

Online Communities of Practice in the Service of Teachers' Technology Professional Development: The Case of Webheads in Action

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ABSTRACT

The aim of this study was to investigate whether an online community of practice (OCoP) approach can be a viable alternative form of technology professional development (TPD) for teachers. In line with this aim, the Webheads in Action (WiA) community, members of which were mainly English as a foreign language (EFL) teachers gathered online to learn more about educational uses of technology, was selected as the case to be studied. A mixed method research approach following convenience sampling strategy was adopted which combined the use of questionnaires ($n= 44$) and interviews ($n= 24$). In order to support findings, members' interactions within the public space of the community were also collated for a period of nine months. Both quantitative (questionnaire) and qualitative (interview) results suggested that participation in the WiA community led to members' perceived TPD. Moreover, significant differences in questionnaire results, supported with interview data, were observed among members with different levels of participation (e.g. peripheral, active, and core). This finding highlighted the importance of participation and collaboration in online learning environments. It is concluded that teachers should be encouraged to participate in OCoPs for their professional development and the creation of OCoPs appealing to different areas of professional development should be supported.

Keywords: Teacher professional development, technology, online learning communities, online communities of practice, English as a foreign language

INTRODUCTION

Little (1987, p. 491) defined professional development as “any activity that is intended partly or primarily to prepare paid staff members for improved performance in present or future roles in the school districts”. In a general sense technology professional development (TPD) can be defined as activities that aim to increase teachers' performance and technology integration through development of their technical skills in the use of video, software, computers, and so on. Additionally, in line with Little's (1987) definition, TPD should provide teachers with opportunities that allow them to relate technology knowledge to the pedagogy and content knowledge that they already possess. Furthermore, due to the fast pace of technological change, TPD needs to be continuous. Therefore for the purposes of the present study, TPD has been defined as activities that are intended not only to improve teachers' skills in using technology but also to extend their knowledge of how to relate it to the components of content and pedagogy employed in the teaching/learning process; it is an ongoing cycle of development.

In an environment in which governments across the world make continuous investments into increasing the use of technology in education, teachers' TPD has become an important issue for all stakeholders (i.e. teachers, students, school administrations, and so on; UNESCO, 2011). The value and significance of TPD becomes more obvious, especially when the low uptake of technology in educational systems across the world is taken into consideration (i.e. Turkey; Cakir, 2012) and realize that the main reason for this outcome is teachers' (in)capacity to use it in teaching/learning processes (UNESCO, 2011). Thus, it can be understood that TPD is an essential factor that can aid the successful integration of technology into education.

Teachers engage in various forms of TPD which include; workshops (including education conferences and seminars which could be as short as one hour) and cascade training (also referred to as the train the trainers model; Lawless & Pellegrino, 2007; OECD, 2009). While each one of these forms of professional development has their value, the low uptake of technology in educational settings suggests that the provision of such professional development opportunities is not able to meet the ongoing nature of TPD. On the other hand, professional development networks which can allow mentoring and informal dialogue (Lawless & Pellegrino, 2007; OECD, 2009) have been found to be ongoing and allowing follow-up and feedback opportunities (i.e.

Meskill, Anthony, Hilliker-VanStrander, Tseng, & You, 2006) which can potentially meet the requirements of TPD. Similarly, an online community of practice can allow the creation of such professional networks within online environments eliminating the boundaries of time and space and allowing anytime and anywhere learning. Thus, OCoPs have recently emerged as an alternative means for professional development and, in the present study, for TPD. There is, however, a need to conduct more research on OCoPs and investigate further whether following an OCoP approach can facilitate teacher professional development. Therefore, taking the case of Webheads in Action OCoP, an online community of English as a foreign language teachers (EFL) gathered online in order to develop themselves in the use of technology for language teaching, the present study sought to find an answer to the following research question;

“Does participation in the WiA OCoP lead to EFL teachers’ perceived technology professional development?”

ONLINE COMMUNITIES OF PRACTICE

“An online community of practice (OCoP) is a group of people, who are brought together by a shared interest and with the aim of deepening their understanding of an area of knowledge through regular interactions facilitated by computer mediated communication (CMC) tools” (Bostancıoğlu, 2016, p. 20). The concept of OCoP is built on Lave and Wenger’s (1991) communities of practice (CoP) framework and the three fundamental characteristics of CoPs have been reflected in the above definition; 1) a shared domain (the area of interest for which members are brought together), 2) community (members of the community interacting regularly), and 3) practice (the knowledge that is the result of members’ endeavours to develop their understating of an area of interest; Wenger, McDermott, & Snyder, 2002; Wenger, White, & Smith, 2009).

The learning taking place within OCoPs can be explained by Vygotsky’s (1978) theory of sociocultural learning. Vygotsky (1931; as cited in Rieber, 1997, p. 105-106) noted that “any function of the child’s cultural development appears on the stage twice, or on two planes first between people as an intermental category, then within the child as an intramental category”. This quote suggests that learning is not just a cognitive process but also a social one and, in fact, highlights the importance of social interactions in knowledge building. According to Vygotsky (1978), there is a difference between what children already know and what they can achieve with guidance from more able peers. The distance between a child’s actual and potential development has been referred to as the zone of proximal development (ZPD). Though slightly in a different way, Vygotsky’s (1978) concept of ZPD has been applied in the community of practice (CoP) framework and been referred to as legitimate peripheral participation (LPP; Lave & Wenger, 1991). The premise of LPP is that, in line with principles of ZPD, members of a community initially do not actively participate in community activities since they do not know how to act in the community and thus are in the periphery. However, in time, through their observations and/or interactions with more experienced community members, they develop an understanding of community workings as well as gain the knowledge and skills that would enable them to become active and/or core members of that particular community who are knowledgeable and experienced in the practices of the community (see Figure 1; Wenger, et al., 2002).

