content of blogs (Q11, Table 3.1), it does not appear to affect the intentions of the pedagogues (Table 5.1). However, it is obvious that work experience weakens the positive attitude towards connectivism, and creates a relative reservation compared to the students' perspective. Furthermore, we observe that work experience weakens the contact of pedagogues with new technologies as it negatively correlates with the frequency of computer use and their sense of familiarity with new technologies (Table 5.1).

6. Conclusion

The results showed that both current and future pedagogues generally have positive attitudes and intentions regarding the use of the principles of connectivism in the field of early childhood education and in the context of their professional development.

It is noted that mainly the frequency of computer engagement and the degree of familiarity with technology seem to positively influence the views and intentions of the participants. According to the indications, it seems that professional experience is negatively correlated with views, the greater the professional experience, the more cautious is the preservation of the views associated with the principles of connectivism. The partitioning of the study of our sample (students / professionals) shows a distinct difference in the positive attitude of the upcoming "generation" of pedagogues,

especially when supported by relevant information and training, showing ready to accept and exploit the principles of connectivism.

The positive attitude of educators towards fundamental principles, underpinning the connectivism shows that they are familiar with the relevant ideology that supports it. Their intention to apply this kind of general principles supports the view that the needs that connectivism could fulfill are compatible with the requirements of the work of the pedagogue of early childhood children. We, therefore, conclude that connectivism could be one of the means for their professional development and would find them positive about their participation in such activities.

Given that connectivism is directly related to technology, we must also take into account the reservedness and the barriers in the field of early childhood education regarding the integration of new technologies (Nikolopoulou & Gialamas, 2013).

The prospect looks much more optimistic with regard to future early childhood educators, as they clearly have a more positive attitude and a more receptive intent on connectivism. This suggests that in the future, connectivism will have an impact on early childhood education. It is therefore proposed for educators to receive the training that will shape the appropriate culture, such that could maximize the benefit from the exploitation of the coexistence.

However, expansion studies are also required, such as: whether early childhood educators are able to enrich their professional networking, to construct the content of the blogosphere themselves, or how to apply the ideas they derive and how they improve them, or how would children's parents face the prospect of connectivism in their children's education?

As research limitations are highlighted, the relatively small sample of the population coming from a particular geographical area, which factors makes it difficult to generalize the results.

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