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Interacting for learning: Digital portfolios for a learning community in a university course

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This study investigates student interactions in a blog-based learning community in a university course. In addition, this study explores the dynamics of group interactions in individual blog-based environments compared with collaborative *wiki*-based educational activities. A learning community of 56 graduate students wrote individual blogs and weekly group summaries using a *wiki* environment. The posts were analyzed by identifying a post content type and explicit feedback promotions, and by counting the number of the blogger's own comments and the number of others' comments per post, received from peers studying in the same versus the other offline group. The results show that choosing the appropriate type of post content (i.e., sharing experiences rather than providing information, explicitly calling for feedback, and providing the blogger's own comments) augments peer interaction in a blog environment, thus explaining 51.4% of variance in peer comments. Group interactions through comments in individual blogs, without the possibility of changing one another's content, seem to be non-intrusive and prompt interactions with offline as well as with online peers. In contrast, actual editing of texts through multi-authored collaborative *wikis* remained affected by student offline former acquaintance. The results are discussed in terms of social interactions and pedagogical beliefs.

Keywords: digital portfolios; blog; *wiki*; collaboration; learning community in a university course; peer social interactions; pedagogical beliefs

Introduction

The core mission of teaching staff in general and in higher education in particular is not simply to ensure that students are taught but to ensure that they learn (DuFour et al. 2010). Teaching staff engaged in a learning community are more likely to demonstrate commitment to transform their teaching practices, including knowledge sharing and collective work, in order to improve

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student engagement and learning outcomes (Lee, Zhang, and Yin 2011). A professional learning community may be built using the affordances of Web 2.0 tools such as a digital blog-based portfolio for the critical reflection of teaching and learning practices (Fenton 2011), and a source for ongoing dialogues among peers about teaching and learning (Pereira Coutinho 2012). About 43% of students reported that they were likely to use the blog-based portfolio in the future and 52% believed the adoption of the blog-based portfolio is a benefit for their employability outcomes (von Konsky and Oliver 2012). Another Web 2.0 tool, a *wiki*, is more suitable for collaborative educational practices, allowing different students to write collaboratively, but also enabling the evaluation of individual contributions to collaborative outcomes (Ioannou and Artino 2008).

This paper investigates the use of digital blog-based learning portfolios as a platform for interaction, knowledge sharing, and reflection of the learning process over time in a professional learning community of graduate students in the Open University course working in a broad area of education and training. In addition, the study compares group blog-based interactions with *wiki*-based collaboration.

Literature review

Interacting by blogging

Vygotsky (1978) claimed that social interactions, either between students and teachers or among students themselves, are essential for the process of learning. Interaction assists learners in advancing through their zone of proximal development (ZPD) – the gap between the improvement that a learner could make alone and improvement he or she could accomplish in interaction with more skilled or experienced others.

However, in the traditional model of lectures in higher education, interactions between instructor and students as well as among students are quite limited (Blau, Mor, and Neuthal 2009). Integration of technology can promote interaction and collaboration in academia. Web 2.0 tools can help educators to engage students in digital discussions creating a digital workspace for collaborative activities (Miyazoe and Anderson 2012). Among such technologies, a blog is a tool that can promote reflection and interaction, while a *wiki* is a tool for supporting collaboration. Blogs are mostly created and maintained by a single author and do not allow readers to change the original post. Instead, readers, as well as the bloggers themselves, add their comments to the original post and to one another's comments. In contrast, *wiki* applications allow multiple authors to write and edit the same content.

Empirical investigations acknowledge the potential of educational blogs as a discussion medium in higher education (Churchill 2009; Ducate and Lomicka 2008; Ellison and Wu 2008; Halic et al. 2010; Top 2012). Blogging stimulates student learning and critical thinking by extending discussion about course

content outside the class, triggering careful examination of the content and offering alternative perspectives related to the course content (Xie, Ke, and Sharma 2008). Similarly, after engaging in blog conversations over the course in Halic et al.'s (2010) study, students reported that the blogging task enhanced their learning, increased reflection on course-related concepts, and facilitated the sharing of different perspectives on the course material among peers. Nonetheless, although the findings revealed that blogging promotes group learning by enhancing the sense of community, many students in that study missed the interactive potential of the tool and did not particularly value the comments of their peers.