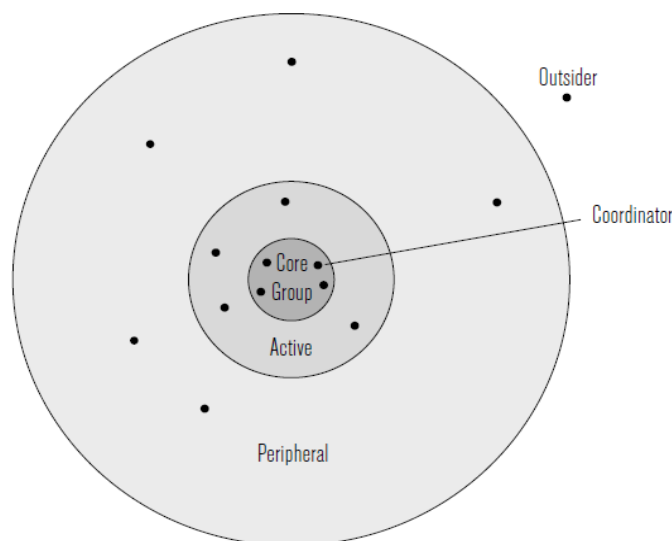


Figure 1. Member participation in communities of practice (Wenger et al., 2002, p. 57)

When applied to technology professional development (TPD), the OCoP framework and the concept of LPP suggest that teachers who become members of an OCoP would go through various stages of LPP and change from being “newcomers” into “old-timers” (Lave & Wenger, 1991, p. 56) as a result of their participation. Thus, it is considered that such a process would encourage scaffolding among teachers which can allow less experienced teachers to advance their knowledge and skills in their profession, and develop professionally. It can be argued that the formation of such professional learning networks for TPD can be valuable since such professional development opportunities reflect components of effective teacher professional development that has been stated in the literature such as; collaboration, an opportunity for mentoring and coaching, and sustainability over time (Cordingley, Bell, Thomason, & Firth, 2005; Darling-Hammond & McLaughlin, 1995; Little, 1993; Putnam & Borko, 1997; Walter & Briggs, 2012). While there has been a considerable amount of research on OCoPs (see for example edited books by Barab, Kling, & Gray, 2004; Lindberg & Olofsson, 2010), there has been limited research on the effects of teachers’ participation in OCoPs on their professional development. Few studies to date have studied this phenomenon and have found positive effects of community participation on teachers’ professional development (Guzey & Roehrig, 2009; Kulavuz-Onal, 2013; Pachler, Daly, & Turvey, 2010; Scott & Scott, 2010; Vavasour & MacGregor, 2008; Zygouris- Coe & Swan, 2010). However, the results of those small scale studies are far from being conclusive and it is not clear whether all community participation levels were represented (i.e. core, active, and peripheral members. In addition, communities in most of those studies were blended communities in which teachers extended their face-to-face communication via the online community platforms. Considering their potential in the service of teacher professional development, further research on OCoPs and teacher professional development is necessary. Thus, the present study aims to contribute to research in this area through examining an OCoP which mainly functions online and taking into consideration the representation of community members with different levels of participation. As mentioned above, taking the case of Webheads in Action (WiA) OCoP, the answer to the following research question has been sought in the present study:

“Does participation in the WiA OCoP lead to EFL teachers’ perceived technology professional development?”

THE CASE

The search for online teacher communities resulted in a number of groups that could be studied. However, the preliminary analysis of the amount of interactions taking place within those communities showed that the WiA OCoP was relatively more engaged in discussions compared to other groups, which suggested that potentially more collaboration and/or mentoring opportunities were present in the WiA community. Therefore, the WiA OCoP has been selected as the case to be studied. The WiA community was founded in 2002 after an eight-week long online training session with the same name, which aimed to develop participants’ understanding of how technology can be employed effectively in teaching languages. At the end of the training, participants decided to maintain their online interactions and Vance Stevens, organizer of that online training session, became the moderator of the community (Johnson, 2005). Unlike most of the online communities studied in the past, most of which existed for a period shorter than *12 months* (Blitz, 2013), the WiA community had existed for over *12 years* (at the time of research). Therefore, it has been considered to provide an *extreme* and *critical* case (Yin, 2014).

