Students' Engagement and Peer Interaction in On-Line Academic Writing Through a Course Blog

Athanassios Jimoyiannis(✉) and Panagiotis Tsiotakis

Department of Social and Educational Policy, University of Peloponnese, Korinthos, Greece
{ajimoyia, tsiotakis}@uop.gr

Abstract. Academic writing is considered one of the most critical competencies that university students need to develop and constitutes an integral part of contemporary educational programs in higher education. This paper presents an analysis of students' engagement in online academic writing associated with inquiry and peer interaction practices through a course blog. The intervention was designed in the context of a blended postgraduate course under the assumption that on-line writing in the course blog could promote students' academic writing skills. The key aspects of student generated content, peer interaction and reflection in the course blog were directed by the principles of e-learning 2.0. Descriptive and Social Network Analysis revealed important information regarding individual students' contribution, peer interaction and the network structure of a learning community that was emerging in the course blog.

Keywords: On-line academic writing · Educational blogging · E-learning 2.0 · Learning presence · Social Network Analysis

1 Introduction

E-learning is nowadays becoming more widespread in higher education and new pedagogical philosophies, design models and forms of learning are dynamically emerging. The Web 2.0 technologies, like on-line platforms, open educational resources, blogs, wikis, social networking media, multiuser virtual environments etc., shape new directions and challenge educational organizations to consider new ways of delivering their on-line programs. In this perspective, Web 2.0 technologies have fundamentally changed the way we think about e-learning environments, pedagogical strategies, as well as students' learning activities and outcomes. Therefore, a radical shift in e-learning pedagogy is quite apparent from the traditional-individual perception of learning to new dynamic and emerging approaches that put emphasis on authentic, participatory, interactive, self-directed, and collaborative processes within communities of learners who share common interests and goals [3, 6, 20, 30].

Changing our notion of teaching and learning, from time and space bound classroom places to flexible, participatory, collaborative, distributed and networked virtual environments, is not a new idea [1, 26]. In this perspective, Web 2.0 tools have moved

M. Tsitouridou et al. (Eds.): TECH-EDU 2018, CCIS 993, pp. 103–119, 2019.
https://doi.org/10.1007/978-3-030-20954-4_8

this debate forward by offering a wide range of affordances to create enhanced and dynamic learning spaces that promote on-line writing, exchanging ideas, sharing information and resources, and promoting networking among learners [10, 19, 28]. Within appropriate educational contexts, Web 2.0 applications can be transformed into participatory (task-oriented), personal and social learning spaces, independently of physical, geographical or institutional boundaries [9, 14, 20].

Blogs in particular have received a growing educational and research interest and a wide range of studies are reported in higher education [12, 13, 17, 19, 30]. Existing research findings have shown that educational blogging provides enhanced opportunities to the students to achieve deeper understanding and knowledge construction through sharing resources, expressing and exchanging ideas, critical and reflective thinking, group work and collaboration in both, blended and on-line forms of learning [2, 15, 21, 23, 27–29].

Literature review on current empirical investigations suggested that a wide range of published studies were directed towards students' perceptions of blogging and their experiences during learning activities within educational blogs [4, 19, 27]. Therefore, there is need for further empirical research regarding students' patterns of engagement and learning presence in educational blogging activities. In particular, finding new ways of integrating educational blogs into existing institutional and learning contexts in higher education is an open research topic.

Despite that academic writing skills are considered as key competencies that university students need to acquire in their studies [8], literature review regarding online environments for academic writing showed that this topic is actually at a starting level. In the last years, blogs appeared to be a new means to promote students' on-line academic writing and argumentation [11, 16, 18, 33].

The present study has two main objectives: (a) to explore the patterns of students' academic writing, debate and reflection in the context of a masters' degree course, (b) to analyse students' performance by identifying critical indicators that represent individual contribution, peer interaction, the influence each student had to the others, and the overall structure of an emerging community academic writing in the course blog. In accordance to the research objectives, the following research questions were addressed:

- To what extent the course blog afforded an effective learning environment that promoted students' academic writing as members of a learning community?
- Can we estimate students' individual contribution, and depict their social interactions and roles in the course blog of academic writing?

The paper is structured as following. The theoretical foundations of on-line academic writing through blogging which addressed the design framework of the present intervention are outlined. The methodological issues of the research as well as the preliminary findings of both descriptive and Social Network Analysis (SNA) are presented to depict students' overall performance and structure of the learning community created in the course blog. The results provided supportive evidence that on-line academic writing was an effective learning activity and promoted students' mutual interaction and learning presence.

2 Theoretical Framework and Literature Review

2.1 E-Learning 2.0 and Student Generated Content

The notion of e-learning 2.0 was introduced by Downes [5] to describe new pedagogical approaches, educational initiatives and learning activities that harness the core features of Web 2.0 applications. By adopting the fundamental ideas of connectivism, he described e-learning 2.0 as a range of approaches that provide to the learners enhanced opportunities to create and cultivate their own learning as active members of learning networks through reflexive dialogue, creativity, collaboration and self-direction. In addition, Brown & Adler described learning 2.0 as a new form of technology enhanced learning in specific Web 2.0 spaces that afford the emergence of open and participatory learning ecosystems supporting active, creative and sustainable communities of learners [1].