Blogging as student-centered learning and pedagogical beliefs

The effectiveness of student-centered teaching and learning is related to pedagogical beliefs held by instructor and learners. Exploring the formation of pedagogical beliefs, Strauss (2005) argued that the notion of teaching as a human natural cognitive ability can be a possible explanation for teachers' resistance to constructivist pedagogy. Empirical findings support this claim, showing that pedagogical beliefs are shaped by the teachers' previous experience and knowledge (Lim and Chan 2007). Regarding the possibility of transforming pedagogical beliefs of teachers and learners, Strauss (2005) holds that they are relatively stable and resistant to change. Teachers as well as adults who are not teachers possess a model of teaching based on the acquisition metaphor, viewing knowledge as directly transmitted from the source of knowledge (teachers) to its recipient (learners). Due to the resilient nature of the beliefs system, even well-designed educational programs often have little effect on pre-existing pedagogical beliefs (Lim and Chan 2007). However, long-term programs are more likely to support change of pedagogical beliefs (Lim, Pagram, and Nastiti 2009).

In a blog-based learning environment, changing pedagogical beliefs can be realized through seeing students as a source of knowledge, diminishing facilitation and feedback by teaching staff, promoting peer learning, and welcoming feedback received from other students. Paulus, Payne, and Jahns (2009) found that blogging in an unstructured environment, without discussion facilitation by instructors, allows students to offer multiple perspectives on the general course topic. According to these authors, the blog's archive could serve instructors more as a monitor of student learning than an additional platform for disseminating information. This use of technology shifts the focus of learning from passive assimilation of information to active construction and sharing of knowledge (Dede 2008). The model provides instructors with opportunities to carry out ongoing inquiries into their teaching practices to engage students in their learning. Through reading the blogs of students, instructors receive a kind of formative evaluation. They can better understand if their students struggle with the course materials and help students overcome barriers to learning by

providing ongoing feedback and by redesigning learning activities (Paulus, Payne, and Jahns 2009).

The use of digital portfolios is growing extensively not only in academic courses, but also in a student-centered approach to teacher education and professional development, prompting students to undertake a more active and critically reflective approach to the role of teacher (Lynch, Mannix McNamara, and Seery 2012). Pereira Coutinho (2012) underlines the importance of portfolios in teacher education programs as a tool helping students to develop skills for self-assessment and critique their own teaching and learning experiences. For pre- and in-service teachers, participation in a dialogic blog-based professional learning community can impact understanding and development of a teaching portfolio (Wray 2007). Participants attributed their professional development to the portfolio's construction – most students found the process of reflecting on coursework and experiences contributed to their growth and professional development.

Collaboration and ownership in blogs versus wikis

Analyzing educational blogging, some authors (Petersen, Chabert, and Divitini 2006) argued that this technology can facilitate not only interactions, but also better collaboration among students. However, it seems that these authors use the term 'collaboration', i.e., working towards a common goal, while each individual is contributing to the *whole* (McInnerney and Robert 2004), while actually referring to 'knowledge sharing' (for further discussion regarding the difference between the two, see Blau 2011) – a process that is indeed widely supported by educational blogs (Halic et al. 2010). Other technologies, such as *wikis*, prompt group writing and editing, and thus create a digital workspace for collaborative activities (Miyazoe and Anderson 2012).

Regarding educational collaborative practices, the sense of ownership seems to interfere with the process of collaboration (Caspi and Blau 2011). Psychological ownership is 'the state in which individuals feel as though the target of ownership or a piece of that target is "theirs"' (Pierce, Kostova, and Dirks 2003, 86). This sense of possession may be felt not only toward physical objects, but also ideas, words, creations, academic products (Pierce, Kostova, and Dirks 2003), or information (Raban and Rafaeli 2007). Webster et al. (2008) claimed that generating ideas is likely to engender feelings of possession, because of the intimate familiarity with that knowledge, as well as the time and effort one has invested in generating the ideas.

Reports of collaboration through multi-authored *wiki* technology support the concern of interfering with the sense of ownership. Students preferred not to engage in collaborative learning through *wikis*, but rather continued to cultivate a practice of individual accountability and individual ownership (Caspi and Blau 2011; Ioannou and Artino 2008). When requested to collaborate by using *wikis*, students feel that it is inappropriate to edit others' work (Coyle 2007)

and tend to avoid changing the writing of other students (Dalke et al. 2007). When they do, changes are more on a language level than on a content level (Lund and Smørdal 2006), e.g., by formatting or adding information rather than deleting sentences written by others (Meishar-Tal and Gorsky 2010).

