Social Media and Social Capital in Online Learning

Abstract

Online learning affords students with an opportunity to collaborate with peers in furthering their learning. Open distance learning (ODL) institutions typically accommodate students from diverse educational backgrounds with disparate levels of access to technological resources. The mere existence of an online learning platform does not necessarily equate to student access to the collaborative learning opportunities. Online students need to be able to activate and customise those opportunities and establish social learning networks to further their studies. A qualitative study investigated how diverse students in an online learning module collaborated with peers in pursuit of their learning project at a large ODL university. It emerges that students engage in various formal and informal collaborative learning activities which constitute a personal learning environment (PLE). Social capital theory shows how different types of social ties in PLEs provide for bonding and bridging social capital; the combination of which serves the learning project by providing for both strong ties in supportive relationships between students and weak ties with knowledge generation capabilities between previously unacquainted students. The results can benefit designers and facilitators of online learning who want to capitalise on the inherent collaborative nature of online learning.

Keywords: online learning, collaborative learning, Personal Learning Environment, bonding social capital, bridging social capital.

# 1 Introduction

The affordances of online learning enable students to interact with one another and with their course materials across boundaries such as social background, time and place. Such interactions are determined by affordability, preferred time slots and platforms of choice. Collaborative online learning has the potential to provide a social space for diverse students to develop social capital by participating in the establishment of a learning network, which provides for learning together and building trust, even when they are from different locations and backgrounds (Oztok, Zingaro, Makos, Brett and Hewitt, 2015, 19).

However, not all students benefit equally from the opportunity to collaborate with peers due to varying levels of access to requisite technologies and diverse skills needed to use these learning technologies. As a result, varying degrees of isolation and disconnectedness present in online learning settings. The challenges to becoming a participant who benefits from an online learning community include limited communication and flow of information between online students and the challenge of establishing rapport and trust with online peers. For these reasons, ODL institutions need to determine whether their online learning approaches and practices make it possible for students to develop social capital in their online collaborations in order to further their academic careers.

This study is concerned with establishing the role of social capital development in online learning in view of the challenges mentioned above. A qualitative research approach was used to study the collaborative online learning experiences and perceptions of online students in a fully online module at a large ODL institution in South Africa. The aim of the article is to describe how online students respond to the demands of collaborative online learning through peer interaction and the formation of social ties and learning networks in service of their learning project.

The article starts by raising an awareness of varied levels of participation in online learning in ODL in relation to divergent levels of connectedness among online students in South Africa. The practice of widespread participation in both formal and informal learning networks in PLEs among diverse students is described. The theory of social capital is applied to explain the contribution of different types of social ties in facilitating the development of close ties or bonding social capital and weak ties or bridging social capital in facilitating collaborative learning between diverse students.

The study does not provide a comprehensive view of the overall architecture of all possible social networks used in online learning and is not directed at establishing causal links between student collaborations and academic performance. The article is also not concerned with the dark side of collaboration. Although the study suggests the possibility of racial differences between levels of online collaboration and the accumulation of social capital benefits, the analysis is not concerned with social justice issues but with understanding the patterns and outcomes of collaborations between diverse students in order to derive insights for improving the design of learning experiences for such students. The contribution of the study is to conceptualise the intersection between formal and informal learning networks in providing an answer to the question of how the development of bonding and bridging social capital in PLEs help to facilitate online learning.

# Literature overview

Advances in online learning pedagogies and technologies have the potential to provide a social space for students to collaborate and build a network of learning. The interactive quality of the internet facilitates participation, interaction and dialogue between online students. The reciprocity embedded in interactivity may serve as a threshold for mutually beneficial learning practices. Online collaboration between students facilitates the sharing of resources, building histories of learning together and the development of trust and belonging, even when they are from different locations and social backgrounds. Online students can work together to obtain cognitive and socio-affective benefits not necessarily readily available to them in their individual capacities (Lin 1999, 31; Narayan and Pritchett 1999, 873-874).

