Behavioural Clusters in Online Learning

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Abstract

Why do some people participate in online learning forums and others not? What differentiates those that post in online blogging/ discussions and those that lurk? Our results show three distinct behavioural clusters within online learning communities: reticent participants; individualistic contemplators; and e-collaborators. E-collaborators perceive significantly higher levels of social capital within the online learning community and therefore participate to a much greater extent. Understanding each of these multiple knowledge sharing approaches within the three different behavioural clusters needs to be taken into account when developing our teaching and learning strategies.

Keywords: online learning, knowledge sharing, marketing education

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Introduction

The use of information and communication technologies to facilitate learning are now common practice within Australian universities (McGill and Klobas, 2009; Bell et al., 2002) with WebCT™ the most commonly used system. Online learning systems do impact student learning and it has been found that instructors strongly influence how such systems are utilised by students (McGill and Klobas, 2009). Online learning systems take many forms from minimal sites, such as brochure ware sites, to highly interactive sites that include podcasting of lectures, chat rooms, discussion boards, blogging sites, etc. (Cronin, 2009). The overall aim of online learning tools is to improve the student learning experience and develop a sense of community within the learning environment. Yet, experience indicates that some students participate to a much greater extent than others. We investigate this quandary in an attempt to understand the different behavioural segments within the student cohort.

This research focuses on the use of blogging sties and online discussion boards within the online learning environment. These particular aspects were chosen as they are commonly used across most universities and offer students an interactive experience. Student participation is an important component in the emergence of the online community and the development of their own learning experience. Although, discussion boards have been used within WebCT™ for some time, we are now seeing the use of weblogs as a means for students to share experiences and knowledge (Huang and Yang, 2009; Kim, 2008; Phang, Kankanhalli, and Sabherwal, 2009; Chen, Wu and Yang, 2008). Although only a proportion of students use online discussion boards and blogging sites (Kim 2008), both readers and posters value the information contained within the community (Taylor and Murthy, 2009).

Part of the use of online learning tools is to foster a sense of an online learning community as learning is a social activity (Kogut and Zander, 1992). Social Capital Theory has been used to explain the behavioural intentions within blogging sites and discussion lists (McLure Wasko and Faraj, 2005; Hsu and Lin, 2008; Chow and Chan 2008) yet most of this research is focused on contexts outside of universities. We aim to investigate how social capital can be used to explain differences in online discussion behaviour within University based learning communities.

Social Capital Theory

Social capital describes the resources available to actors through their social networks, i.e. resources that are accessed through social relationships (Adler and Kwon, 2002). In other words it is used to understand how social contexts can be used to access resources through interaction. In the case of this research, social capital is used to describe how participants in online learning forums access knowledge (resources) through the wider network of online learning forum participants.

Social capital has been conceptualised as having three dimensions: structural, relational and cognitive (Nahapiet and Ghoshal, 1998; Tsai and Ghoshal, 1998). The *structural dimension* refers to the network position of the actor through the number of connections and position relative to other actors. The *relational dimension* describes the strength of the relationships

between the actors. Adler and Kwon (2002) also argue that social capital includes motivation and reciprocity, which have also been included in this research. The *cognitive dimension* describes the similarity of cognitive understanding between the actors. This dimension includes aspects of similar culture, language and goals.

Structural Dimension of Social Capital

The structural dimension considers an actor's network position relative to other actors in the network. Previous researchers used the concept of centrality to measure the structural dimension of social capital (Tsai and Ghoshal, 1998; McLure Wasko and Faraj, 2005). Centrality looks at the number of connections each actor has relative to other actors. In the online environment, one way that centrality can be measured is therefore in terms of the number of times that actors read or respond to other actor's postings. In this study however, we used measures of actor perceptions of their centrality. This approach is consistent with Moody (2001) and Kim and Lee (2006) in which an actor's assessment of their centrality is based on their degree of interaction with other actors in both online and offline environments.

Relational Dimension of Social Capital

In online environments, the relational dimension of social capital measures a willingness to contribute to the relationship between members and their intrinsic motivation to share knowledge with each other in the group (Huysman and Wulf 2004). The relational dimension has four constructs: trust, reciprocity, motivation and enjoy-helping. Trust is critical if actors are willing to cooperate and share knowledge (Tsai and Ghoshal, 1998) and has been used to measure the relational dimension in previous research (see McLure Wasko and Faraj, 2005; Tsai and Ghoshal, 1998; Nahapiet and Ghoshal, 1998). Reciprocity describes an individual's expectation that if they share information in the present they will receive a return of the favour in the future (McLure Wasko and Faraj, 2005; Adler and Kwon, 2002). Individuals who are motivated to share are more likely to participate and contribute social capital resources to the network (Adler and Kwon, 2002). Motivation is also linked to individuals who enjoy-helping others. In other words, individuals who enjoy helping others learn are more likely to participate (McLure Wasko and Faraj, 2005).