Study purposes and hypothesis

This study explores *actual* (realization of) interactivity (Rafaeli and Ariel 2007) through digital blog-based portfolios, in contrast to examination of *perceived or expected interactivity*. Previous studies mostly investigated interaction through educational blogs as self-reported by students (Halic et al. 2010). Blau and Barak (2012) reported that the self-reported expectations of the participants regarding their online interactions were unrelated to actual behavior, therefore questioning the possibility of generalization of the results of self-reported studies.

In addition, this study compares interaction patterns via blogs to those in *wikis*. Blau, Mor, and Neuthal (2009) reported that in a university course, private authorship of students writing personal blogs results in different group interaction patterns, compared with multi-authored *wikis*. While educational blogs promote the creation of an online learning community that includes all students of the course, choosing collaborators for *wiki* assignments was affected by student offline former acquaintance and social contact. However, this was a single small-sample study and the growing adoption of blog and *wiki* technologies in academia and professional learning communities suggests the need for further investigation of interaction and collaboration processed through these tools.

The research *purposes* are:

(1) To investigate peer interactions in a blog-based learning community of professionals working in the field of education and training and enrolled in a graduate Open University course. The environment was unstructured, without active facilitation by instructors, promoting peer learning and facilitation in order to explore pedagogical beliefs of the participants;
(2) To compare group interaction patterns in individual blog-based versus collaborative *wiki*-based educational activities in a university course.

We *hypothesized* that:

(1) For a blog-based learning environment, the type of post content (providing information versus sharing experiences), explicit call for feedback and the number of the blogger's own comments per post would positively influence the number of comments per post received from other participants in a professional community;

(2) Individual blog-based learning environment would arouse different dynamics of group interactions in a professional community, compared with multi-authored collaborative *wikis*.

Method

Participants

The participants were 56 graduate students from central and northern Israel enrolled in two semesters of the same graduate course in the field of Educational Technology at the Open University of Israel. Students were professionals working in the field of education and training. Each semester the participants studied in a blended learning environment, including six face-to-face meetings in two groups with two different instructors (there were no offline meetings with students of the other group). Twenty-five of the participants (76% women) aged 27–53 were enrolled in the spring 2009 semester; 31 of the participants (78% women) in ages 25–56 were enrolled in the spring 2010 semester. The same two female instructors were teaching the course in both semesters and moderated online communication between course students.

The students in both semesters were similar in terms of age and gender and did not differ in the rate of activity. Twenty-five participants enrolled in the course in the spring 2009 wrote 133 posts (*M*: 6.76, SD: 1.92) and 209 comments (*M*: 11.36, SD: 2.73); thirty-one participants enrolled in the spring 2010 wrote 151 posts (*M*: 6.62, SD: 1.83) and 283 comments (*M*: 11.86, SD: 2.54). Students used the same learning materials, and performed the same learning tasks (see details in the next section).

Instrumentation

As a part of online learning activities with minimum involvement of moderators during the graduate course, the students wrote personal blogs using *Google's* Blogger[1] platform as well as weekly group summaries using a *wiki* environment. These assignments were not graded. Both platforms were presented by instructors in the beginning of the course. In addition, short screencasts presenting the use of these platforms were available through the course website. Students were required to reflect in blogs at least once a week their learning, and discuss with peers how the course materials are applicable to their personal life and/or work. They also were required to subscribe, regularly read and comment on posts of their peers. The requirements regarding weekly summaries using a *wiki* platform were similar. However, these summaries were group-based activities instead of individual work. Since online subscription was used for *wiki* summaries, students could freely choose offline as well as online peers (from other learning groups of the course) as their partners. In contrast to commenting in personal blogs, which does not affect original posts, using a *wiki* platform, students could actually edit entries of their peers.

The unit of analysis in the blog-based environment was a single post with the comments received, not a student or his/her blog. This unit of analysis is similar to the approach of the quantitative content analysis of posts in the Community of Inquiry model (Garrison and Arbaugh 2007). In order to determine if differences exist among semesters, Table 1 presents descriptive statistics and analysis of variance for comments of other students and comments written by a blogger him- or herself. Since all the variables were not normally distributed, non-parametric Kolmogorov–Smirnov *Z*-tests were used for the analysis of variance.