The online learning environment in South Africa is characterised by divergent levels of access to information and communication technology (ICT) devices, internet access and relevant online learning skills. These discrepancies are relevant in the case of Unisa as a large proportion of its students come from disadvantaged communities with poor socio-economic circumstances and sub-standard educational backgrounds with limited access to the requisite technologies and online learning skills. In contrast, students from higher social-economic backgrounds are academically strong and are technologically savvy which is precisely why they claim to esteem online learning and enjoy its benefits (Queiros and de Villiers 2016, 166). This is relevant to the Unisa context because a lack of access is associated with low literacy levels that can marginalise students, cause anxiety that underscores the digital divide (Kajee 2008, 216-217; Bharuthram and Kies 2013, 415; Queiros and de Villiers 2016, 174). The compromised levels of access to technological resources has a bearing on online students’ connectedness and opportunities to engage with the learning materials and their peers.

In addition, online communities are not coherent or homogeneous and this exacerbates the challenge of online participation and collaboration among online students. Online learners do not necessarily share the same interests, they may not have known each other before and most often a group has zero-history (Oztok et al. 2015, 20). A concern for parity when achieving collaborative online learning benefits is real. The risk posed by low levels of connectedness leads to challenges that undermine meaningful collaboration and social capital development among online students.

Social capital is a useful theory for studying the way in which relationships and connections develop within and among people in social networks in an online learning environment. The theory of social capital is concerned with the resources embedded in networked relationships where there is “mutual acquaintance and recognition” between the relationship partners (Bourdieu 1986, 249). Social capital can also be described as inherent attributes or qualities that exist in or between social groups or networks (Coleman 1998). Social capital is thus about the benefits to an individual of being a member of a group or network as well as the benefits for the group or network by virtue of the development of interaction among its members.

The mere existence of connections among students does not guarantee the development of social capital as social ties come to fruition only when information can flow and norms and values of trust and reciprocity have developed in those relationships (Putnam 2001; Oztok et al. 2015, 20).

It is possible to distinguish between different dimensions of social capital in an online learning environment, namely structural, relational and cognitive opportunities to collaborate and share experiences and resources (Wasko and Faraj 2005; Cummings, Heeks and Huysman 2006; Chiu, Hsu and Wang 2006). These three categories relate to the structural (opportunity), relational (motivation) and cognitive (ability) dimensions of social capital.

The structural dimension involves the extent and the ways in which an individual connects with others within a network or community and pertains to opportunities for social capital transactions (Adler and Kwon 2002, 24). The relational dimension of social capital concerns the normative side of relations among participants. Relational social capital refers to trust, norms, sanctions, obligations, expectations and identification in the on-going and personal relationships that people establish and maintain in a network (Nahapiet and Ghoshal 1998, 244; Daniel, Schwier and McCalla 2003). The concept of cognitive social capital concerns shared language, codes and narratives whose presence will bring people together and whose absence will keep people at a distance (Nahapiet and Ghoshal 1998, 244). Opportunity, motivation and ability to collaborate are key ingredients of social capital in an online learning environment (Adler and Kwon 2002, 24-27; Nahapiet and Ghoshal 1998, 251). This implies that students will discharge their social capital supply differently and therefore the potential exists for different types of relationships within and between networks (Oztok et al. 2015, 20).

## Bonding social capital in online learning

It is possible for close ties to develop among people who are similar in one way or another, i.e. having the same background such as race, culture or language or sharing the same goal such as working hard. Students with similar interests develop high levels of bonding. The concept of bonding social capital describes the process during which close social ties develop between relatively homogenous individuals. Bonding social capital refers to the start of intimate and long-term connections with people who become friends and share feelings of closeness and belonging. These bonds reinforce social cohesion which facilitates substantive social and emotional support. This is known as “network closure” and is based on the assumption that strong ties can create opportunities for the development of social capital among friends (Burt 2004, 51).

Where there are close ties, members interact frequently and develop an appreciation of collaboration which helps them to learn from peers’ input, even if it contains critiques. Bonding social capital creates supportive relationships through which information and resources can be exchanged (Carceller, Dawson and Lockyer 2015, 15; Oztok, Zingaro and Makos 2013, E204; Oztok et al. 2015, 20).