METHODOLOGY

Conducted within the paradigm of pragmatism, the present study followed a case study approach utilizing a mixed method strategy that included the use of questionnaires, interviews, and document analysis (see Figure 2 for the overview of methods)

In the summer of 2014, an invitation to participate in the study was sent to WiA’s public Yahoo! group page. The invitation included information about the study and the link to the survey. The aim of utilizing the survey method was to be able to reach as many members of the community as possible, collect demographic information about the members of the community, and measure English as a foreign language (EFL) teachers’ perceived TPD. In relation to the last point, the EFL-TPACK questionnaire, which was developed by Bostancıoğlu (2014) for measuring EFL teachers’ perceived technological pedagogical and content knowledge (TPACK), was used. The EFL-TPACK questionnaire was the result of extensive research into what constitutes TPACK for the EFL context and a two-stage validation which included; a) the consultation of computer assisted language learning (CALL) experts and b) the administration of the survey to a cohort of 542 English language teachers across the world, following a convenience sampling strategy, for conducting exploratory factor analysis (EFA). The EFL-TPACK survey consisted of 11 item measuring technology knowledge (TK), 7 items measuring technological content knowledge (TCK), 7 items measuring technological pedagogical knowledge (TPK), and 7 items measuring technological pedagogical and content knowledge (TPACK) which makes a total of 32 items.

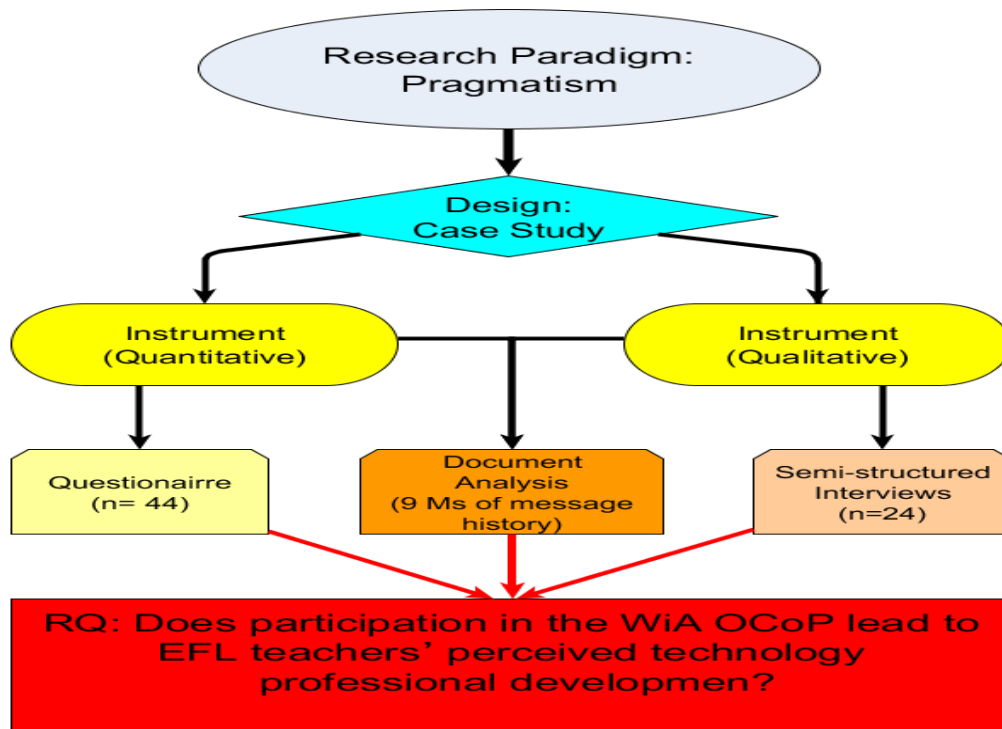


Figure 2. Overview of methods

The survey was open for participation for a period of one month and during that time frame a total of 69 participants with various levels of participation in the community responded to the survey. However, 25 of these respondents were either English as a second language (ESL) or retired teachers and since the focus of the present study was EFL teachers, these 25 responses were only used for demographic purposes. As a result, 44 EFL teachers' responses were used for measuring perceived technology professional development. At the end of the survey, participants were asked if they would want to volunteer to do a follow-up interview. Of the 44 EFL teachers 24 agreed to be interviewed. The interviews took place online (via Skype) since members of the community were dispersed across the world. In line with the research question asked in the present study, interviewees were first asked about how they integrated technology into their teaching and where possible they were asked to provide example uses. After that, they were asked to what extent they would relate their use of technology to their participation in the WiA community. Additionally, community interactions spanning over a period of nine months (from October 2013 to June 2014, prior to the administration of the survey) were collated to support findings from the survey and/or the interviews.

Different data analysis techniques were used due to the use of both qualitative and quantitative data collection tools. Descriptive statistics were used to present demographic information collected from survey respondents. In line with the premise of LPP, inferential statistics were used in order to find out whether there was a significant difference among peripheral, active, and core members' scores in technology knowledge (TK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and technological pedagogical content knowledge (TPCK). As for the interviews, thematic analysis (TA), which is claimed to be "a foundational method for qualitative data analysis" has been used (Braun & Clarke, 2006, p. 78). Since TA is not bound by theory and/or epistemological positioning, its use fits the pragmatic nature of the present study. As such, TA in the present study has been used both inductively and deductively. It has been used deductively since technological pedagogical and content knowledge (TPACK) framework and its sub-components (i.e. TK, TPK, TCK, and TPCK) have been utilized as predetermined categories in analysing the interview data. As explained previously, the document analysis approach has been used to support, challenge, and/or elaborate on the findings of the interviews and questionnaires.

