

Evaluation of a Collaborative Learning Environment on a Facebook Forum

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Abstract: An academic group and discussion forum were established on Facebook for a cohort of postgraduate students studying 'Concepts and Principles of eLearning'. The Forum had a constructivist, student-centric ethos, in which students initiated discussion topics, while the course leader and administrator facilitated. In previous research, content analysis was undertaken of the discussions, but the present study evaluates the collaborative learning environment on Facebook, investigating social relationships, study-related pursuits and the balance between them, as well as considering whether the Group could be viewed as a Web 2.0 application.

A literature review shows how social networking by students, initially social, began to overlap with academia, leading to groups and forums for academic purposes. In mixed-methods research, *qualitative analysis* was done on *free-text data* to extract themes from students' reflective essays and from an exam question, while *heuristic evaluation* was conducted by expert evaluators, who analysed *forum discourse* in line with contemporary learning theory and considered the social culture of participation. Findings of the qualitative analysis and results of the heuristic evaluation of forum participation confirmed each other, indicating a good social climate and a conducive, well-facilitated environment. Inter-personal relationships were fostered between distance learners, and academic value arose from independent research, peer-learning and social negotiation. Facebook served well as an environment for collaborative learning, but did not provide a full Web 2.0 environment for the collaborative generation of artifacts or projects.

Keywords: ELearning, Facebook group, heuristic evaluation, discussion forum, qualitative analysis, Web 2.0

1. Introduction

Social networking sites (SNS's) are increasingly used in academia. This article investigates the collaborative-learning milieu of an academic Group and online discussion Forum (ODF) on Facebook, to enhance learning for postgraduate distance-learners studying 'Concepts and Principles of eLearning' at the University of South Africa (UNISA). Most of the students were computing professionals, whose ages ranged from 25 to 58.

UNISA, a distance-education institution, provides eLearning forums on its official site, but we offered an alternative supplementary group and discussion forum on Facebook for a postgraduate cohort. It had a constructivist, student-centric nature, in which students initiated the discussion topics. The course leader and administrator facilitated as *guides on the side*, rather than as *sages on the stage*. The aim was to encourage interaction that provided subject-related information and academic discourse. Previous research (de Villiers, 2010) involved content analysis of the on-forum topics and discussions, using quantitative frequency counts of interaction types, and qualitative analysis of the content. The study showed that active participation in the Forum supported learning and enhanced performance. Secondary benefits occurred, including the emergence of peer-to-peer relationships, leading to the present study on social aspects of the collaborative learning and progress towards eLearning 2.0 in a Web 2.0 context.

2. Literature review

Various studies addressing students' use of SNS's, have determined that the interactions were primarily social (Madge, Meek, Wellens and Hooley, 2009; Selwyn, 2009). In an online survey of 600 student users, Mazman and Usluel (2010) found they visited Facebook for approximately 30 minutes daily, mainly for socializing. A meta-analysis of 36 studies on students' and teachers' use of Facebook, indicates little educational use (Hew, 2011). According to Lampe, Ellison and Steinfield (2008), Facebook is ubiquitous on US campuses with the typical user visiting for 80 minutes daily. However, Lampe *et al.* found that academic matters such as lectures, reading materials, deliverables, and instructors were mentioned and about 15% of students used Facebook to contact lecturers. Selwyn (2009) studied Facebook Walls of UK undergraduates, visiting over 600 sites with public viewing profiles. Four percent of the exchanges related to academic schedules, venues, lectures and deliverables, while another theme was criticism of keen students, seminars and lecturers.

Nevertheless, educational use is on the increase and explicit academic use of SNS's has been reported. Four case studies on social networking by students (Jones, Blackey, Fitzgibbon and Chew, 2010) show a divide between students' learning space and personal space, yet acknowledge that educators should leverage SNS's and create environments for independent learning, reflection, and communities of inquiry.

In a study of relationships between Facebook and engagement in studies, Junco (2012) surveyed 2368 university students and found that time spent on Facebook was negatively related to academic engagement and time spent preparing for classes. Kirschner and Karpinski (2010) surveyed 219 students to investigate the relationship between Facebook use and academic performance, measured by self-reported academic grades and the amount of time spent studying. In findings congruent to Junco's, their data revealed significant differences, with Facebook users reporting lower mean scores and less hours studying than non-users. Considering students' inherent Facebook involvement, Junco proposes educational practices that incorporate Facebook in ways that optimise engagement and academic benefits. The work reported here – which predates Junco's study – is in line with this call.