Cognitive Dimension of Social Capital

The cognitive dimension has three constructs: expertise, social norms and goals. Individuals who feel they are an expert in the area are more willing to share knowledge with others (Constant, Sproull and Kiesler, 1996; Lu and Hsiao, 2007). Yet, McLure Wasko and Faraj (2005) found expertise to insignificantly influence blogging behaviour, indicating inconsistent results. Social norms of behaviour are an important aspect in deciding whether participation is acceptable to the current network (Adler and Kwon, 2002). Significant influence on knowledge sharing has been found (Lu and Hsiao, 2007; Chiu, Hsu and Wang, 2006; Chen, Wu and Yang, 2008; McLure Wasko and Faraj, 2005) while others have found insignificant results (Hsu and Lin, 2008; Mc Gill and Klobas, 2009; Tsai and Ghoshal, 1998). Common interests and goals encourage individuals to exchange information so that everyone achieves their goals and is an important construct for cognitive capital (Tsai and Ghoshal, 1998; McLure Wasko and Faraj, 2005; Chow and Chan, 2008).

We have also included four other constructs in our research: knowledge sharing intentions; nurturing/competition, individualism/collectivism, and freedom. Knowledge sharing

intentions were included to determine intentions to participate in online discussion forums. Nurturing/competition and individualism/collectivism were included to see if nurturing individuals are more likely to participate and if those with strong individualism traits are more likely to participate. Freedom of expression is expected to be a catalyst of the online sharing and thus individuals who perceive the discussion forums extremely flexible are more likely to participate.

Methodology and Results

All measures were chosen from previous sources [Moody (2001); Kim and Lee, 2006; Kankanhalli, Tan and Kwok-Kee, 2005; Tsai and Ghoshal, 1998; Lochner, Kawachi and Kennedy, 1999; Ridings, Gefen and Arinze, 2002; McLure Wasko and Faraj, 2005; Wang and Fesenmaier, 2003; Jarvenpaa and Staples, 2000; Kim and Lee, 2006] to improve reliability. Multiple measures were used for each construct and a seven point Likert scale was used for each item. Surveys were emailed to online blogging communities at Australian universities and within WebCT™ at the University of Western Australia. One hundred and ninety six responses were deemed feasible for use, with participants from the following disciplines: agricultural science (5%); arts and humanities (7%); computer science (11%); education (5%); engineering and science (12%); medicine and health science (7%); economics and commerce (35%) and other (18%).

Two-step cluster analysis was performed and resulted in three clusters being identified as shown in Table 1. Similarity was measured using Euclidean distance between each pair of discussion forum participants. The cluster solutions were reviewed for inclusion of irrelevant variables and outliers and they did not change the structure as result of those tests. Finally, the clusters' profiles were compared using MANOVA analysis and non-parametric tests.

When examining the differences across clusters based on their attitudes, all four multivariate tests (Pillai's trace, Wilks' lambda, Hotelling's trace, and Roy's largest root) indicated that the vectors of attitudinal factors scores are significantly different ($p<0.001$). When examining every variable separately, all discriminate between clusters at 0.01 level (Table 1).

Table 1 - Profile of clusters based on the attitudes towards online collaboration and knowledge sharing

Dimension for comparison / Cluster		1 - "reticents"	2 - "individualistic contemplators"	3 – "e-collaborators"	Significance value p
N		52	70	56	
Structural dimension of social capital	Social connections	-0.6556	-0.01088	**0.6465**	<0.001
Cognitive dimension of social capital	Expertise	-0.6465	-0.1142	**0.8485**	<0.001
	Norms	-0.8209	0.05175	**0.7691**	<0.001
	Goals	-1.1337	0.2916	**0.7516**	<0.001
Relational dimension of social capital	Trust	-0.8287	0.0737	**0.7339**	<0.001
	Reciprocity	-0.7844	-0.0015	**0.7815**	<0.001
	Motivation	-0.8072	-0.0529	**0.8394**	<0.001
	Enjoy helping	-1.1046	0.04157	**1.0379**	<0.001

Additional constructs	Knowledge sharing	-0.9573	0.00127	**0.9133**	<0.001
	Nurturing/competition	-0.4959	-0.1975	**0.7202**	<0.001
	Individualism/collectivism	-0.0366	**0.2317**	-0.2727	0.007
	Freedom	**0.6114**	-0.1503	-0.3768	<0.001

Note: The attitudinal questions were factor analysed and regression factors scores obtained for 12 latent constructs. All congeneric models had insignificant $\chi 2$ and standardised loadings above 0.55.