In terms of validity and reliability, Bostancıoğlu (2014) established the validity of the EFL-TPACK instrument through content validation (consulting subject matter experts) and exploratory factor analysis. The reliability of EFL-TPACK instrument was established through the calculation of Cronbach's alpha values which ranged between .81 and .89 for various sub-dimensions of the TPACK framework. Additionally, a number of steps were followed in order to establish the trustworthiness of the study as a whole. For example, a member checking

procedure was followed in order to establish credibility. Thus, the preliminary results were shared with community members and they were asked to confirm and/or contest the conclusions that the author of the present study had reached. Another step in establishing credibility was the use of multiple data collection tools which facilitated triangulation. To increase the transferability of the findings, as much detail as possible was included to be able to offer a “thick description” of the case (Mertens, 2010). Last but not least, the ethical procedures that the Association of Internet Researchers (AoIR, 2012) suggested for doing online research have been followed and the Department of Education Ethics Committee at the University of York (UK) granted ethical approval for conducting the present study. Pseudo names were used in order to protect interviewees’ identities.

RESULTS

Demographic data showed that the members of the Webheads in Actions (WiA) community ($n= 69$) were dispersed across the seven continents around the world (see Table 1). The average teaching experience of the participants was 22 years and their experience ranged from 1 year to 55 years, indicating that the WiA community harboured both veteran and novice teachers. The number of female participants ($n= 53, 77%$) were significantly higher than male participants ($n= 16, 23%$), which reflects the higher proportion of female teachers in the field. As discussed before, 44 of the 69 responses received belonged to EFL teachers. Prior to the invitation to participate in the survey, member interactions within the community were observed for a period of nine months, and the 44 EFL teachers’ participation in community activities were categorized based on how active they were within that time frame. As a result, 27 teachers (61%) were considered to be peripheral members, 14 (32%) active members, and 3 (7%) core members (Wenger, et al., 2002; Wenger, et al., 2009).

Table 1. Countries in which community members were located

Country	N	Country	N	Country	N
Argentina	7	Italy	1	Spain	4
Australia	4	Kuwait	1	Sudan	1
Brazil	4	Morocco	1	The United Arab Emirates (UAE)	1
Canada	1	Nigeria	1	The United Kingdom (UK)	2
Czech Republic	1	Oman	1	The United States of America	8
Egypt	1	Poland	1	Turkey	2
France	1	Portugal	2	Ukraine	1
Germany	3	Saudi Arabia	1	Venezuela	7
Iran	5	Slovenia	2	N/A	5
Total N: 69					

Apart from the demographic information, the participants were also asked to rate themselves on a 7-point Likert scale (1= strong disagreement; 7= strong agreement) to measure their perceived technological pedagogical and content knowledge (TPACK; Mishra & Koehler, 2006). Participants were presented with statements in the four subscales of the TPACK framework that related to; 1) technology knowledge (TK), 2) technological pedagogical knowledge (TPK), 3) technological content knowledge (TCK), and 4) technological pedagogical content knowledge (TPCK). TK refers to the skills required for operating and working with technologies. TPK refers to the understanding of how the use of particular technologies in particular ways can change teaching and learning. TCK, on the other hand, is described as “knowledge about the manner in which technology and content are reciprocally related” (Mishra & Koehler, 2006, p. 1028). And TPCK refers to the understanding of how to use technology in a meaningful and pedagogically sound way in order to be able to provide opportunities for learners so that they can better understand the content to be learned.

The descriptive statistics showed that WiA members’ perceived TPACK knowledge levels were high (see Table 2). Community members scored highest in the TK subscale ($Mn= 6.64$) and their scores slightly decreased for TPK ($Mn= 6.26$), TCK ($Mn= 6.24$), and TPCK ($Mn= 6.05$). Additionally, members generally considered their community participation to be helping them to “grow professionally” (Mary, Active member). In support for this statement, community interactions indicated that members helped each other through; 1) experimenting (online) in the use of different technologies for teaching purposes, 2) asking each other questions in community’s public space, and 3) following what has been shared in the public space (i.e. information about specific tools, invitations, and so on).

Table 2. Perceived TPACK levels of EFL teachers in the community

	N	Mean	Min.	Max.	Range	Std. Deviation	Variance
Technology Knowledge (TK)	44	6.64	4.09	7.00	2.91	.68	.46
Technological Pedagogical Knowledge (TPK)	44	6.26	2.00	7.00	5.00	1.03	1.06
Technological Content Knowledge (TCK)	44	6.24	1.86	7.00	5.14	1.16	1.34
Technological pedagogical and content knowledge (TPACK)	44	6.05	2.29	7.00	4.71	1.19	1.43

To begin with, community members seemed to be motivated to both experiment and share their knowledge within the community:

“the more we see that people are motivated and actively participating, [...] the more it makes us feel like participating and carrying on and going to extremes” (Telma, Core member).

As a result of this, members were found to be encouraged to “take risks with no problems of failure” (Cecilia, Core member). Cecilia added that “there is no such a thing of failure for us”. This supports Betty’s (Active member) statement that members “are mostly [...] geared at exploring the technological processes”. In fact, the community interactions supported these statements. In November 2013, the community gathered in an online session in which they tried to overcome the 10-people participation limitation of Google+ Hangouts by airing the session on YouTube and embedding the YouTube link to an EtherPad clone, which allowed the audience to interact with the presenter via text-chat. Within the nine-month time frame, the community also explored many different topics such as the use of iPads in language teaching and ideas for flipped classrooms.