In absence of statistically significant differences between student demographics and activities, we analyzed the data of both semesters together.

For the analysis of participant *inter-personal interactions through blogs*, four variables were used: the type of post content, presence or absence of explicit calling for feedback, the number of a blogger's own comments, and the number of other participants' comments. The last one was a dependent variable.

Blog content usually fits one of two categories (Chesher 2005; Herring et al. 2005): (1) informing blogs that continue the tradition of newspapers and (2) personal diaries, sharing people's experiences, thoughts, and feelings. According to this *post content* categorization, posts were divided by a rater into two groups: posts providing information ($n = 81$, 28.5%) versus posts sharing experiences. Twenty-five percent of the posts were additionally analyzed by another rater and inter-rater agreement for the post content categorization was very high, Cohen's $\kappa = 0.95$.

Feedback promotion was defined as a dichotomous variable. The rater checked if a post included ($n = 69$, 24.3%) or excluded phrases explicitly inviting comments such as 'I'd love to know your opinion', 'What do you think?', 'is someone feeling like me?' etc. The inter-rated agreement for feedback promotion was very high, Cohen's $\kappa = 0.92$.

Table 2 presents descriptive statistics for the *number of a blogger's own comments* for his or her post as well as for the dependent variable – the number of *other participants' comments* per post ($n = 284$).

As can be seen from the data presented in Table 2, both variables are not normally distributed. Raban and Rabin (2009) argued that in order to perform parametric statistical tests (based on an assumption of normal or close to normal distribution) with such asymmetrical, 'long tail' distributed variables, some kind of transformation is needed. According to the results of

Table 1. Comments per post ($n = 284$): means, SD, and analysis of variance.

Comments per post	Blogger's own comments	Comments of others
Semester 2009b – *M* (SD)	0.30 (0.78)	1.47 (1.48)
Semester 2010b – *M* (SD)	0.35 (0.66)	1.54 (1.86)
Z	0.77	0.62
Significance	$p = 0.60$	$p = 0.83$

Table 2. Descriptive statistics for comments of others and blogger's own commenting.

Commenting	Range	Median	Mean	SD	Skewness
Blogger's own comments	5–0	0	0.33	0.72	2.84
Comments of others	13–0	1	1.42	1.70	2.19

a curve estimation procedure, we performed a logarithmic transformation (base 10) of these two variables before the data analysis.

In order to compare patterns of *group dynamics, interactions through blogs versus wikis* were analyzed in the level of group. *Group interactions using blogs* were measured as the number of comments received from peers studying in the same offline group versus the comments of peers from the other group. *Group interactions using wiki* were measured as the number of students choosing partners for shared weekly summary writing from their own offline learning group or from the other group.

Procedure

At the end of the second semester, all the posts were analyzed by identifying a post content type and explicit feedback promotion. The analysis was conducted by a rater trained by the first author. In order to check inter-rater reliability, 25% of the posts were additionally analyzed by another rater who was also trained by the first author. The number of blogger's own comments per post, the number of others' comments per post, the number of comments received from peers studying in the same versus the other offline group, and the number of participants choosing partners for *wiki* assignment from their own offline group versus from the other group were counted. The results were analyzed using *SPSS 19*.

Results

Regarding the *interaction in a blog-based environment*, Table 3 presents descriptive statistics and Table 4 the analysis of variance for the effects of choosing a content type, calling for feedback, blogger's commenting on his or her post, and the effect of interaction. In the analysis of variance, a content type and presence/absence of calling for feedback were defined as fixed factors, while a blogger's own commenting served as a covariate. Since choosing a content type and calling for feedback were numerical variables, and blogger's commenting was a scale, the ANCOVA test was conducted.

Three bloggers' behaviors – choosing an appropriate content, explicitly calling for feedback, and providing a blogger's own comments affected interactivity through digital portfolios, explaining 51.4% of variance in the number of other's comments per post, $F(4, 279) = 73.66$, $p < 0.001$. As can be seen

Table 3. Descriptive statistics for the effect of content and call for feedback on the number of comments.