The Levene test of homoscedasticity showed similar variances ($p>0.05$) of the constructs in all three groups, except for expertise, norms, trust, and gender and cultural differences.

Table 1 indicates that "e-collaborators" rate social capital as significantly more important in their learning experience when compared to the other two clusters. They value social capital as an important aspect of their learning experience and therefore have a significantly higher intention to share knowledge online than the other two clusters. "Reticents" present the lowest scores for social capital, intentions of sharing knowledge, nurturing/competition and individualism/collectivism, while the highest score for the freedom of expression. "Individualistic contemplators" make up the second cluster, as a blend/combination of the three dimensions of social capital. Their uniqueness is their highest individualism score, suggesting lack of interest in knowledge exchange or cooperation through the online network. They are passive recipients of the voluntary contribution put on the network by the others, without necessarily believing that rewards arise from their participation.

Table 2 outlines the different online behaviours between each of the clusters. All clusters spend around the same amount of time on the Internet (no significant difference), yet the "e-collaborators" spend significantly more time within online discussion forums and are more likely to post, reply and read the messages within the online discussion forums. The "individualistic contemplators" spend the lowest time on the Internet and have the fewest conversations/exchanges with their peers. It may be they feel their expertise is insufficient for exchange or contribution, or their connections or the commitment are lacking.

Table 2 - Profile of clusters based on their online behaviour

Characteristic / cluster	1 - "reticents"	2 - "individualistic contemplators"	3 - "e-collaborators"	Significance p
hours per day on the Internet	44.7% less than 5 hours 23.9% 5-10 hours 31.4% more than 10 hours	61.8% less than 5 hours 16.2% 5-10 hours 22% more than 10 hours	43.5% less than 5 hours 32.6% 5-10 hours 23.9% more than 10 hours	0.634
hours typically on WebCT discussion board	74.6% less than 2 hours 7.5% more than 3 hours	94% less than 2 hours 1.5% more than 3 hours	**32.6% less than 2 hours** **20% more than 3 hours**	<0.001
hours in your own posting session	83.6% less than 2 hours	98.5% less than 2 hours	**39% less than 2 hours**	<0.001
how long have you participated in this discussion board	41% less than 3 months 18% more than 3 years	62% less than 3 months 12% more than 3 years	**20% less than 3 months** **24% more than 3 years**	<0.001
hours per day in this discussion board	67.2% less than 3 hours	86% less than 3 hours	**26% less than 3 hours**	<0.001

frequency reading messages	19.4% daily 36% monthly or less frequently	6% daily 67.2% monthly or less frequently	**17.4% daily** **23.9 monthly or less frequently**	<0.001
frequency posting messages	3% daily 87% monthly or less	**1.5% daily** **92.5% monthly or less**	6.5% daily 62.5% monthly or less	<0.001
last time you posted a message	73% more than 1 month ago	91% more than 1 month ago	30.4% more than 1 month ago	<0.001
last time you replied to other members' messages	60% more than 1 month ago	83.6% more than 1 month ago	26% more than 1 month ago	<0.001

Discussion

The three clusters built on the antecedents of online knowledge sharing show significant differences in their attitudes and behaviours. Cluster 1 of "reticents" displays the lowest scores for social connections, trust, goals and motivation, and knowledge sharing. They also have the lowest value for expertise thought to be brought to the forums, lowest value for norms, and they value the highest the freedom of expression on the discussion board. This suggests that their behaviour may be constrained if they perceive an inflexible environment or censored (such as WebCT™ discussion boards rather then anonymous blogging sites), where they cannot freely express their ideas. These students are more likely to be the lurkers, in that there is still a high percentage of students reading the messages daily but without posting.

Cluster 2 of "individualistic contemplators" has the lowest interaction in forums. They spent the lowest amount of time on the discussion board, they respond least frequently and they have the highest value for the individualism construct. These students need to be reached through another strategy rather than online discussion forums, such as face-to-face situations where their individualism can be more prominently displayed.

Cluster 3 presents the "online collaborators". They value the connectiveness, possibility of sharing, they enjoy the most helping others and they feel confident about the knowledge to be shared in the forum. They are not deterred by the norms of e-collaboration, on the contrary they have the lowest score for freedom. They are the least individualistic and they dedicate considerable time on the forum, posting, and replying. They are the most consistent contributors to the discussion form.

The analysis shows a significant segmentation, which is relevant for universities in understanding the benefits of e-knowledge sharing for various groups of participants and their preferences for the way the forum is organised/moderated. For example, making the participation anonymous may enhance the participation of "reticents" (cluster 1 members). On the other hand, it identifies a group that needs a differentiated approach for making it active online (cluster 2 of "individualistic contemplators"): if the forum may provide more individual benefits or have built in activities to trigger the participation behaviour, this cluster may switch their current attitudes and intentions on online sharing.

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