Secondly, the perceived professional development seemed to occur through the questions that members directed to the community. Over the nine months, members exchanged 556 messages which have been grouped into 190 threads (the average length of a thread was 3 messages). 20 of those message threads (11%) were help requests about the use technology. Moreover, there has been at least one answer to a query on the day it has been posted and the fastest response was received to Annie’s (Peripheral member) query about how to teach a lesson using technology more effectively (see Thread 43 in Appendix 1). Annie posted her query at 15:01 and the first response was received at 15:14 which is less than a quarter of an hour. In their responses, community members tried to direct Annie to resources that might help her with her query (see Thread 43 in Appendix 1). It is possible that the geographical diversity of the community helped members receive timely responses to their queries

Thirdly, members also seemed to benefit from the community’s expertise by following the knowledge created and shared within the community:

“...sometimes a new topic, a new tools is being introduced or someone wants to learn how they can use a specific tool [...] So by just seeing what are being raised and the responses that other Webheads give... So I get some ideas” (Havva, Peripheral member).

Parallel to this, it has been observed that members shared resources within the community (34 threads, 18%), which included; articles, e-books that can be used for teaching English, recordings of events such as conference presentations, information on webpages/software/applications, and excerpts from members’ teaching practice using technology (see for example Thread 49 in Appendix 1). In general, these messages tended to invite feedback and responses from other members. One other way in which members shared information was the Learning2gether updates that Vance Stevens (the moderator) shared with the community. Learning2gether is the name given to the online synchronous sessions that the community held every other week in order to come together and share and discuss issues that relate to educational uses of technology. The Learning2gether message threads (n= 42; 22%) included information on past Learning2gether sessions as well as an invitation to the upcoming ones (see Thread 19 in Appendix 1).

At this point it is timely to revisit the notion of legitimate peripheral participation (LPP) which indicates that peripheral members who, in theory, do not know much about the practice of the community would become more knowledgeable in time as they observe and participate in community activities (Wenger, et al., 2002; Wenger, et al., 2009). Inferential statistics were run to test this hypothesis. Normality tests were carried out in order to decide which analysis to run. The results of Kolmogorov-Smirnov ($p < 0.001$) and Shapiro-Wilk ($p < 0.001$) tests were significant, suggesting that the data was not normally distributed (see Table 3). Therefore, Kruskal Wallis, a non-parametric test, was run (Field, 2009). Kruskal Wallis test results yielded significant results for all TPACK subscales, but TK [$H(2) = 6.54$ for TCK; 7.99 for TPK; and 8.59 for TPACK; see Table 4]. The

Jonckheere-Terpstra test revealed a significant trend in the data: the more frequently a Webhead interacted with the community the higher their scores were in TCK ($J = 314.50, z = 2.42, r = .37$), TPK ($J = 363.00, z = 2.70, r = .41$), and TPACK ($J = 370.00, z = 2.88, r = .43$; see Table 4).

Table 3. Test of normality of the data

	Kolmogorov-Smirnov			Shapiro-Wilk		
	Statistic	df	Sig.	Statistic	df	Sig.
TK	.314	44	.000	.587	44	.000
TCK	.256	44	.000	.686	44	.000
TPK	.236	44	.000	.717	44	.000
TPACK	.213	44	.000	.766	44	.000

That there was no significant difference between TK scores of members was not unexpected. Regardless of their level of participation all members reported that they learned how to operate/use certain tools and technologies as a result of their participation whether it be peripheral, active, or core:

“I learned the blogging [...] I learned some things with Google and Google docs” (Sarah, Peripheral member).

“...how to use blogs, how to use Skype, how to use Yahoo groups, I don't know, uhm, how to use wikis [...] lots of tools like these ones. Google drive, google docs... You see, I have learned a lot. I mean all I know about technology” (Mary, Active member).

“I can give you tons of examples like blogging, setting up a blog, uhm, podcasting [...] How to work with audio using Audacity for example, it's something you know that I learned with the Webheads” (Cecilia, Core member).

Table 4. Kruskal-Wallis and Jonckheere-Terpstra test results comparing TK, TCK, TPK, and TPACK scores of participants across different levels of participation

Participation Level	N	Mean Rank			
		TK	TCK	TPK	TPCK
Peripheral	27	20.46	18.69	18.22	18.24
Active	14	24.07	28.86	29.21	28.14
Core	3	33.50	27.17	29.67	34.50
Total	44				

Kruskal Wallis Test Statistics

Chi-Square	3.55	6.54	7.99	8.59
df	2	2	2	2
Asymp. Sig.	.170	.038*	.018*	.014*

Jonckheere-Terpstra Test Statistics

Observed J-T Statistic	314.50	350.00	363.00	370.00
Mean J-T Statistic	250.50	250.50	250.50	250.50
Standard Deviation of J-T Statistic	39.42	41.13	41.60	41.49
Standard J-T Statistic	1.62	2.42	2.70	2.88
Asymp. Sig. (2-tailed)	.104	.016*	.007*	.004*

“*” Result is significant at a confidence interval of 95%

Six categories were created to group the technologies that members have learned from the WiA community. These were; 1) web tools; 2) audio tools; 3) video tools; 4) computer mediated communication tools; 5) office applications; and 6) data saving tools (see Table 5).