Schroeder and Greenbowe (2009) encountered low participation by chemistry students on the official bulletin board and chat facility. Since students spend time on SNS's anyway, Schroeder and Greenbowe established an optional Facebook forum where students could pose questions and discuss chemistry outside the classroom. The Forum was supplementary and official material was uploaded on the university site. Nevertheless, 67 posts were uploaded on Facebook and only 17 on the official site, with the Facebook posts addressing advanced topics and eliciting meaningful responses. Believing that Facebook enhances motivation, affective learning and student-faculty relationships, Wang, Woo, Quek, Yang and Liu (2011) established a Facebook Group at a teacher training institute, where students attended classes supplemented with some online sessions. Surveys were conducted to investigate the students' perceptions on this environment. Regarding pedagogical affordances, the most highly rated item in the survey was the ability to hold online discussions via Facebook. With respect to the social aspects, however, ratings on getting to know peers via the textual mode of the Group, were low.

Web 2.0 applications were not designed for educational purposes, but can play meaningful roles in education. SNS's, blogs, wikis, etc. are gaining acceptance in higher-education institutions as collaborative learning environments and the need arises for frameworks to evaluate learners' engagement. Jimoyiannis and Angelaina (2012) suggest that social computing offers opportunities for teamwork, resource sharing and student-directed learning. It shifts the boundaries of learning and merges education with entertainment. They studied blogs in educational practice for, among others, discussion forums, group blogging, and conversational platforms, all of which are aspects of the present study. Jimoyiannis and Angelaina applied the community of inquiry (CoI) model to guide research and practice in online collaborative learning. The CoI Model comprises three components to guide and analyse online experiences:

- social presence – how learners express themselves socially and emotionally;
- cognitive presence – construction and confirmation of meaning via discourse and sharing academic content;
- teaching presence.

There is increasing academic use of Facebook in South Africa, the authors' home base. Bosch (2009:147) did a 'virtual ethnographic' study of Facebook profiles of 200 students, supplemented by interviews with students and staff who communicated on Facebook and found that the experience undid 'traditional power hierarchies'. Students were more engaged on Facebook than on the official course management site. Many belonged to groups for societies and academic programmes, where they shared resources and logistical information and checked class-related material. Visagie and de Villiers (2010) (not the present author) surveyed 32 academics and established that 56% would consider using Facebook as an academic tool. As academic use of Facebook increases, research is being conducted on subject-related discourse in discussion forums. Content analysis of the present Forum has been undertaken (de Villiers, 2010). First-year students participated in peer-initiated topic-based conversations in a systematic, well-articulated way (Rambe and Ng'ambi, 2011). Informal learning occurred in a social-constructivist community where students and instructors conversed and shared knowledge to support better understanding of the subject matter (Ractham and Firpo, 2011).

3. Research design and methods

The research questions addressed are:

Did the collaborative learning environment enhance both social relationships and academic pursuits?

Can the Facebook Group be viewed as a Web 2.0 application?

To evaluate the social and academic impact of collaborative learning on Facebook and to investigate whether the Group and Forum provided eLearning 2.0 in a Web 2.0 milieu, we focused on the social culture and interaction patterns as described by students in reflective free-text essays and as identified by heuristic evaluators studying the discussions. The nature, impact and facilitation of the discussions were considered, as well as the ethos of the interactive community and the use of personal styles of participation. In an extension of work by de Villiers and Pretorius (2012), a mixed-methods research strategy (Creswell, 2009) was employed, supported by data triangulation and methodological triangulation. Data triangulation occurred from using three datasets: students' essays, exam responses, and forum discourse. Methodological triangulation was implemented by two evaluation methods: qualitative analysis of free-text and heuristic evaluation of forum discourse.

Study 1 *Qualitative analysis of free-text data from reflective essays and an exam question.* These perceptions were qualitatively analysed by the primary researcher using a *grounded theory method*.

Study 2 *Heuristic evaluation (HE)* by four expert evaluators: The experts investigated *forum contributions* to determine the social climate and to establish whether the ethos of the discussions conformed to contemporary eLearning theories. These evaluations were mainly *quantitative*.

For ethical reasons participants were informed that research was being conducted and they signed informed consent, as did the evaluators.