In this context, the debate regarding e-learning 2.0 means to go beyond oversimplified notions that conceive the educational Web 2.0 as a space for educators, i.e. for providing educational content to the students. Educators need to conceptualize Web 2.0 as a space for learners, i.e. for active, self-directed and collaborative learning. Under this lens, we have identified six interrelated dimensions of the educational Web 2.0 that integrate its technological, social and learning features in a complete and meaningful framework to be adopted by both, educators and learning designers [14]: participation, openness, interactivity, collaboration, sociability, and learning platform.

Learning within a social context means on-line interaction between learner-tutor, learner-learner and learner-members of the wider learning community. Therefore, e-learning 2.0 is a social process determined by the following key features [9, 14]:

(a) Learning beyond the classroom boundaries: e-learning 2.0 could take place always, everywhere and in many different forms and contexts. Towards building active learning communities among students, we need to adopt a blended and open learning philosophy and to cultivate attitudes of networked and ubiquitous learning among learners.
(b) Combining community and content: New forms of pedagogy, known as Pedagogy 2.0, are necessary to facilitate peer feedback, reflection, collaboration, emergent and self-directed learning [19]. Students are active learners by interacting and collaborating with peers, expressing their knowledge, creating on-line content, and participating in learning networks though peer interaction, content and knowledge sharing and distributed responsibilities.
(c) Combining e-learning and open learning: e-learning 2.0 is an evolving and long-term process, which includes open and dynamically emergent learning determined by authentic learning activities. Actually, it is addressed by an open philosophy, with open learning objectives, open procedures and an open, learner-created curriculum. In this perspective, due to their features, blogs can operate as dynamic on-line writing and collaboration spaces that support long-term academic writing activities in blended and fully online courses. A course blog, for example, offers to the students a common-integrated space operating as a content composition system, an online discussion tool and a literature repository (content source).

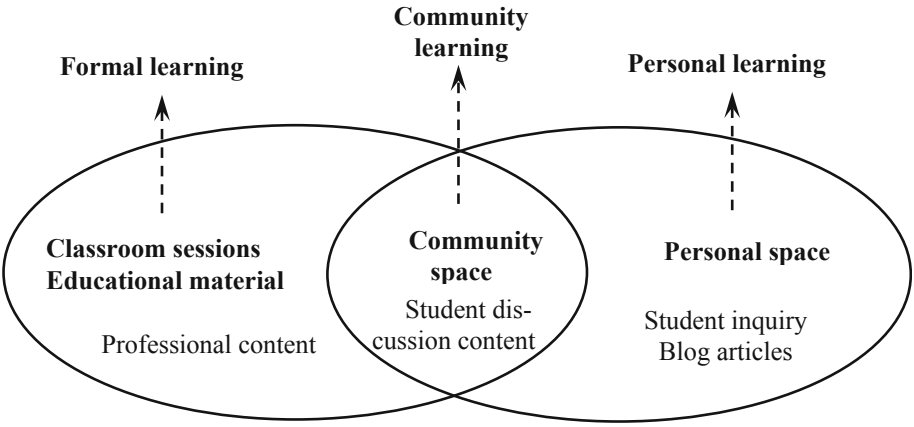

Fig. 1. Content 2.0 and on-line academic writing in blogs.

Student generated content is a new notion and a critical factor in Web 2.0 spaces [6]. It is a new type of content that students can authentically create in on-line communities, based on their knowledge, creativity, reflection and collaboration. The notion of Content 2.0 has been introduced to indicate the difference, in nature, between student-generated content in on-line collaborative environments and the officially provided content in conventional e-learning programs [9]. The actual meaning is that Content 2.0 incorporates the content evolution, the process of learning and the emerging community features.

In on-line academic writing, student performance content determines the transition from tutor-led to open learning approaches, where content is constructed by the learners themselves in a dynamic and emerging manner [6]. Student performance content elaborates knowledge construction through personal inquiry, article writing, ideas evolution, peer feedback and co-creation. This is a long-term, evolving process that combines multiple forms of learning actions, i.e. formal, personal and social. Ultimately, this process is expected to help on-line learners to transform their performance content into professional content, which they collaboratively construct as active members of a learning community (Fig. 1).

2.2 On-Line Academic Writing

Academic writing skills are traditionally considered as the key competencies that undergraduate and master students need to develop. Current trends in higher education promote the notion that university students should be properly educated to connect scientific knowledge (classroom instruction, personal readings and searching online resources) and writing skills. In this perspective, academic writing was suggested as an integral part of university students' learning, in a sense that the development of their writing abilities is practically seen as a strong indicator of knowledge construction [8].