Content type	Call for feedback	*M*	SD	*N*
Providing information	Exclude	0.69	1.284	68
	Include	0.77	1.013	13
	Total	0.70	1.239	81
Sharing experiences	Exclude	1.91	2.196	147
	Include	2.75	2.168	56
	Total	2.14	2.215	203
Total	Exclude	1.53	2.032	215
	Include	2.38	2.143	69
	Total	1.73	2.088	284

Table 4. Analysis of variance for receiving peer comments.

Effect	*F*	Df	*p*	Partial η^2
Content type	17.04	1.283	<0.001	0.06
Call for feedback	7.83	1.283	<0.05	0.03
Blogger's own commenting	225.59	1.283	<0.001	0.45
Content type* Call for feedback	0.26	1.283	$=0.72$	0.00

from the data presented in Table 4, statistically significant main effects were found for the content type, calling for feedback, and blogger's own commenting on his or her post. The interaction effect between choosing the content type and calling for feedback was not statistically significant. Regarding the effect of content type, posts rated by judges as sharing experiences received significantly more comments of others compared with posts rated as providing information. Concerning the effect of explicitly promoting interaction, posts inviting comments indeed received significantly more comments of others compared with posts that did not use this strategy. Regarding the effect of a blogger's own comments, bloggers who continued interacting with the audience in the comment area received significantly more comments of others compared with bloggers who stopped interaction after posting, and the effect size was very high ($\eta^2 = 0.45$).

The comparison of *group interactions through blogs and wiki* showed differences between these tools. Significantly more students (43 of 50 participants, $\chi 2\ (1) = 25.92, p < 0.001$) chose to write *wiki* weekly group summaries with others known from face-to-face interaction, compared with students who chose editing a *wiki* summary with unknown students from the other offline group. However, group interactions in blogs were not related to offline groups; no statistically significant difference was found between receiving comments from the blogger's own group and from students enrolled in a different offline group (196 versus 188 comments respectively, $p > 0.60$).

Discussion

The purposes of this study were (1) to investigate peer interactions in a professional blog-based learning community in a university graduate course without active facilitation by instructors, in order to enhance peer learning and explore pedagogical beliefs of the participants and (2) to compare patterns of group interactions in individual blog-based versus collaborative *wiki*-based educational activities.

Consistent with the *first research hypothesis*, choosing the appropriate type of post content, explicitly calling for feedback, and providing blogger's own comments augmented the number of comments per post received from other participants in a professional learning community of graduate students. These three variables explain 51.4% of the variance in peer commenting. Thus, for a blog-based environment in a professional learning community in a university course without active facilitation by instructors, behaviors such as sharing experiences, explicitly calling for feedback, and providing blogger's own feedback in the comment area resulted in a higher number of peer comments, compared with posting information without calling for feedback and without blogger's own comments. Consistent with our previous study (Blau, Mor, and Neuthal 2009), blogger's own comments had the strongest impact on receiving comments of others, suggesting that peer blog-based interactions are more effective when a blogger continues interacting with the audience after publishing a post.

The results also showed that choosing an appropriate content type for a post by focusing on sharing experiences rather than providing information augmented peer comments. Schmidt (2007) claimed that readers expect from either personal online diaries or informational blogs to express the writer's personal voice and to be open for dialogue rather than to engage in one-way communication. Kim's (2008) study recommends students seeking relevant information from other websites and share this information with others through their blog. However, our results indicate that sharing personal experiences and thoughts significantly enhanced a dialogue with peers, while providing others with information mostly resulted in one-way communication. Thus, the participants 'rewarded' others for sharing their own experiences and ignored posts focused on dissemination of information.

Only about a quarter of the posts written during the investigation focused on providing information. In contrast to our results, Hou, Chang, and Sung's (2009) findings exploring the behavioral patterns and the depth of knowledge construction using blogs for teachers' professional development, showed that blogs serve for teachers learning a program as a channel to provide information, while the aspect of knowledge construction remained limited. This difference can be explained by the minimum level of facilitation by instructors in our study. Paulus, Payne, and Jahns (2009) found that blogging in an unstructured environment, without active facilitation by instructors students offered multiple perspectives on the general course topic. Consistent with Paulus et al.'s claim,

in our study, blog-based environments were unstructured and instructors did not disseminate information, enhancing peer learning and facilitation, and changing pedagogical beliefs of our participants from transmitting information to constructing meaning. It seems that in accordance with Dede's (2008) description, the educational use of blog technology has a potential of shifting the focus of learning from passive assimilation of information to active construction and sharing of knowledge, but this potential needs to be supported by an appropriate design of learning activities.