Table 5. Technology knowledge reported by community members

Category	Tools
Web	Blog, Dreamweaver, Flickr, Makebeliefscomix.com, MOOCs, Moodle, SurveyMonkey.com, Wiki,
Audio	Audacity, Podcast, Voicethread, Voxopop,
Video	Camtasia studio, Screencast-o-matic, Snagit, Touchcast,
Computer Mediated Communication (CMC)	Anymeeting.com, Blackboard Collaborate (Elluminate), Diigo, Google Hangouts, Twitter, Yahoo groups,
Office Applications	Google Docs, Prezi, Skype,
Data saving	Google Drive,

That there was a significant difference between peripheral, active, and core members’ scores in TCK, TPK, and TPCK scores suggested a positive relationship between members’ participation levels in community activities and their perceived technology professional development (TPD). There are two possible explanations for these results: 1) members who were categorized as active and core members had already possessed a good level of knowledge about integrating technology in their instruction and they participated in community activities more frequently because of that and became active/core members; and 2) members’ participation in community activities, in line with the notions of LPP, increased as they learned through their observations in the community thus allowing them to become active/core members. The second hypothesis seemed more appropriate considering the below quotes in which, when asked about the extent to which interviewees would relate their TPD, peripheral members did not seem to relate their perceived TPD to the community whereas active and core members did vice versa:

“No, I would not say that because I developed my skills mainly by myself [...] but in terms of keeping me updated and curious about some tools, yes I would say that” (Trella, peripheral member).

“I cannot think of something that I actually applied. At the moment I cannot remember” (Havva, Peripheral member).

“Well, before joining Webheads it was like zero compared to now. [...] The only technology I know was the Google search and that's it” (Amal, Active member).

“...but I think not knowing anything about technology before I became a Webhead means that they are very instrumental [...] Everything I have learned has come from the Webheads” Sarah (Active member).

“I would not say 100 % but 90%. 90% of what I became and what I know [...] the skills that I developed in terms of digital competencies are related to the Webheads” (Cecilia, Core member).

In addition, the TPD, as reported by the members, was found to suit the critical approach of integrating technology:

“We looked at ways of using technology but only if it's the right tool for the job. I think teachers sometimes don't use their critical thinking skills and they jump on technology when, really, the whiteboard or the paper and pencil could do the job better and I think that's one of the good things about the Webheads. They don't push technology; they push the right tool for the right job” (Sarah, Active member)

Moreover, the reported example uses of technology in their teaching supported the existence of technological pedagogical, technological content, and technological pedagogical content knowledge (TPK, TCK, and TPCK). For example, Betty (Active member) reported the use of blogs for writing activities and Voicethread for speaking activities. This demonstrates Betty’s awareness of how technology can be used for the representation of content (in this case the teaching of language skills) and can be considered as TCK.

It can be understood from Vania’s (Active member) statement below that she adapted the use of technology in her teaching and extended the teaching process to outside the classroom, which can be considered as a manifestation of her technological pedagogical knowledge (TPK):

“I do blended learning [...] Some of my sessions are... we do them distance. So I have face to face classes and I blend them with online interactive learning in the Moodle”.

Another example provided by Mary (Active member) can be considered as TPCK since Mary showed her

awareness of how technology can be employed to support the teaching of the simple present tense and vocabulary by taking into consideration her students' age and levels:

“SwitchZoo is a website about animals, their habitats and other stuff. There is one special link to create ‘crazy animals’. My students love it. As there is one unit about animals in our course book, I always use this site as “wrap up”. I teach them how to use the site and how to create a crazy animal. The grammar taught here is simple present; so students have to create their animal and write about it. As it is an invented animal, all is crazy and used in the simple present. I use it with second year students”.

To summarize, members participation in the WiA seemed led to perceived TK development, regardless of their level of participation. However, there were significant difference between members' level of community participation and their perceived TCK, TPK, and TPCK scores which suggested a positive relationship between TPACK scores and level of participation. The interview data supported the hypothesis that the difference in perceived TPACK of members might be due to members' level of interaction and co-construction of knowledge within the community.

DISCUSSION

The results of the present study suggested that the members of the Webheads in Action (WiA) perceived to have developed a number of skills and knowledge in relation to technology and its integration into the teaching/ learning processes. All members, including peripheral members (who generally observed other members' interactions), active members (who participated and interacted with other members of the community), and core members (who generally helped to organize community activities as well as supported other members) reported to have learned about the use/ operation of a variety of technology tools such as how to use a wiki, blog, and Blackboard Collaborate (Elluminate) from the WiA community. This suggested that members had developed their technology knowledge (TK) out of their participation. This finding is in line with previous studies which have investigated teachers' technology professional development (TPD) through community based approaches and found that community members developed similar operational skills with regards to the use of technology tools (Guzey & Roehrig, 2009; Pachler, et al., 2010; Scott & Scott, 2010; Vavasour & MacGregor, 2008; Zygouris- Coe & Swan, 2010).

In addition, the Webheads' responses suggested that they had developed an awareness of how different technologies can be used to teach different language skills which can be considered to be technological content knowledge (TCK). Furthermore, examples of how Webheads adapted technology and tried new pedagogical approaches constituted evidence of technological pedagogical knowledge (TPK). Finally, the teaching practices that Webheads reported to have carried out (e.g. the use of SwitchZoo, an application that allows the creation of hybrid animals, in the teaching of present simple tense to young learners) seemed to include the use of technology in pedagogically sound ways, which provided opportunities for learners to practice English and better understand the content. This can, therefore, be considered as technological pedagogical content knowledge (TPCK). These findings suggested that TPCK is mediated within the WiA community which is different from the findings of previous studies, which have investigated TPD through community based approaches in which teachers' reported TPD generally remained at the level of TK (Guzey & Roehrig, 2009; Pachler et al., 2010; Scott & Scott, 2010; Zygouris- Coe & Swan, 2010).