Goodfellow advocated also that students' induction into academic culture and scientific discourse is the principal way to demonstrate the knowledge and skills they have acquired in their studies [8]. Students must have enhanced opportunities, as well as the appropriate guidance, to carry out systematic review and scientific inquiry, detailed and analytical reading of literature papers, critical thinking, argumentation and documentation, expressing and discussing their ideas in order to revise misconceptions, to internalize new concepts and to apply them in problem-solving cases [22].

Wingate, Andon and Cogo suggested that academic writing is both a process and a textual product, i.e. students' written artefacts and essays [33]. In this perspective, students' development of academic writing skills is expected to be the outcome of critical reading, dynamic scientific discourse, reflection and feedback among peers. The students involved in online academic writing are expected to draw new forms of scientific discourse by critically reflecting on their own writings and interacting with their classmates [16]. Likewise, it was reported that the integration of in-class and online writing tasks with assessment feedback was effective to support the development of students' academic writing abilities [31].

Educational blogs integrate dynamic features and offer an ideal community space for student generated content, through participatory, reflective and constructive ways. Student contributions are evolving artefacts constituted by an initial (starting) article or post and the related peer or tutor's comments. This is an integration of content and peer interaction, both appeared in the same space (the blog), which provides an overview of the topics under study and the ideas therein, students' individual contributions and reflection, peer feedback, the overall meaning and the knowledge constructed within the blog community [10].

Existing research findings, on students' engagement and interaction practices associated with online academic writing through blogging is limited. There are few published studies showing that academic writing through blogs promotes the creation of reflective and collaborative skills while the students can improve critical thinking and writing skills. For example, Kung [18] explored students' perceptions, motivation and confidence, as well as their perceived strengths and weaknesses of on-line academic writing, through blog-assisted language learning. Likewise, Novakovich [21] conducted a comparative study on students' academic writing and peer feedback by using traditional in-class methods and blog-mediated writing practices. The findings suggested improved quality in students' writing in the blog and increased peer feedback reflection in the form of critical and directive comments, which promoted students' self-assessment and metacognitive self-awareness. Kathpalia and See [16] showed that class blogs were efficient to enhance students' scientific argumentation with valid claims, evidence and rebuttals in a critical writing course. In addition, they advocated that specific pedagogical strategies, like argumentation prompts and peer-evaluation schemes, are necessary to enhance student argumentation through blogs. By extending previous research findings, we have found that students' learning in educational blogging was achieved as the outcome of reflection and collaboration among active students, members of an on-line community of inquiry [12].

3 Research Method

3.1 Context and Participants

The present intervention and the consequent study were conducted in the context of a masters' degree course regarding e-learning and its applications in educational practice. The main objectives of this course were to enhance students' theoretical knowledge in e-learning and learning design skills, as well as their ability in conducting scientific research and communicating their achievements to an audience consisted of their peers and the instructor.

The course was offered in the spring semester of 2017. A total of 47 students attending this course were enrolled in two separate classes; the first class included 21 students and the second 26. The participants had a bachelor degree in various educational disciplines while the majority of them (40 students) were in-service teachers in primary or secondary schools.

3.2 Course Design and Workflow

The primary objectives of this blog-based intervention was to engage all students in a learning process that can (a) combine academic writing skills with individual students' knowledge and creative thinking, (b) stimulate peer interactions and collective knowledge through argumentation, peer dialogue, self and shared reflection, (c) promote students' collaboration, creativity and community identity, and (d) make transparent the learning trajectories of each individual student.

The course was designed in a blended format including five face-to-face sessions properly interwoven with students' on-line work in the course blog, both individual and collaborative. Classroom sessions, in the two classes, were separate in space and time. The course was thematically structured into two parts. In the first part, between starting and sixth week, the students were asked to do literature search and scientific inquiry regarding various e-learning topics of their choice. Between 7th and 14th course weeks each student was advocated to write two academic articles (1500–2000 words) in the form of blog publications in a WordPress platform customised by hosted at the University of Peloponnese. These articles should be related to the main course topics and the literature review that the students carried out individually.

The instructor was acting as e-moderator [24] by shaping an emergent, reflective and collaborative way of students' academic writing and performance with the aim to promote dialogue, peer interaction, self-directed scientific reasoning and collaborative inquiry as members of an on-line community in the course blog. The students were advised to use proper ways of academic writing in order to communicate their outcomes and share their knowledge with peers. Guidelines were also given to the students with regards to searching and referencing on scientific literature, doing critical evaluation of primary research articles and writing-synthesizing literature reviews. In addition, examples of good strategies of academic writing and suggestions to avoid plagiarism were given.

The students were also asked not only to restrict their activity in publishing their articles in the course blog but to get actively engaged into the blog discourse on regular

and systematic basis. They were encouraged to reflect upon peer contributions through critical comments alternative views, comprehensive argumentation, expansion of ideas or themes, in order to collaboratively create a common space of valuable academic content.