## Bridging social capital in online learning

Contact and interaction with a variety of students in a learning network may provide for the establishment of widespread or loose ties. These ties or bridges are described as weak as they are formed quickly, may be sporadic or once-off. Loose ties serve the function of forming bridges between previously unacquainted students, and provide access to new information and possibly alternative viewpoints. They have the potential to close the gap between strangers. The bridges between diverse people is explained by the concept bridging social capital which refers to the beneficial role of wide and shallow ties between people from different life situations (Valenzuela, Park and Kee 2009, 880). The strength of weak ties is not based on the intimacy embedded in the ties but on their ability to facilitate “betweenness”, to traverse social distances between groups otherwise unconnected (Granovetter 1973, 1360, 1363). This is why weak ties are described as bridging social capital (Steinfeld, Ellison and Lampe 2008, 436; Oztok et al. 2015, 20).

Bridging social capital may therefore be indispensable for communications about learning as it provides pathways to students in other networks, people they would otherwise not have had the opportunity to connect with. The formation of weak ties is essential in bringing online students together as people come together in online groups not because they know each other or share similar interests, but because they are enrolled for the same course (Oztok 2012, 5).

The concept “structural holes” is used to explain a space of disconnectedness between two contacts that represent a gap in the social network. The structural hole can be overcome by “brokers” who connect previously unacquainted people and control the flow of information between the gaps. The theory of structural holes challenges the idea that only strong ties within a homogeneous group can facilitate effective collaborations between students. Structural holes present an alternative idea, namely weak ties offer opportunities to get fresh knowledge and diverse ideas which are not possible with strong ties owing to relational inactivity and cognitive lock-in (Burt 2004, 350). The side-effect of network closure is that members may be prevented from accepting new ideas. Therefore, a student’s position on the network is just as important as the strength of their ties. People near the holes have a greater chance of having good ideas (Burt 2004, 351). The more diversity there is in a network, the more diverse the resources will be. Structural holes and network diversity may be critical for innovative thinking, knowledge production and academic performance (Chen, Choi and Yu 2012, 80).

It is proposed that individuals with a large and diverse network of connections have more social capital than those with small, less distributed networks (Valenzuela et al. 2009, 877). Students with larger networks have more opportunities to interact with a broad of spectrum of people and their viewpoints will be challenged (Casquero, Ovelar, Romo, Benito and Alberdi 2016, 64). These interactions provide openings for input from peers which leads to improved performance as they are exposed to more alternative ideas, comments and resources (Casquero et al. 2016, 65). There is a distribution advantage too which means collaborative learning in networks provides opportunities to overcome individual limitations. The larger reservoir of cognitive capacity also provides for the division of tasks between members (Kirschner, 2009,14).

## Personal Learning Environments (PLEs)

The underlying principle of the social ties between students is that learning is both an individual and a social process. Being engaged with people (Oztok et al. 2015, 19), while interacting with technology, is an “in the head” phenomenon that takes place in a social context. Learning takes place throughout people’s lives, in all kinds of settings and contexts. This implies that learning takes place in everyday life and that formal learning is but one part of the process. This has given rise to the concept of a PLE which describes a comprehensive space where a formal learning platform works in tandem with a loosely-knit collection of social networking tools used for collaborative learning. PLEs are seen as portals to the world, offering flexible access to people and resources worldwide, including formal and informal learning networks (Downes 2007). This view holds that mandatory interactions on a formal learning network are augmented by voluntary, self-initiated interactions on an informal network. A PLE is a space where students move within and across different learning platforms (Dawson 2010, 736), interacting and collaborating with peers in pursuit of their own learning and the development of collective know-how (Attwell 2007). The one size fits all model of a learning management system (LMS) may not accommodate the diverse needs of students.

The integration of offline and online tools or networks in forming PLEs is confirmed in a research paper which explains that PLEs can include both online and offline tools or platforms (van Harmelen 2006). PLEs are described as a “mash-up” of distributed services which provides a single window from which students can track their learning activities and those of others, while sourcing, editing and sharing content in their collaborations with peers (Chen et al. 2012, 77).

Figure 1: Illustration of interaction of formal and informal leaning in a PLE

While the formal and informal learning networks exist independently of each other, they intersect when students engage with one another to further their studies. Each PLE grows organically according to students’ needs and circumstances. Students manage and coordinate the formal and informal learning options available to them in a PLE and regulate their learning activities. PLEs encapsulate an intersection of both individual and social learning dimensions in an online learning environment.