4. Study 1: Qualitative analysis of free-text data from students' reflections

Membership of the Group was encouraged, but not compulsory. Thirty of the 40 in the cohort joined. Twenty seven students continued through to the exam and, of those 27, 21 joined the Facebook Group. Twelve of the 21 were active contributors, while nine made three or less postings. Some students who did not complete the course were also active contributors.

Free-text data from students' reflective essays and from an exam question about the Group and eLearning 2.0, was analysed by grounded theory and categorized under emerging themes and sub-themes. The findings in Sections 4.1 to 4.6 are supported by quotations from the textual data and cited using pseudonyms for anonymity, e.g. P1 represents Participant 1 and NP1 Non-Participant 1.

4.1 Vibes and ethos of the virtual community

In off-forum reflections, students gave varying perspectives on the ethos and impact of the discourse.

Virtuality became Reality

Distance dissipated, as participants got *'to know each other'* and conversed *'in the presence of peers'*:

'Since it is often outside the classroom that students get to real knowledge sharing, social networks can play a major role in informal social learning and accessing each others' implicit knowledge'.

'The group is friendly, enthusiastic and passionate about the subject... the interaction is excellent'.

The group became a community and had a sense of real-world talking and listening:

'What you teach fellow students is embedded in your mind longer... because you say it to people'. 'If I share my thoughts, I like to know who is listening. It is gratifying to interact with people with a common goal'. (P3, P5, P12, P14, P17).

Culture and tone of interactions

The environment was warm and conducive. Some students built relationships and conversed off-forum. Although real-world academia can be self-focused and competitive, the Group culture was not geared to personal achievement:

'The best is that users freely share their sources of information, how they interpret concepts, and their personal experiences'.

'Wisdom of crowds... the whole is greater than the parts'.

'Make or break depends on support of peers... those with experience and intent to help can mentor and guide novices'.

'I enjoyed interacting with fellow students on a social level, although I did not benefit academically'.

'Interaction was enjoyable and fulfilling'.

'I have (previously) used forums to pose questions and seek answers, but I disliked the standardized and uncreative way they were presented'.

The tone was informal yet cordial: *'Nobody called the lecturer "Madame" yet, on the other hand, there was no use of shortcuts like B4, 2b or LOL'.* (P4, P6, P7, P13, P16, P27).

Removal of isolation

'Standard, boring distance learning was enriched'; 'The sense of isolation dissipated'.

To a long-term distance-learner, it was *'a thrilling experience. The first exotic e-fun occurred when fellow-students introduced themselves as if sitting alongside me, but writing from Australia, Japan, Namibia, Pretoria'.* (P1, P4, P12).

Challenge, yet affirmation

Written words do not vaporise like spoken words and this calls for careful reflection before posting:

'... a new-found sense of pressure to understand what I was reading'.

'Someone else would be reading it, and giving their opinion'. (P13, P21).

However, contributing brought affirmation: *'The brief experience when I shared my views was a turning point...My confidence peaked...'*

'It was heartening to see that a number of fellow-students agreed... '.

'Being introvert, I only made one comment, but it is a start'.

'Participating with the professor and fellow students, I felt honoured to be part of the exercise and especially getting accolades for my contributions'. (P2, P25, P27).

4.2 Support for individual styles

Most students found the Group and Forum supportive. Several exercised pro-active leadership and initiated topics, while others saw it as a place to participate in discussions without the exposure of contact-learning. Yet others did not contribute, but observed and 'listened'. They benefitted, although some fellow-learners did not appreciate observers. While some students found the atmosphere of the Forum non-intimidating, others tended to be daunted:

Better than a real classroom

Some participants were more comfortable conversing on Facebook than in a conventional classroom:

'Sharing is less rigid than when responding to questions in a class'.

Learners are *'...not frowned on when they express themselves in whatever way they feel comfortable'.*

'People are less afraid, and speak without fear of being mocked'. (P7, P17).

'It eliminated possible first-line prejudices that might have occurred in a contact situation. One considered the content and not the person'. (P21).

'Got more feedback than in class situations, where a few students might dominate'
(P4).

Non-intimidating – a place to take initiative

The ethos encouraged some to take the lead:

'Should I take the initiative?...it was clear this was a place to take charge... Grasping the new-found freedom, I decided to start...'

'Some are outspoken and involved in everything, with quick responses, but others keep to themselves'.

'We could ...have a brainstorm session'. (P7, P13, P17).