3.3 Analysis Framework

The research data were collected by monitoring and recording students' publications in the blog during the second part of the course, when the on-line academic writing project was implemented (eight weeks). Students' contributions were divided into (a) academic articles and (b) comment posts, which typically included questions, replies, new ideas and arguments, proposals for content resources, and criticism about a particular article or previous peer comments. Every student publication was considered as the unit of analysis [10].

Systematic content analysis procedures, based on well-documented models of learners' discourse in on-line learning environments, were used to reveal students' performance in on-line writing, patterns of mutual interaction, ideas interchange and the social relations that determine knowledge construction within the blog community: (a) Social Network Analysis (SNA) algorithms to reveal the information flow in the course blog, students' connections and groups developed therein, as well as the power and the influence each student had within the community of on-line writing [10, 13], (b) Community of Inquiry [7] and (c) the Learning Presence [25] frameworks to connect students' discourse and individual learning evolution.

In this paper we present the results of the descriptive statistics combined with SNA formulas to map an overall view of students' on-line presence and peer interaction within the course blog. Cyram NetMiner 4.0 software was used to implement SNA. Using SNA, a social structure, the blog community in our case, can be represented as a network; every student is a node and the interactions among members (communication, information exchange, knowledge sharing etc.) is depicted as a series of links connecting the various nodes. In addition, SNA provides a set of algorithms that quantify social and cognitive interaction among members, the amount of communication (and the information exchanged), the different student roles, member groups, power or influence of individuals etc., in terms of network structure parameters. All these parameters encode certain networking forces shared among students, which are necessary to keep learning sustainable along the timeline of the academic writing project within the course blog.

4 Results

4.1 Students' Engagement in On-Line Writing

Table 1 shows the results of the descriptive analysis of students' activity in the blog during the investigation period, i.e. the comments each student published in peer articles and the comments received by the other students in his/her articles. They depict an overall picture of the academic writing part of the two courses and the contributions

of each individual student. Fictitious names S1i, S2i were used to represent the students in the two classes; T was the instructors' code name. A total of 96 original articles were published on the blog which received 1399 comments that represent detailed discussions among students in both classes that were evolving during the on-line academic writing project.

Table 1. Member activities within blog community.

Student (class 1)	Comments published	Comments received	Student (class 2)	Comments published	Comments received
S1.1	31	35	S2.1	8	27
S1.2	68	50	S2.2	9	12
S1.3	13	25	S2.3	16	15
S1.4	14	32	S2.4	13	17
S1.5	61	46	S2.5	5	18
S1.6	35	34	S2.6	10	25
S1.7	53	52	S2.7	11	22
S1.8	17	38	S2.8	14	21
S1.9	32	43	S2.9	10	19
S1.10	129	41	S2.10	8	25
S1.11	84	44	S2.11	2	11
S1.12	10	30	S2.12	72	44
S1.13	15	21	S2.13	3	20
S1.14	175	61	S2.14	3	16
S1.15	52	46	S2.15	20	19
S1.16	25	30	S2.16	6	17
S1.17	63	20	S2.17	0	23
S1.18	21	40	S2.18	20	21
S1.19	34	37	S2.19	77	48
S1.20	45	36	S2.20	21	20
S1.21	21	40	S2.21	15	31
			S2.22	25	31
			S2.23	9	26
			S2.24	0	18
			S2.25	9	20
			S2.26	11	26
T	4	6	T	4	6
Total	1399	1399	Total	1399	1399

Students on-line articles were related to various theoretical and research topics, i.e. e-learning, ICT-based educational practices, learning design, Web 2.0 in education, collaborative learning, flipped classroom, learning communities, open educational resources, digital storytelling, MOOCs, etc. Figure 2 shows a screenshot presenting a typical student article related to the topic of "Learning Analytics" and the discussion

among students through 24 peer feedback and reflection postings. Table 2 presents indicative examples of student's posts showing their ideas and argumentation that promoted reflexive dialogue and enriched the initial blog article.

Fig. 2. Blog platform showing a typical article written by student S1.2.

Table 2. Examples of student reflection posts.

Post number	Student	Blog posts
1	S1.14	… This is actually a very interesting article… Regarding to your question, I would like to say that, despite the limitations, learning analytics can effectively support research; this indicates the significance and future development of learning analytics. In particular, I would like to focus on the ability to visualize educational data in a very powerful way
3	S1.16	Dear S1.2 we have been dealing with the same topic… But your analysis was based on a completely different view and this is very helpful!