# Research methodology

ODL institutions such as Unisa need to establish as to whether their online learning practices make it possible for students to develop social capital in their online collaborations in order to further their academic careers. A qualitative research approach was preferred because the research question calls for complex answers to exploratory questions about the subjective experiences of collaboration between diverse online participants. Qualitative analysis provides for the inclusion of notions of a personal and pre-existing network instead of looking at a formal official network only, the aim being to recognise multiple, subjective realities and gain an in-depth understanding of participants’ social capital experiences in online learning.

A case study is used to obtain information about the phenomenon in an authentic field. The use of a case study is not a methodological consideration but is determined by the scope of the study and offers the opportunity to narrow the theme down to one easily researchable topic (Shuttleworth 2008). Such a contraction allows for in-depth research to describe and analyse the interplay between relevant variables in one bounded system. The research therefore employed a case study to obtain information about the phenomenon of collaborations and social capital development between students in online learning at Unisa as an authentic field and a bounded system.

One of the fully online modules, presented during the first semester of 2015, was selected as a suitable case because the assessment strategy of the module requires students to interact and participate in online discussion forums as part of the formal assessment for the module. This online module allows for a comprehensive exploration of social capital development in online learning through an in-depth examination of student perceptions and experiences of online collaboration in relation to their learning over a specified period. The literature guided the development of a discussion outline to be followed during interviews with the students in which descriptions of structural, relational and cognitive social capital are used (Adler and Kwon 2002; Cummings et al. 2006; Daniel et al. 2003; Wasko and Faraj 2005). The discussion outline includes questions about participation in learning networks, such as why, how and when they connect with peers, who they collaborate with and what they talk about in the online learning environment.

A rigorous research framework was devised to ensure that the process of recruitment, data gathering and interpretation was carried out in an ethically responsible and sound manner. A system was developed to protect the anonymity of the student participants and make sure the research would not harm them in any way. After ethical clearance had been obtained and permission granted by the university, prospective student participants were recruited by phone. Care was taken to include a spread of students, some had obtained distinctions, while others passed or failed the module.

 A combination of focus groups and telephonic interviews with a number of online students was used to elicit in-depth information about questions directed at the type, content, frequency and results of interactions with peers on both the official formal LMS called myUnisa and informal platforms and social networks. For the focus group interviews, students were separated according to whether they had obtained a distinction, passed or failed. In this way, successful students could not intimidate less successful ones. On completion of the focus groups, a series of in-depth interviews was used to obtain information about the full spectrum of experiences and perceptions of online interaction and collaboration to gain insight into the development of social capital in online learning and the accompanying potential benefits of online collaborations.

The data obtained from the focus group and individual interviews were transcribed, coded, processed and analysed using computer-aided qualitative data analysis software and were interpreted using thematic data analysis. Insights into the data developed over time and a strong narrative emerged after several rounds of robust analysis.

# Results

It transpired during the research that participants use a variety of methods, platforms and technologies to support their online learning and have divergent experiences and perceptions of these collaborations. It emerges that students do not only rely on the official and formal learning platform, myUnisa, but make wide use of other informal learning platforms, social media and service providers. The research reveals that the interactions on the informal learning network include both offline (face-to-face) gatherings and online interactions. Online learning activities include the use of social media tools such as WhatsApp, owned by Facebook, and StudyNotesWiki (SNW), developed by and for Unisa students. These service providers are not associated with or contracted to the university. The range of student interactions and collaborations are depicted in figure 2 below.

Figure 2: Illustration of different interaction modes on formal and informal learning platforms 

The findings contain a lot of information about the experiences and perceptions of the use of both the formal and informal learning networks. It is noted that some participants were dissatisfied with the online offering of the module in general, and specifically with the collaborative aspect of the model. The dissatisfaction is aptly described by Poppy, a young black African female, who exclaimed ‘I was completely lost, at some point I was like what, what are they looking for?’

There were exceptions and students reported they engaged positively in their small groups and expressed satisfaction with their collaborations with peers on myUnisa. These students identified a range of benefits associated with working together on myUnisa, including quick access to information, knowledge transfer, exposure to alternative viewpoints, obtaining a broader perspective, clarification of concepts, enabling self-assessment, stimulation of meta-learning, development of professional skills, decreased feelings of isolation and building confidence.