Daunting

Some felt intimidated and inadequate. They feared negative responses or no response:

Exposure to *'...some refined and polished contributions, led to feelings of academic inferiority'*.

'People can be afraid to express views, because they are unsure of relevance and accuracy'.

'You would like to contribute or ask questions, but wonder if you will look stupid'.

(P5, P10, P21).

Responses to postings

Contributors anticipated responses to their postings and were disappointed if this took time:

'You are demoralised if no feedback is forthcoming'.

'The time-independent nature of the interactions meant that discussions were sometimes drawn out, preventing immediate feedback...'

'You (have to) wait for the response when somebody is online'. (P8, P16, P21).

Observers

Some perceived the Group as a safe space for learning without contributing. They chose to watch and listening, yet without the negative connotations of 'lurking'. Certain participants were disturbed by this:

'I experienced frustration when just a few participants contributed, though I realise that some preferred to read what others wrote rather than contributing'.

'Some joined the group, but did not make postings'.

'Some students joined but kept silent... just watching, a bit creepy!'. (P1, P17, P27).

The observers were content:

P25 explained, *'I go on forum to see if someone asks what I want to know. It helps me learn if I am going in the correct direction. I log in daily and am disappointed when there are no new contributions'*.

'I mostly observed. I configured my notifications and got updates instantly' (P15-exam).

4.3 Web 2.0, eLearning 2.0 and Facebook

Web 1.0 has led to Web 2.0, where users personally generate content. Similarly, eLearning 1.0, where learners accessed existing educational Web content, has been succeeded by eLearning 2.0, where learners are empowered to contribute content. Ebner (2007) defines it as:

eLearning 2.0 = Web 2.0 + eLearning 1.0 + Human Factor.

This section overviews participants' impressions of Facebook as a Web 2.0 learning environment.

Paradigm shift towards eLearning 2.0

In the context of education:

'Web 2.0 means a learner-centric approach' (P16), where *'learners contribute content'* (P12).

'You want to give your best, so you research your response to ensure validity' (P10-exam).

In line with Ebner's human factor, eLearning 2.0 is more a *'social phenomenon' / 'social revolution'* than technological:

'.. paradigm shift', 'Social media are part of the shift to eLearning 2.0',

'...relinquish tried and tested ways, which takes time and not everyone joins the revolution' (P7, P8, P16, P14, P11-exam).

Some can be *'more sociable than before'* but *'others are just not sociable'* (P12).

Several cited Ebner, *'Technical issues will be solved quickly, but to change the thinking about learning and teaching is hard and long'*.

'We can't expect everyone to feel comfortable with social tools, but change is a constant...' (P3, P11).

In the exam, P21 reflected:

'While Facebook is Web 2.0, the Group was not eLearning 2.0, but "eLearning 1.5", since it lacked dynamic content and simultaneous multi-user participation. If supplemented by wikis, blogs and podcasts, it would be true eLearning 2.0'.

Non-participants made similar points:

'Web 2.0 has dynamic pages' (NP5-exam)

'Collaborate on blogs, using security features to lock content that others should not change' (NP2-exam),

'Wikis would support collaborative work, because content can be edited and changed' (NP4-exam).

Academia on Facebook

Some were convinced that Facebook is the way forward:

'For someone like me, who already uses Facebook and enjoys working smartly, Fb provides a single point of entry where I interact socially, follow updates, and participate in communities... I am comfortable using it as a learning tool'.

'This type of discussion forum works with what is already available'.

'We are the mobile-interconnected-global-village generation with Web 2.0 Fever'.

(P7, P13).

Furthermore, Facebook is ideal for forums.

'It is well-structured with good layout and areas for discussions, the Wall for banter, pictures and videos, membership lists, ways to handle permission and access';

'...has global interconnection' and 'You can reach members personally by accessing profile pages'. '...A co-operative environment that fosters trust among learners and instructor', allowing students to 'learn from one another'. (P7, P11, P13, P18).

P11 made a strong statement: *'Educational institutions should use Facebook and provide links from their institutional websites'*.

Shy users and silent users

Facebook breaks barriers for those who are shy or who feel vulnerable. Despite being a public space, it can conceal members when they pass opinions:

Those who *'struggle to socialise'* or *'have difficulty with social skills'* found it easier to communicate on Facebook than face-to-face. *'Collaborative online learning brings major changes, so that learners with low self-esteem can communicate and comment without face-to-face interaction'*. (P4, P8, P10).