(*continued*)

Table 2. (*continued*)

Post number	Student	Blog posts
7	S1.6	Dear S1.2, your article is very interesting and deal with a up to date topic!!! It is actually a comprehensive presentation of Learning Analytics… I think we also have a similar experience in this Master's course. I will agree with S1.14 about the visualization of educational data and results; it is very impressive and useful for any educational process
8	S1.2	Dear S1.2, in the time I was writing this message there were 87 published articles and 861 comments on our blog. These numbers are very impressive; actually we could expect huge numbers in large communities. Just consider how many ideas, suggestions, questions or views we all have presented in the course blog. And there is one more month to complete this activity. Therefore, there will be a great amount of big data. How could be all this data analysed if not by using Learning Analytics methods?…

The majority of the students appeared to be effective and they contributed to both, the individual and the interactive dimensions of the on-line writing activities. They all published two academic articles and discussed on critical theoretical, pedagogical and learning design issues that emerged in the on-line discussions around blog articles. In most cases, they sent more posts than they received. Students in Class1 were more active members of the blogging community comparing to their fellows in Class2, in terms of the number of blog posts they uploaded.

Students S1.14, S2.19, S1.2, S1.10, S1.11, S2.12, S1.17, and S1.5 were the most effective learners by providing feedback, asking questions, exchanging ideas and replies, presenting new arguments and criticism, sharing and suggesting new resources, drawing conclusions and, eventually, co-constructing new content knowledge. On the contrary, there were 5 students in Class2 which had a peripheral role in the community, since they had extremely marginal presence with 2–3 sporadic posts (the students S2.11, S2.13, S2.14) or no interaction at all with other members in the blog (S2.17, S2.24).

4.2 Social Network Analysis

Individual contribution, member relationships, group dynamics and community operation were analysed in terms of network structure parameters, namely cohesion, power centrality and betweeness centrality. Cohesion analysis can reveal the architecture of the blog community in terms of subgroups (cliques) of members who tended to be connected internally more than externally, i.e. with other members outside of these subgroups. In other words, student links within a clique are stronger, on average, than with other students [10].

Table 3 shows the results of the cohesion analysis. A total of 295 student subgroups (cliques) appeared within the blog community. It is important to be noticed that the

majority of the student cliques (252) included a significant number of members, ranging from 7 to 12. This indicates that a range of cohesive subgroups were dynamically emerging during the academic writing project. In other words, the students had enhanced opportunities to develop strong interrelations and, therefore, to share and construct knowledge as members of a community of inquiry.

Table 3. Cohesion analysis and student cliques.

Members within a clique	Number of cliques
12	17
11	25
10	30
9	20
8	69
7	91
6	38
5	5
Total	295

Individual contribution, member relationships, group dynamics and community operation were analysed in terms of network structure parameters, namely *cohesion*, *power centrality* and *betweeness centrality*. Cohesion analysis can reveal the architecture of the blog community in terms of subgroups (cliques) of members who tended to be connected internally more than externally, i.e. with other members outside of these subgroups. In other words, student links within a clique are stronger, on average, than with other students [10].

Power (centrality) analysis is an effective SNA method to measure network activity, to reveal the operation of the blogging community and to assess the impact each member had with respect to spreading information and influencing others in this network [10, 13]. In-degree centrality represents the number of interactions (blog posts) a student received from other members in the community. Accordingly, out-degree centrality is the number of connections a student had to the other classmates. Betweeness centrality represents the capacity of a member to act as a connector between other students, i.e., it is an indicator of individual position within the community.

Table 4 shows the results of the network activity measures that present the power distribution among participants in the community. The majority of the students were active community members, since they interacted, at least, with 30% of their peers. Students S1.14, S1.10, S1.17 and S2.19 were the most influential members, since they were connected with more than 80% of the participants. On the other hand, students S1.14, S1.2, S2.19 and S2.12 were the most popular and successful members in the community by receiving a great number of posts from their peers ($\sim$50%). It is quite apparent that some students, like S2.24, S2.17, S2.12, S2.11, S2.16 and S2.1, had a marginal contribution as community moderators.

Table 4. Power analysis of students' activity in the blog.

Student	In-degree centrality (%)	Out-degree centrality (%)	Betweeness centrality
S1.1	0.362	0.383	0.006
S1.2	0.511	0.617	0.026
S1.3	0.340	0.191	0.002
S1.4	0.319	0.234	0.002
S1.5	0.362	0.574	0.012
S1.6	0.468	0.532	0.021
S1.7	0.468	0.553	0.018
S1.8	0.147	0.234	0.006
S1.9	0.319	0.362	0.005
S1.10	0.447	0.936	0.043
S1.11	0.168	0.894	0.044
S1.12	0.298	0.191	0.005
S1.13	0.277	0.234	0.002
S1.14	0.660	1.000	0.109
S1.15	0.426	0.617	0.020
S1.16	0.383	0.340	0.011
S1.17	0.426	0.809	0.045
S1.18	0.468	0.340	0.009
S1.19	0.298	0.426	0.007
S1.20	0.362	0.468	0.006
S1.21	0.426	0.340	0.007
S2.1	0.277	0.128	0.010
S2.2	0.149	0.170	0.001
S2.3	0.298	0.319	0.009
S2.4	0.255	0.277	0.006
S2.5	0.255	0.085	0.003
S2.6	0.277	0.149	0.003
S2.7	0.277	0.191	0.005
S2.8	0.255	0.213	0.005
S2.9	0.191	0.149	0.002
S2.10	0.298	0.128	0.011
S2.11	0.170	0.021	0.001
S2.12	0.489	0.766	0.067
S2.13	0.255	0.043	0.001
S2.14	0.277	0.085	0.003
S2.15	0.191	0.340	0.007
S2.16	0.170	0.085	0.000
S2.17	0.255	0.000	0.000
S2.18	0.340	0.319	0.009
S2.19	0.596	0.809	0.065