The benefits associated with online collaborations on myUnisa are illustrated by a comment made by Omi, an Indian female:

‘And then somehow when you meet them [online] you feel more confident about yourself and what you are learning. In that sense you are not isolated with your own books but there is interaction. It can make you a better learner, more confident and get other ideas and prepare you.’

In contrast to the limited interaction on myUnisa, there was lots of divergent activities on informal learning networks. The informal networks consist of voluntary, self-initiated contacts between onliners that include the use of a variety of face-to-face (offline) and online exchanges according to personal goals, intentions and available resources. The informal collaborations reveal a different side to collaborative learning compared to what is evident on myUnisa. Students find alternative ways to communicate and collaborate using affordable alternatives such as study groups and social media tools such as WhatsApp and SNW.

A revelation was that some online students still have face-to-face (offline) interactions with peers in informal study groups. These groups mostly existed prior to the online module and continued after the completion of the module. Petra, a black African female explains that she was part of a study group that existed prior to her involvement in the online module. She describes the development of strong bonds with these peers and calls the study group her family. Petra explains the functioning of her group in the following way:

‘… because in my group, we helped each other a lot. We met on Saturdays from 09:00 till 16:00 because we are all working. We fought if we want to reach our goals. What we did, we delegated tasks that so that when we start the assignment, everybody had to prepare one particular question. So then we start, we know what to do. Each has their part to discuss and then we come and consolidate to agree or disagree or something and then we go home and work until we could submit.’

Social media tool WhatsApp proved to be popular among online students as it provides opportunities for quick and affordable access to peers. For example, Vuyo, a black African male explains that more students have access to WhatsApp than to personal computers and laptops. Another critical feature of WhatsApp is that it allows for synchronous communication between two or more people. According to Vuyo ‘the better thing of WhatsApp is that everybody is phoning at the same time’. The immediacy of WhatsApp communication is further supported by the short messages and abbreviations typically used in WhatsApp texts.

The nature of the messenger application is to connect with contacts anytime and anywhere and is used by students to get ‘just-in-time’ information or knowledge to close gaps in their existing knowledge. WhatsApp is used a lot before the closing date of an assignment or before an examination. For example, Jasmine, a black African female, describes her experience of how students would help one another via WhatsApp just before due dates for assignments ‘… it was like, especially on a Monday or a Tuesday when the assignments were due then the messages would fly around all day’.

Connections may be brief and sporadic but they can last longer to facilitate the sharing of history and context. Take for example Poppy, a black African female, who shared the following:

‘I feel it [WhatsApp] helps sometimes [as it is better than] than being on your own and believing that you understand when you don’t understand, so we get to share ideas.’

Conversely it is possible to meet and start interacting with strangers on a social networking site such as SNW by registering as a member and searching for peers who are doing the same module. The exchanges may be brief such as quick impersonal requests for information or making a request publically and hoping for a reply. Over longer periods of time, SNW interchanges develop into reciprocal relations where sharing, talking about work and collaborating takes place. Exchange partners are selected on the quality of their contributions to on-site discussions. It seems that students who do not make meaningful contributions are excluded from on-site group conversations. It is possible for some SNW users to develop close ties, a sense of community and shared values of reciprocity and obligation towards one another.

For example, Benita, a white female, explains her membership of SNW in the following way:

‘The community that I belong to is actually virtual. It is a website, called StudyNotesWiki. It was originally only for LLB, but now for BCom and I see BSc. It is fantastic. A lot of times you don’t get feedback from lecturers. Then you ask questions (on SNW). Somebody will show a word that changes everything; this forum helped me a lot. This helped me through a difficult subject.’

SNW facilitates the emergence of a wide network of distributed weak ties between people previously unacquainted. It is possible to form loose ties with people and groups who are dissimilar in one way or another. It is also possible to establish strong ties on SNW by forming close relations on the network through regular interaction, sharing resources and insights and developing a sense of communal purpose or belonging.