There were silent observers, as noted in Section 4.2. Some were insecure and preferred not to communicate, but essays indicated that others had joined and were unable to access the Forum. At

least two of them wrote on the Wall, but did not manage to join a discussion (P4, P5). The usability of Facebook Groups has since been improved.

Collaborative learning

Answers to the exam question on eLearning 2.0 stressed collaboration and innovation:

'In eLearning 2.0 we collaborated with others. We learned more, because we learned together' (P2-exam).

'We generated our own Web content' and gained *'wisdom gathered from collaborative learning'*. *'Agreement/disagreement encouraged debate and challenges'* (P4-exam, P14-exam).

'Today's mobile devices have embedded SNS's, which (can) promote learning' (P8-exam).

'eLearning 2.0 is characterized by greater locus of control and sharing of the learner/teacher experience' (P2-exam),

'... access information from different sources to synthesize own material', *'...exposed to different views'* (P9-exam, P17-exam).

'No formal educational material was delivered via Facebook' (P16-exam),

'The Group was a benchmark platform where we gauged our own grasp of the topic against posted comments – highly motivating!' (P7-exam).

Asynchronicity and synchronicity

Asynchronous interaction via social networking offers Ebner's (2007) *'Triple A: Anytime, Anywhere, Anyone'*, which provided convenient interaction (P3, P1-exam, P10-exam, P21-exam).

Opinions varied on asynchronicity: Some appreciated that *'questions and answers could be carefully thought out before posting'*, whereas others felt it *'detracted from spontaneity and natural dialogue ... debate is interrupted by time'* or conversely that *'it moved fast, I struggled to contribute'*. Furthermore, asynchronicity and different topics result in different threads and *'... at times, it was difficult to follow them all'* (P1, P17, P21).

There was little use of synchronous Chats, although some learners held real-time forum dialogues.

Membership

Some would have liked membership to be compulsory, but the course leader took a considered decision not to enforce it. A high achiever who chose not to join, appreciated the flexibility: *'I have a solitary, intrapersonal and introspective learning style. I ponder, evaluate, and write down thoughts... I tackle problems and solutions alone'* (NP1).

Answering the exam question, P21 expressed *'concern'* about non-participation. With hindsight, others speculated in the exam on the reasons: *'Either they are too busy or they are unsure how to use a Group'* (P15-exam), *'Maybe they need extrinsic motivation, like marks for participating'* (P16-exam).

4.4 Control and management by the facilitators

Management of the forum was challenging. Since the explicit ethos was student-initiation of discussions, we positioned ourselves as facilitators between the extremes of strong control and hands-off. We served as *guides on the side*, not as *sages on the stage*. Management involved carefully watching accuracy of the content, as well as monitoring security.

Constructivism

Many appreciated the constructivist-style freedom and low-level control:

The Forum was an implementation of the current *'focus on cognitivism and constructivism'*.

'Well moderated; well managed'.

'A new paradigm of teacher-learner interaction. The professor merely facilitates and guides'.

It was *'not dictated by the teacher'* who is employing *'new ways of teaching and guiding'*.

It could have been managed *'by fixed principles, but that would curtail conversation – which was not the idea behind this free, natural learning interaction'*.

'The input snippets received from the leader and administrator are gold nuggets'.
(P1, P2, P7, P8, P16, P18).

'The teacher guided, enhancing and enriching the learning experience' (P2-exam).

Constructivism was highlighted in the exam, where different aspects were described:

'Starting your own topic',

'Adding responses' / 'Different angles on same topic',

'Links to other sources' / 'sharing information beyond prescribed material' / 'relevant resources' / 'exchanged notes'.

'Active learning' / 'lively feedback' (P3-exam, P4-exam, P5-exam, P7-exam, P8-exam, P10-exam).

Security

Some students felt threatened by security breaches: *'It is difficult for me to use Facebook socially, let alone as a learning tool. My reservations are due to lack of security...'* (P11).

We erroneously admitted an *intruder*, believing he was a student whose registration was not finalised. He participated, then posted advertisements for motivational courses and financial products. A disconcerted student communicated off-forum and challenged him with an academic question he could not answer: *'It is exciting to say I have encountered an e-stalker! Yet I must question how he managed to infiltrate our group'* (P1). As facilitators, we immediately removed him. The shrewd P1 picked up another anomaly: *'A profile image introduced a beautiful young lady and we chatted away on academic matters. Her achievements amazed me. After a few weeks she admitted to being "him", a student, who had borrowed his daughter's Facebook membership (with Prof's permission) due to logistical difficulties'*.