In line with the communities of practice (CoP), it has been observed that members did not participate in community activities equally and thus were categorized as peripheral, active, and core members (Wenger, et al., 2002; Wenger, et al., 2009). As such, a significant difference was observed between members' participation levels and their reported TCK, TPK, and TPCK scores, respectively; the more a Webhead interacted and collaborated with the community the higher their TCK, TPK, and TPCK scores were. Moreover, the interview data supported the observation that this difference was related to members' levels of participation in the community. These findings provide support to the notions of zone of proximal development (ZPD; Vygotsky, 1978) and legitimate peripheral participation (LPP; Lave & Wenger, 1991) of members since peripheral members reported to have extended their knowledge and skills of technology integration through their interaction and collaboration with others in the community. It is possible that those members, who were once peripheral members, began to participate more actively in the community and moved towards the centre as they became active/ core members who seemed to be more knowledgeable than the current peripheral member (Lave & Wenger, 1991). Therefore, these findings highlight the importance of interaction and collaboration among members for developing the practice of the community. It should, however, be acknowledged that in spite of the evidence (questionnaire and interview data) presented to support this argument, there is still a possibility that an individual with a high level of expertise can join the community and stay in the periphery to better understand the workings of the community first and then start participating actively once s/he feels safe and confident to

contribute to the community. Nevertheless, in the light of the evidence presented so far, it can tentatively be concluded that an online community of practice (OCoP) approach might be used as an alternative approach for teacher professional development. Indeed, there are a number of characteristics that the WiA community and its members have which can explain the perceived learning taking place in this OCoP. Those characteristics will be discussed below.

First, the WiA community follows a bottom-up approach since it has been built by the initiative of its members and the moderator (Johnson, 2005). They are free to share the information that they find valuable to the practice of the community and direct questions and get answers to their queries. In addition, in their Learning2gether synchronous sessions, they discuss the issues that they want to discuss about and members do not seem to be restricted. Therefore, it can be interpreted that the community members have the choice to choose the areas of development that they consider necessary for their teaching practice, which is one of the characteristics of effective professional development opportunities (Walter & Briggs, 2012). This also suggests that the teachers are empowered within the WiA community (Putnam & Borko, 1997) and learning is participant driven (Darling-Hammond & McLaughlin, 1995).

Secondly, the WiA community is diverse and consists of members who are teaching languages in different parts of the world, which suggests there is variation in the levels of expertise within the community from which members can benefit. Therefore, we can say that the WiA community brings in expertise from outside each members' own school environment, which has been found to be an additional characteristic of effective professional development (Cordingley, et al., 2005; Walter & Briggs, 2012). It is possible that thanks to this diversity, there is generally someone who can help the other members with their queries and the geographical diversity of the community allows members to receive timely responses to their queries. This situation can be considered to provide "just in time" rather than "just in case" training opportunities for TPD which Hixon and Buckenmeyer (2009) claimed to be effective (see also Hanson-Smith, 2006; Vavasseur & MacGregor, 2008).

Thirdly, in order to be able to interact online, the Webheads need to use technology tools which provide them with opportunities where they are not only communicating with other members but also practicing the use of technologies. In addition, in their Learning2gether synchronous sessions they explore and experiment with the use of new technologies and the members reported to have subsequently utilized those tools in their teaching. Therefore, this experience can be considered to be "hands on", concrete, and situated, which are characteristics that are deemed effective by researchers (Darling-Hammond & McLaughlin, 1995; Lieberman, 1995; Walter & Briggs, 2012).

Fourthly, Webheads' perceived professional development takes place through their participation and interactions within the community. Teachers help each other, collaborate, and engage in collegial dialogue not only in the public Yahoo! group page but also in synchronous Learning2gether sessions. This supports researchers' conclusions that in effective professional development teachers become active participants of the learning process and collaborate with each other (Cordingley, et al., 2005; Darling-Hammond & McLaughlin, 1995; Little, 1993; Putnam & Borko, 1997; Walter & Briggs, 2012). Finally, the learning taking place in the WiA community has been continuous throughout the last 12 years (at the time of research); thus, it can be considered ongoing and sustained over time, which is another characteristic of effective professional development (Darling-Hammond & McLaughlin, 1995; Walter & Briggs, 2012).

CONCLUSIONS

The answer to the research question asked in the present study appears to be "yes"; participation in the WiA community led to EFL teachers' perceived technology professional development (TPD). Regardless of their level of participation in community interactions, all Webheads reported to have developed their TK. A finding that needs to be tentatively highlighted is that; active and core members' more frequent interactions and collaborations with other community members resulted in significantly higher TCK, TPK, and TPCK scores, which suggested a positive relationship between members' perceived professional development and their level of participation. Overall, these findings suggest that an online community of practice (OCoP) approach can be a viable alternative to technology professional development, thanks to the provision of factors such as: allowing teachers control in the selection of areas in which to develop their knowledge/skills; providing "just in time" support; actively engaging teachers in the learning process; and sustaining engagement and interactions over time.