The findings show that online students do not function only in the formal learning environment but become involved in extended informal networks of learners who interact and collaborate across a spectrum of platforms in pursuit of their online learning project. The students engage in both offline and online interaction and develop close ties or bonds with the peers they interact frequently with, while simultaneously engaging in sporadic interactions with a diversity of students that serve as bridges across networks. Such bottom-up participation in informal learning network activities (Czerkawski 2016) facilitates cooperation between previously unconnected students who are separated by social background and place. This kind of brokering provides opportunities for collaborations between students from different social backgrounds and offers learning benefits to students across the spectrum. Several cognitive benefits emerge from these engagements, namely sharing resources, receiving constructive feedback, participating in discussions and being exposed to alternative viewpoints. The range of socio-affective advantages of participating in informal learning networks includes developing confidence, trust, reciprocity, and a sense of shared purpose and community.

# Discussion

The intersection between formal and informal learning networks, conceptualised as PLEs, includes student collaboration on both a formal, university-bound network and informal, student–driven networks, in other words students learn inside and outside the university (Attwell 2007; Van Harmelen 2006). Student participation in informal structures takes place independently from the formal learning network. Where participation on the formal LMS may be limited, the vast self-initiated activities and participation in the informal learning networks extend across platforms and are fast-growing.

Informal activities are self-regulated and occur according to individual needs and circumstances. Students look elsewhere when formal learning does not satisfy their needs. The findings indicate that online students can no longer be seen as individuals who are passive information consumers, but should rather be regarded as active and socially engaged participants in PLEs. They use technological tools and social media platforms that are accessible to them in terms of affordability and applicability, a fact demonstrated by varied use of offline and online platforms for student collaboration. New technologies enable students to connect with people who they have previously been unacquainted with and are outside their immediate groups. For example, students communicate across social groups defined by race, gender and location. Informal learning networks also allow students to consult with students outside the university, for instance people who have already completed their studies. It is evident that affordable and accessible social technologies open up a new world for student interaction and collaboration that were previously unavailable.

However, not all relationships and collaborations between online students are equal (Oztok et al. 2015, 20; Carceller, Dawson and Lockyer 2015, 151). The research results demonstrate that student collaborations include both strong and weak social ties on various platforms. On the one hand, students who have frequent and close ties with peers report several social capital gains, such as finding emotional support and satisfactory learning experiences through the sharing and co-creation of knowledge. On the other hand, students who are engaged in widespread ties across networks report social capital benefits such as making new friends, obtaining fresh information and creating new knowledge while being participants in the formation of a broader community.

Bonding social capital is found in strong ties and bridging social capital exists in weak ties that link otherwise unconnected students. Bonding social capital has the advantage that students find support and build trust with members of their groups. Group members readily share information and resources and motivate each other. There is an element of closure in high levels of trust and connectedness between members of such groups which has the potential to increase intolerance of out-group students and distrust of alternative viewpoints. In essence, bonding social capital facilitates the sharing of more of the same. This solidarity may support the sanctioning of one-sided views.

Conversely, bridging social capital facilitates the sharing of information between groups or previously unconnected students. Bridging ties can serve as brokers which help to diffuse information across diverse groups on the entire network (Sajuria, van Heerde-Hudson, Hudson, Dasandi and Theocharis 2015, 710). Bridging social capital facilitates the generation of new knowledge as students are exposed to alternative views from those with different backgrounds to their own. Weak ties play an important role for students as they help to close gaps in their existing knowledge, give insight into different points of view and develop broader perspectives. They also assist in developing meta-learning skills such as self-reflection. This may not happen when students are continually surrounded by those who share their views. The study showed that it cannot be assumed that only strong ties in intimate groups have learning benefits for students. Weak ties play an important role in brokering knowledge in comprehensive learning networks. Therefore, both strong, cohesive ties with supportive prospects and weak ties with a coordinating potential have learning benefits. Both bonding and bridging social capital have complementary roles to play in facilitating online learning.

The issue of non-participation in the form of lurking on the periphery of a group needs special attention. Although hard-working members of a student group could resent being required to support non-participants, a social capital perspective provides an alternate insight. The principles of bridging social capital can be used to explain the value of having lurkers in a learning network. While lurkers might not directly contribute to the functioning of a small group, they serve as ‘brokers’ who transmit information to other groups in a broader learning network. The ‘brokers’ bear alternate viewpoints or non-redundant information that might increase the generation of new knowledge and stimulate new social development (Huysman and Wulf 2005, 8-9).