Control and reliability

Some students wanted tighter management:

'Such platforms need proper control and facilitation'; 'All content should be verified'. 'People should not be allowed to say just anything – there was irrelevant content on the Wall' (the intruder).

'Without verification or personal discernment, learners could be misled by inaccurate statements'.

'A weekly question from the facilitators might have encouraged more interaction'. 'It's better if topics are explicitly given, so only one discussion runs at a time'.

(P3, P12, P17, P20).

Members and a non-member expressed concern about distinguishing between fact and opinions:

There was *'potential both to confuse and illuminate, confusing when it's "I think..." without proper backing. However, when the posts are well thought through and backed with credible references, the potential for real learning is high'* (P21).

'Teachers should set standards and test contributions before they are uploaded' (P3).

'What proves that the points shared by a student are true and valid?' (NP2).

Our response is that pre-approval is not possible in forums and, as facilitators, we were reluctant to destroy spontaneity. There can be monitoring after postings, with discerning public comments and private communication with offenders. If content was merely weak, we did not react, but when

discourse veered off-track, the course leader responded by pointing to theory or posting a challenging question.

4.5 Balancing academic and social interactions

To users accustomed to SNS's for entertainment, the playing fields now offered study facilities. This section overviews the integration of social relationships into the academic environment.

Successful integration of social and serious

The *Wall* and *Introduce Yourself* informally offset the distance and gave a friendly context for the study-related pursuits. Most members felt that social networking and serious studies could be effectively combined. Several mentioned the incorporation of *'fun'*, *'entertainment'*, *'informality'*, *'interactivity'* into learning (P4, P7, P8, P14, P16, P17, P21).

'I learned to melt into social networking scenes, let the resistance go, flow with the wave, yet keep wearing the academic hat'.

'Push and pull factors: friends pull; academia pushed us to view Facebook as a serious tool'.

'Social and educational tasks are executed simultaneously. I peep at the study group site each time I log on'. (P1, P7, P10).

'Given their ubiquity, it would be "short-sighted to ignore Web 2.0 applications" for educational purposes' (P21, citing Ebner, 2007).

'Initially regarded the exercise as totally academic, but later saw the social value, along with the constructivist learning' (P1).

'Facebook was intended for social and recreation, but it can be leveraged for learning. I found the Group an enjoyable and refreshing alternative to traditional forums' (P13-exam).

'Students could send each other personal messages' / 'I received mail from members in my Inbox' (P3-exam, P15).

'Get to know peers better, air views that might differ because of cultural or other differences, understand each other's viewpoints.' (P4-exam) / *'Get acquainted with classmates on a social level – an easy way to connect like-minded people globally' (P13-exam).*

'There was a natural bonding, some of us became friends and created a network of professionals with a common purpose. We will keep on interacting after this' (P7-exam). A non-participant commented, *'Facebook has caused addiction... a study group there could be a good way to study' (NP6).*

Distractions

Some struggled with distractions:

'Other Facebook interactions and the whole Internet could easily pull one away...'

'...numerous inviting sites could attract learners to something totally different'.

'Family and friends found me and nagged to be my friend'; '...friends determined to "poke" me'.

'It calls for a change in mindset among those who see it as a fun tool and miss its essence in learning' (P1, P16, P17).

Potential distraction prevented a non-participant from joining. *'Literature indicates that SNS tools and systems incorporate high interactivity to hold users' interest. This could distract from learning' (NP2).*

4.6 Nature of discourse and debate

Discussions that simulated face-to-face interaction were enriching for distance learners:

Interactive communication between peers

'The ability to interact with people of similar interests anywhere in the world, was a definite advantage. One could tap into the collective consciousness of a diverse group of people.'

'We are exposed to having views challenged and can engage in discussions of the subject matter.'

'Opinions differ over same material, but without challenging others disrespectfully.'

'Different perspectives on the same topic...' (P2, P7, P10, P21).

New insights

Students learned from their peers and it is notable that the more active participants all performed well in the examination. Matters emerged that learners had not identified independently:

'Collectively the learners are exposed to an abundance of information... collaboratively they digest content and information within a short time.'

'...useful perspectives, beyond what one would obtain by merely reading the articles.'

'The whole community benefits from one another's insights.'

'Current information and state-of-the art development make a significant contribution to learning.'