An important limitation of the present study is the generalizability of the findings. As discussed at the beginning of this article, unlike most other online communities, the WiA community has sustained its existence for over 12 years. Therefore, although this research contributes to the body of knowledge regarding theory of OCoP and

EFL teachers' TPD, the findings that have emerged from the study cannot be generalized to all OCoP contexts and/or EFL teacher populations. Thus, further case studies can be conducted with different teacher OCoPs that investigate teachers' professional development. Such studies would contribute to the growing body of knowledge in the field of teacher OCoPs, which in the future can be used for a meta-analysis of that body of knowledge, leading to more generalizable findings. On a different point, all levels of participation (core, active, and peripheral members) were represented in this study and it has been found that core and active members contributed to the community much more than peripheral members. Thus, they can be considered to be the key people and the driving force of the community. Future research can, therefore, further investigate that key role they play for the community (i.e. how and why they contribute to the community).

Through studying the WiA OCoP, it is considered that a better understanding of OCoPs as social learning environments has been reached. The findings indicate that OCoPs can be used in the service of teacher professional development. Therefore, it can be concluded that it is important to encourage teachers to participate in OCoPs for their professional development by, for example, informing them about the potential benefits of such participation. In addition, this form of learning can be acknowledged and the time teachers are engaged with the community can be formally recognized by policy makers. Last but not least, since members can belong to more than one community and the premise of the OCoPs is that teachers will receive support in the areas they need help with, the creation of communities appealing to different areas of professional development could usefully be encouraged and the current OCoPs supported. In conclusion, the present study provided tentative evidence that OCoPs can be used in the service of teacher professional development.

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APPENDICES

Appendix 1. Thread examples from the WiA Yahoo! group message history

Category	Message content
Help Requests	<p>Thread 43- Message 1 of 15 Dear Webheads Since 2012 I am a member of this yahoo group. Many times I have used your suggestions related to study English with the help of modern means. I want to thank you for the great job you do right here, particularly for the teachers who want to improve. I need some advice of how to teach a lesson about Internet better. I am using wikis, thesaurus, e mail writing, PowerPoint. Best wishes from Romania. [Name]</p> <p>Thread 43- Message 2 of 15 Dear [Name], Great to hear from you! You might want to start by checking this great publication that has some of our dear Webheads. What I like about it is that we have the theoretical background together with case studies. It was edited by [Name] http://www.teachingenglish.org.uk/sites/teacheng/files/C607%20Information%20and%20Communication_WEB%20ONLY_FINAL.pdf - Innovations in Learning Technologies for English Language Teaching Also, sites like http://edutopia.org can give us great insights. I also recommend you take one of our free online sessions happening in the beginning of January, the Electronic Village Online. There will be an amazing variety of topics to explore with educators all over the globe. It is a great way to find new insights to teach English with Technology. I hope this helps. Cheers from Brazil, [Name]</p>
Sharing resources	<p>Thread 49- Message 1 of 5 Dear All, It's that time of the year again when I get many students' goodies to share. I'm sharing with you a few ezines that my Mass media class have produced for their midterm project. Please have a look. Share with your students- my students would definitely be happy to hear from you/them. Note though: some students have submitted their drafts for editing, some didn't. What you'll see on these pages are their published work presented in class. Some articles are good, some need more polishing. One thing they have learned is- it's always better to double- (or even tripple-) check their work before publishing Here's the padlet site: http://padlet.com/wall/1mcwqdxsk1 Here's the wiki page (see sidebar for rubric and task description) http://massmedia2013.pbworks.com/w/page/70654531/Students_Ezines Thanks! [Name]</p> <p>Thread 49- Message 2 of 5 These are just great, An --look terrific! Did padlet create the book formats, or was that just a place to store them together? What tools did you use with the students? Cheers</p> <p>Thread 49- Message 3 of 5 Hi [Name], Padlet was just a wall to 'hang' my students' ezines. Issuu works like that too- but Issuu does not provide a space where all the ezines can be collected and exhibited in one wall. In creating their ezines, they made use a mix of tools: microsoft word, adobe illustrator, photoshop, publisher, Paint, and powerpoint. Some lay-outs were created using Paint and Word- yet the results are impressive. For editing, we used Meetingwords and Word. [Name]</p>

Category	Message content
Learning2gether	<p>Thread 19- Message 1 of 1</p> <p>Hi everyone, I believe I pointed you to the archive of last week's Sunday chat with [Name] and [Name] http://learning2gether.net/2013/10/20/learning2gether-with-hora-hedayati-and-susan-marandi-on-impediments-efl-teachers-perceive-in-implementing-call-in-efl-classes-in-iran/ I have since rendered the mp3 from the Elluminate recording in case you would like to simply listen. This Sunday and next we have Learning2gether events designed for EVO moderator training but as always all are welcome to attend. Both events are at 1400 GMT. This week we will explore Elluminate and next week we will explore how you set up and stream hangouts. This week, the plan is to make anyone a moderator who wants to be one and show them the tool kit and explain what you need to know about uploading to the whiteboard and setting number of available mics, and how to register the event so we don't get double bookings, and other such tips and tricks. If there is an another agenda, that is fine too, but I'll be in the background helping those interested with whatever they wish to know about the platform. At the appointed time please join us at http://learningtimesevents.org/webheads/ For more information and to see when that time is where you are, visit: http://learning2gether.pbworks.com/w/page/32206114/volunteersneeded#Nextupcomingevents Vance Stevens</p>