(*continued*)

Table 4. (*continued*)

Student	In-degree centrality (%)	Out-degree centrality (%)	Betweeness centrality
S2.20	0.298	0.340	0.009
S2.21	0.362	0.234	0.015
S2.22	0.383	0.383	0.039
S2.23	0.298	0.149	0.009
S2.24	0.213	0.000	0.000
S2.25	0.234	0.128	0.002
S2.26	0.319	0.191	0.003
T	0.149	0.085	0.002
Mean	0.335	0.335	0.014

Figure 3 presents the degree centrality map which presents the overall blog activity. Student S1.14, who placed at the center, was the most effective member toward connecting others and, consequently, she had more control of the interaction and information interchange within the blog community. Students, S1.10, S1.11, S2.19, S2.12, S1.6, S1.15, S1.2, S1.20, S1.4, S1.21, and S1.7, were also good connectors compared to their peers in the periphery. As an overall view, the blog was a very cohesive community; the majority of the participants had significant contribution while only four members had a marginal contribution, i.e. S2.17, S2.24, S1.23, and S1.7.

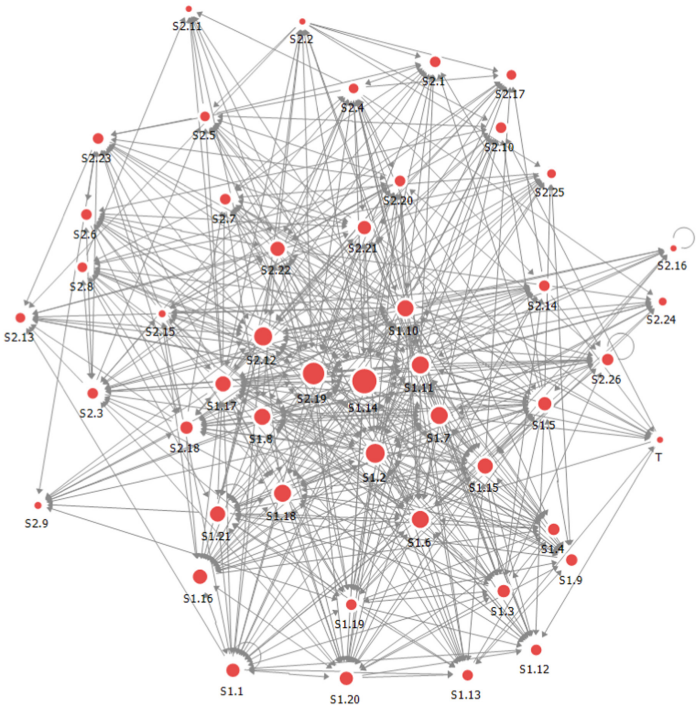

Fig. 3. Degree centrality map

Figure 4 shows the power centrality map of students' activities, which includes the connections of the members and offers a measure of the influence each participant had to the blogging community. S1.14 was the most influential and powerful student. In addition, a large group of teachers that are placed near the center of the map (i.e., S1.10, S1.11, S2.19, S1.6, S1.15, S1.2, S1.20, S1.4, S1.21, and S1.7), were also very active, members in the community; they had many ties and connections to other powerful participants. On the other hand, as moving to the periphery, students were less powerful and important community members. For example, students S2.17 and S2.24, who did not publish any comment to other blog articles, and S2.5, S2.11, S2.14 had a marginal contribution to the community by uploading very few comments (2–3 posts).