And a perceptive point made by different students:

'By posting ideas, we solidify our thoughts. By reading others' responses, our ideas are refined.'

'I gained insight through reading posts of others, and the process of thinking through my responses helped clarify issues'. 'When reading fellow students' input..., my own interpretation changed'

(P2, P10, P16, P21, P25).

'The discussions stimulated self-study, highlighted shortcomings and induced cognitive awareness' (P1-exam).

Generational differences

Perceptions and approaches differed. Some older students joined Facebook as novices and became avid contributors. Three participants mentioned their need to print discussions, while some from the Net-generation preferred the e-word to the printed or spoken word:

'The ability to recall and regain online discussions is vastly superior to non-eLearning scenarios of searching through paper-based materials or trying to recall verbal conversations' (P21).

'I view Facebook as a social tool for the younger generation and unsuitable for academic purposes. It was a novel approach, but should have just been an experiment...' (P27).

5. Study 2: Heuristic evaluation by expert evaluators

Four expert evaluators, who are profiled in Table 1, conducted a heuristic evaluation (HE) to investigate the social climate of the Facebook Forum and to assess contributions against eLearning theories based on human-centred values. The HE is founded on philosophies of education from seminal studies by scientists and psychologist such as Anderson, Bruner, De Bono, Piaget and Simon. In the past 20 years, these classic paradigms have been applied to instructional and learning environments and are used here in evaluating the Facebook Forum, although they pre-date Web 2.0. The expert evaluators, all four of whom were 'double experts', i.e. experts both in eLearning and heuristic evaluation, considered sets of criteria/heuristics to establish whether the online discussions conformed to the pedagogies associated with six factors: (i) *cognitivism*, (ii) *constructivism*, (iii) *customization*, (iv) *creativity* (v) *collaborative learning*, as well as (vi) judging *social aspects* of the experience. These factors in combination, investigated the Group's social culture, academic impact and implementation of collaborative learning in a Web 2.0 context.

Table 1: Profiles of the expert evaluators

Evaluator	Occupation	Expertise	Group Involvement
A	Researcher	ELearning theory and practice; heuristic evaluation (HE)	None
B	Lecturer and post-graduate student	ELearning environments; HE	Member and contributor
C	Usability practitioner	Usability evaluation; ELearning theory and practice; websites; HE	Administrator
D	Information Systems professor	ELearning; MLearning; HE; Human-computer interaction.	None

The experts performed their evaluations independently. They did not see the off-forum reflective essays (Study 1), but formed conclusions by considering and evaluating the Forum discourse.

The evaluation template comprised sets of criteria for each of six factors, sixteen criteria in total, phrased as evaluation statements and rated on a Likert scale, with 5 as *Strongly agree* and 1 as *Strongly Disagree*. There were spaces for open-ended comments. Table 2 tabulates the criteria against the quantitative results, showing the average rating assigned to each criterion, as well as the cross-criterion average for each factor. This is followed by theoretical explanations of the six factors and discussion of the evaluators' ratings and responses to open-ended questions. There was close consensus between the four evaluators. On only one occasion did the ratings for a particular criterion differ by more than 1.

Table 2: Results of the heuristic evaluation

Strongly agree (5)	Agree (4)	Neutral (3)	Disagree (2)	Strongly disagree (1)	
Category and criteria – rated on the scale above				Average rating	
1. Cognitivism					
The interactions on the Facebook Study Group implement cognitive learning.				4.25	
2. Constructivism					
The activities undertaken in the Group are highly constructivist.				3.5	
Participants in discussions think independently and make personal interpretations.				4.125	
Discussions moved beyond the curriculum and applied concepts in the real world.				4.75	
Cross-criterion average				4.125	
3. Customisation					
Participants can customise the time and place of their interactive learning.				5.0	
The discussion forum is learner-centric in that participants could select and initiate their own topics for discussion and contribute personal content.				5.0	
Cross-criterion average				5.0	
4. Creativity					
Academic discussions in the Forum represent an innovative way of using Facebook for learning purposes.				5.0	
Participants responded to the Group environment in creative ways.				4.25	
Cross-criterion average				4.625	
5. Collaborative learning					
The study group was well used by participants for collaboration in the form of communication and sharing ideas.				4.0	
The Facebook Group was a suitable environment for doing collaborative projects.				2.25	
The Group provided opportunities for distance learners to get to 'know' each other.				4.75	
Cross-criterion average				3.67	
6. Social climate of the Group					
Interaction on the Forum took place in a friendly and conducive environment.				4.5	
The distance learners who joined the Group got to know each other.				4.5	
The ethos of the Forum supported individual styles of participation.				4.0	
Cross-criterion average				4.33	
The way the Forum was managed, resulted in a space that was:					
rigid/strictly controlled (1)	firmly controlled (2)	balanced and well moderated (3)	led by students, with leaders on the side (4)	led by students, with leaders hands-off (5)	3.5