The students in the current study valued peer interaction: a quarter of the posts explicitly asked others for comments, and in some cases they continued interacting with peers in a comment area. These results are different from Halic et al.'s (2010) in which students did not particularly appreciate the comments of their peers. We can raise at least three possible explanations for this difference. (1) The sample of undergraduate students in Halic et al.'s paper versus the sample of graduate students in the current study. Graduate students are more likely than the undergraduates to perceive themselves and peers as knowledgeable, therefore valuating peer feedback; (2) Students in Halic et al.'s paper were divided for blog-based activity into relatively small groups of 7–14 students each, while in the current study in contrast, students divided into two groups during offline sessions interacted altogether through blogs, forming one learning community. Literature claims (Blau 2011; Peddibhotla and Subramani 2007) that a 'critical mass' of active participants is needed to maintain an online community active. Dividing online activities into such small groups diminishes the chance to reach a necessary level of student involvement. (3) Teacher assistants in Halic et al.'s paper acted as blog facilitators answering student questions, e.g., student focus was on assimilation of information (Dede 2008). Consequently, they acted consistently with the acquisition metaphor, viewing knowledge as directly transmitted to them from the external source of knowledge (Strauss 2005) – teacher assistants. In contrast, as mentioned before, in the current study, involvement of the instructors was minimal and students themselves facilitated the discussion. Thus, students were focused on learning from peers and facilitating learning of other students, therefore appreciating peer feedback and having the possibility of changing their pedagogical beliefs.

Consistent with the *second research hypothesis*, an individual blog-based learning environment aroused a different dynamic of group interaction in a professional learning community, compared with multi-authored collaborative *wikis*. This result replicates our previous small-sample study (Blau, Mor, and Neuthal 2009) showing that blogs promote the creation of an online professional learning community which included *all* course students, while interactions in *wikis* remained affected by student offline former acquaintance and social interaction. DuFour et al. (2010) claimed that building the collaborative culture in a professional learning community is a question of will. However, collaborative writing and editing may evoke a conflict between individuals'

feeling of contribution and their sense of ownership toward the collective outcomes (Caspi and Blau 2011). It seems that group interactions via comments in individual blog-based learning, without the possibility of changing one-another's writing, are less intrusive for students, prompting interactions with less known peers, in comparison to actual editing of texts through multi-authored collaborative *wikis*.

Conclusions and implications

According to Vygotsky (1978), inter-personal interaction can enhance learning, promoting students in their ZPD. However, the possibilities for interacting in academia are quite limited. The results of this study show that choosing the appropriate type of post content, calling for feedback, and a blogger's own comments augment peer interaction in a learning community of graduate students – professionals in the field of education and training. When incorporating blog-based activities in an academic course, in order to increase student interaction and enhance their learning, we recommend faculty diminish their facilitation and instruct students to focus on sharing experiences rather than information, promote dialog with readers by explicitly asking for feedback, and continue interacting with the audience through the comments area. Blog-based activities promote interaction with less known peers and can be recommended in order to create an online learning community which includes *all* course students, while *wiki*-based collaboration remained affected by students' offline former acquaintance and social interactions.

This study investigated and provided implications based on actual interactivity through digital blog-based portfolios, in contrast to the perceived interactions reported by students themselves in previous studies that might differ from participant actual behavior. In addition, the participants of this study were demographically and professionally diverse graduate students from two semesters in the Open University course working in a broad field of education and training. This diversity of the participants widens the possibility for generalization of the findings. However, the study is exclusively based on the quantitative interactivity investigation. Qualitative exploration of interactivity in future studies can contribute to a deeper understanding of these issues.

Note

1. https://www.blogger.com/

Notes on contributors

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Tami Neuthal is an information specialist and instructional designer in the Center for Information Technology in Distance Education in the Open University of Israel. She also teaches information literacy and social media use in several teachers' professional development programs. Her main interests are knowledge management in academia, social media as personal learning environments, and online collaboration within communities of practice.

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