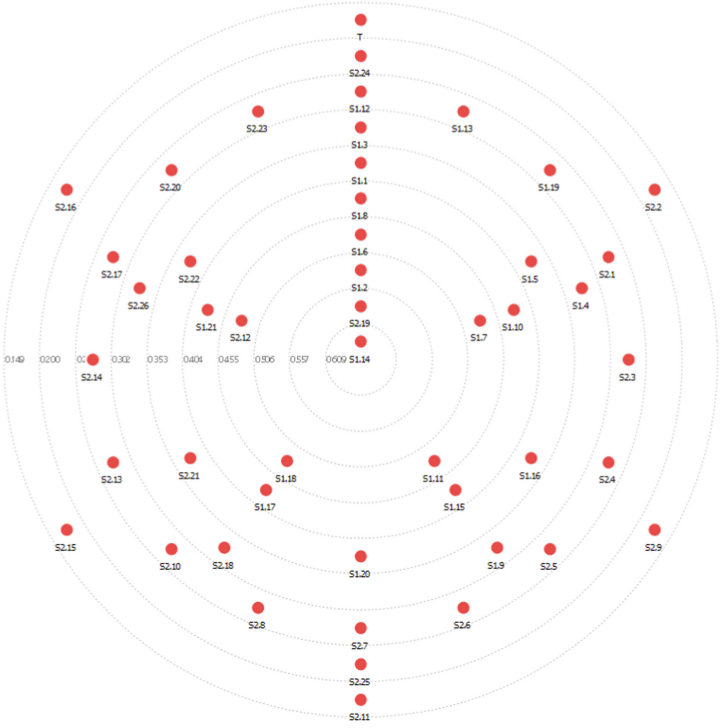

Fig. 4. Power centrality map

5 Conclusions and Future Work

This study reported on students' on-line academic writing through blogging in the context of a post-graduate course. Our analysis has shown that, by publishing their academic articles on the course blog, the students had enhanced opportunities for managing individual work, peer feedback and interaction, supportive dialogue and reflection, sharing ideas, critical thinking and metacognition, all having a positive impact on the quality of academic writing. The majority of the students demonstrated

enhanced interest and they were actively engaged into the community activities that were spontaneously emerging within the course blog (uploading articles and postings, supporting dialogue and contributing to discussion topics, interchanging ideas, sharing content and resources, shaping new topics of interest, etc.). Confirming existing research findings [16, 18, 21], our results provided supportive evidence that on-line academic writing, embedded in higher education through course blogs, can promote students' reflective engagement, scientific research, critical thinking as well as the development of writing skills as active members of an on-line community.

The findings of SNA provided important information about the structure and the cohesion of the blog community, the student groups that developed therein, student connections and information flow, as well as the power and the influence each participant had within the blog community of inquiry. SNA revealed that the instructor was not the central member in this on-line academic writing program. Our findings provided a promising evidence of a decentralized learning community, where the learners had enhanced control and motivation to shape their contribution by adopting a continuous and dynamically evolving presence in the course blog.

In addition, SNA findings revealed differences in students' engagement with regards to the interactive and collaborative part of the on-line academic writing project. Three main groups of students were recorded according to their contribution to the information flow, the influence and the power they had within the blog community: (a) the students leading discussion and facilitating dialogue in the course blog through posting comments, questions, criticism and suggestions, (b) a large group of students that were good responders and connectors, in particular between students from different classes, and (c) a group of five peripheral members, who had no visible interaction with peers in the blog since they published very few comment postings.

Despite that this study is limited by the specific sample and the context of implementation, it has shown promising results regarding the application of blogs in on-line academic writing. Research outcomes could guide the design and the implementation of future interventions in higher education settings, as well as ongoing research in this area. However, the outcomes presented in this paper need further investigation and empirical testing to enhance the validity of SNA. Our current efforts are directed towards combining SNA results with qualitative data of content analysis regarding students' on-line discourse by using the schemas of Community of Inquiry and the Learning Presence. We expect thus to reveal more information about students' cognitive and learning presence as well as the role of self-regulation and co-regulation in on-line academic writing through blogging [25, 32].

References

1. Brown, J.S., Adler, R.P.: Minds on fire: open education, the long tail, and learning 2.0. Educ. Rev. **43**(1), 17–32 (2008)
2. Chang, Y.J., Chang, Y.S.: Assessing peer support and usability of blogging in hybrid learning environments. Interact. Learn. Environ. **22**(1), 3–17 (2014)
3. Dede, C.: Reconceptualizing technology integration to meet the challenges of educational transformation. J. Curric. Instr. **5**(1), 4–16 (2011)