The extensive informal contact between students shows that some need more interaction than what is currently facilitated on myUnisa, and students generally need more support from the institution. The prominence and success of an external service provider, Critical Law Studies (CLS), demonstrates this need. The support required by students included both ancillary tutorial services and additional learning material. The need for contact with teaching staff was emphasised. The need for more support is also demonstrated by the face-to-face contact among online students. The research shows that some students place a high premium on making contact with others; they make an effort to go to learning centres, the main library, or the CLS campus where they can meet peers and exchange contact details for follow-up discussions about studies.

Students are not dependent on the formal learning network but go out and seek resources, make connections with peers and manage their online relationships (Cho and Shen 2013). The varied interactions in informal learning networks complement the formal learning network (Dabbagh and Kitsantas 2012, 5). Collaborations with peers across formal and informal network boundaries hold the potential for a wide range of positive effects for learning in an online learning environment. This is corroborated by previous research which found that interactions and collaborations with peers enhances aspects of online learning which include co-creation of knowledge, improving understanding of materials, enhancing the ability to apply knowledge, developing critical thinking skills, helping each other to solve problems jointly, enhancing the ability to make judgements and reflect on learning (Shen, Hiltz & Bieber, 2008: 75; Brindley et al., 2009: ¶2).

An important question which may arise is to what extent are naturally occurring social ties in informal social spaces diverted into formal spaces in PLEs. The relevance of this for online learning lies in the social process through which ‘neer peers’ (Rogers, 1995: 18) in informal networks can diffuse knowledge and subjective values to the formal learning space. The findings do show that informal social ties have learning and learning-related benefits but the findings cannot be used uncritically to support a statement that informal social capital is translated into formal social capital for the benefit of transformative online learning. However, such a possibility exists and follow-up research about the relation is required.

The development of PLEs, in which students are able to customise their learning environment, demonstrate the role of student agency in online learning. The finding is supported by previous research which concluded that online students make a plan to overcome structural constraints (Czerniewicz, Williams and Brown 2009). In this sense, PLEs are regarded as under the control of the learners themselves (Van Harmelen 2006).

The above illustrates a shift in pedagogy from experimenting with technology to realising that students are already using technologies according to their own needs. A lot can be learned from the popularity and effectiveness of informal learning networks and PLEs when setting out to design challenging online learning experiences at higher education level which acknowledge varied student interactions, nurture self-regulation, integrate adequate student support, facilitate the development of trust and sense of community among students and enhance student collaborative practices.

This transforms online teaching and learning practices on higher education level (Ngambi, Brown, Bozalek, Gachogi and Wood 2016). The design and development of online learning at university level require careful attention to be paid to pedagogical considerations (Mbati & Minnaar, 2015: 284). A heutagogical approach to learning design is appropriate for students in the twenty-first century as students are increasingly self-directing their learning environments. Students are exercising control over their learning process by choosing relevant content, appropriate times, places, media and activities for learning. In an environment where information is readily and easily accessible, the responsibility is with the students to direct or regulate their own learning, according to their own motivation and beliefs. A heutagogical approach acknowledges that learning also takes place outside the formal learning environment and that a self-directed learner moves freely in and between formal and informal learning networks in a customised personal learning space. The design and development of collaborative online learning may challenge the status quo and be labour intensive but an up-to-date view of student collaborative practices will benefit the learning project.

# Conclusion

The study makes a valuable contribution to understanding the importance of collaborative learning across formal and informal learning networks in PLEs for social capital development in online learning. PLEs facilitate the process of social capital development and learning enhancement through the establishment of different yet complementary types of social ties between diverse online students. Social capital theory is used to explain how bonding and bridging social capital can facilitate online learning. The outcomes of bonding and bridging social capital demonstrates that both close ties in intimate groups and weak ties between diverse groups contribute to the facilitation of online learning. The positive role of social capital lies in bringing diverse students together to create a learning community in which they share resources, learn together, co-create new knowledge and support and motivate each other. In summary, the contribution of social capital in online learning is that it improves learning outcomes at cognitive as well as socio-affective levels for both individuals and the group or network. Several lessons for online learning design are garnered from understanding the collaborations from the student perspective.

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