4. Deng, L., Yuen, A.H.K.: Understanding student perceptions and motivation towards academic blogs: an exploratory study. Australas. J. Educ. Technol. **28**(1), 48–66 (2012)
5. Downes, S.: E-learning 2.0. eLearn Mag. (2005). http://elearnmag.acm.org/archive.cfm?aid=1104968. Accessed 12 May 2018
6. Ehlers, U.-D.: Open Learning Cultures: A Guide to Quality, Evaluation, and Assessment for Future Learning. Springer, Heidelberg (2013). https://doi.org/10.1007/978-3-642-38174-4
7. Garrison, D.R., Anderson, T., Archer, W.: Critical inquiry in a text-based environment: computer conferencing in higher education. Internet High. Educ. **2**, 87–105 (2000)
8. Goodfellow, R.: Academic literacies and e-learning: a critical approach to writing in the online university. Int. J. Educ. Res. **43**(7–8), 481–494 (2005)
9. Jimoyiannis, A.: TPACK 2.0: towards a framework guiding Web 2.0 integration in educational practice. In: Khine, M.S. (ed.) New Directions in Technological Pedagogical Content Knowledge Research Multiple Perspectives, pp. 83–108. Information Age Publishing, Charlotte (2015)
10. Jimoyiannis, A., Angelaina, S.: Towards an analysis framework for investigating students' engagement and learning in educational blogs. J. Comput. Assist. Learn. **28**(3), 222–234 (2012)
11. Jimoyiannis, A., Schiza, E.I., Tsiotakis, P.: Students' self-regulated learning through online academic writing in a course blog. In: Sampson, D., Ifenthaler, D., Spector, J.M., Isaías, P. (eds.) Digital Technologies: Sustainable Innovations for Improving Teaching and Learning, pp. 111–129. Springer, Cham (2018). https://doi.org/10.1007/978-3-319-73417-0_7
12. Jimoyiannis, A., Tsiotakis, P.: Beyond students' perceptions: investigating learning presence in a community of educational blogging. J. Appl. Res. High. Educ. **9**(1), 129–146 (2017)
13. Jimoyiannis, A., Tsiotakis, P., Roussinos, D.: Social network analysis of students' participation and presence in a community of educational blogging. Interact. Technol. Smart Educ. **10**(1), 15–30 (2013)
14. Jimoyiannis, A., Tsiotakis, P., Roussinos, D., Siorenta, A.: Preparing teachers to integrate Web 2.0 in school practice: toward a framework for Pedagogy 2.0. Australas. J. Educ. Technol. **29**(2), 248–267 (2013)
15. Kang, I., Bonk, C.J., Kim, M.C.: A case study of blog-based learning in Korea: technology becomes pedagogy. Internet High. Educ. **14**(4), 227–235 (2011)
16. Kathpalia, S.S., See, E.K.: Improving argumentation through student blogs. System **58**, 25–36 (2016)
17. Kerawalla, L., Minocha, S., Kirkup, G., Conole, G.: An empirically grounded framework to guide blogging in higher education. J. Comput. Assist. Learn. **25**, 31–42 (2009)
18. Kung, F.-W.: Assessing an innovative advanced academic writing course through blog-assisted language learning: issues and resolutions. Innov. Educ. Teach. Int. **55**(3), 348–356 (2018). https://doi.org/10.1080/14703297.2015.1108213
19. Marsden, N., Piggot-Irvine, E.: Using blogging and laptop computers to improve writing skills on a vocational training course. Australas. J. Educ. Technol. **28**(1), 30–47 (2012)
20. McLoughlin, C., Lee, M.J.W.: Personalised and self-regulated learning in the Web 2.0 era: international exemplars of innovative pedagogy using social software. Australas. J. Educ. Technol. **26**(1), 28–43 (2010)
21. Novakovich, J.: Fostering critical thinking and reflection through blog-mediated peer feedback. J. Comput. Assist. Learn. **32**(1), 16–30 (2016)
22. North, S.: Different values, different skills? A comparison of essay writing by students from arts and science backgrounds. Stud. High. Educ. **30**(5), 517–533 (2005)
23. Paulus, T., Spence, M.: Using blogs to identify, misconceptions in a large undergraduate nutrition course. TechTrends **54**(5), 62–68 (2010)

24. Salmon, G.: E-Moderating: The key to Teaching and Learning Online. Routledge, London (2003)
25. Shea, P., Bidjerano, T.: Learning presence as a moderator in the community of inquiry model. Comput. Educ. **59**, 316–326 (2012)
26. Siemens, G.: Learning ecology, communities, and networks extending the classroom (2003). http://www.elearnspace.org/Articles/learning_communities.htm. Accessed 12 May 2018
27. Sun, Y.C.: Extensive writing in foreign-language classrooms: a blogging approach. Innov. Educ. Teach. Int. **47**(3), 327–339 (2010)
28. Tan, S.M., Ladyshewsky, R.K., Gardner, P.: Using blogging to promote clinical reasoning and metacognition in undergraduate physiotherapy fieldwork programs. Australas. J. Educ. Technol. **26**(3), 355–368 (2010)
29. Tang, E., Lam, C.: Building an effective online learning community (OLC) in blog- based teaching portfolios. Internet High. Educ. **20**, 79–85 (2014)
30. Tsiotakis, P., Jimoyiannis, A.: Critical factors towards analysing teachers' presence in on-line learning communities. Internet High. Educ. **28**, 45–58 (2016)
31. Tuomainen, S.: A blended learning approach to academic writing and presentation skills. Int. J. Lang. Lit. Cult. Educ. **3**(2), 33–55 (2016)
32. Volet, S., Vauras, M., Salonen, P.: Self- and social regulation in learning contexts: an integrative perspective. Educ. Psychol. **44**(4), 215–226 (2009)
33. Wingate, U., Andon, N., Cogo, A.: Embedding academic writing instruction into subject teaching: a case study. Act. Learn. High Educ. **12**(1), 69–81 (2011)