Rate the activities and discussions on a spectrum from: (1) Solely Social.....to.....Serious Studies (5)	3.5
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Cognitivism (cognitive learning) became prominent under Jean Piaget and the Nobel Prize winner, Herbert Simon (Anderson, 1983; Inhelder and Piaget, 1958; Newell and Simon, 1972). It addresses cognitive processes that support learning, such as human information processing, mental models, metacognition and self-regulation. New knowledge is integrated with prior learning and new skills are built on previous knowledge. Critical thinking and higher-order thinking skills (HOTS) are fostered by authentic problem solving (Alessi and Trollip, 2001; de Villiers, 2005; Winn, 1990). The ratings for cognitivism averaged 4.25, with a comment, '*The discussions built on theoretical foundations, leading to cognitive learning and higher-order understanding*'. Two other evaluators remarked on the stimulation of higher-order thinking, one saying '**Yes for HOTS!**'.

Constructivism, originating under Jerome Bruner, is a philosophy and an educational approach. The constructivist paradigm followed cognitivism, becoming prominent in the 1990's. It refers to personal knowledge construction and interpretation by learners, their responses to real-world objects, active learning and multiple perspectives on issues (Bruner, 1967). Since constructivism emphasises independent research by learners and collaborative activities, it is increasingly common. It can be implemented within problem- and project-based learning, in forums and open-ended learning, where learners explore and conduct discovery learning (Jonassen 1999; Willis, 2000; Winn, 1992). In investigating the implementation of *constructivism*, evaluators acknowledged the social-constructivist nature of interactions on the Forum. There was scope for participants' insights and independent interpretations, and they applied concepts to real-world phenomena beyond the curriculum. The cross-criterion average rating for constructivism was 4.125. The student-initiation of topics was praised, as was the independent thinking and application of theory to concepts in the workplace and contemporary society. One evaluator felt that the asynchronous conversations lacked the immediacy of contact discourse.

Customisation or personalised learning (Alessi and Trollip, 2001; Bruner, 1967; de Villiers, 2005) entails a learner-centric approach that supports individual processes and learner-control, where learning is adaptable to personal needs and interests. From a practical viewpoint, it can allow learners to take initiative regarding the time, place and sequence of learning. Both of the criteria relating to *customization* were unanimously rated at 5.0, since participants could choose the time and place for activities, while learner-centricity allowed them to initiate topics and match their needs by contributing (or not) in their preferred style.

De Bono's (1970) seminal construct of 'lateral thinking' promoted the value of *creativity* and innovation in the workplace and in learning. Creativity supports the affective, novel and motivational aspects of learning (Caropreso and Couch 1996; Malone, 1981). Learners' attitudes and engagement in a learning situation impact on the affective-cognitive bond, while motivation influences the initial ability to acquire knowledge, as well as perseverance (Price, 1998). With regard to *creativity*, the expert evaluators' cross-criterion average was 4.625. They rated Facebook as a novel and engaging environment for social learning in an attractive, friendly context that was familiar to most of the Group. The congenial atmosphere fostered strategies such as posting links to academic articles (though the articles themselves could not be uploaded); becoming 'friends' with other members; and communicating one-on-one off-Forum. Two evaluators stated that engendering creativity was a '*very strong aspect*' of the Group.

Collaborative learning involves team work and social negotiation, along with individual and joint accountability. It is particularly relevant in problem-based learning and fosters the development of workplace skills (Johnson and Johnson, 1991; Li and Huang, 2008; Singhanayok and Hooper, 1998). The Web enhances collaborative activities as it facilitates communication and joint work. Collaborative learning is associated with social constructivism, which posits that 'learning is inherently social ... knowledge is not simply constructed by the individual but by social groups' (Alessi and Trollip, 2001: 31). The collaborative learning factor produced interesting findings. Two of its criteria were highly rated. All four evaluators agreed that the study group was well used as a medium for collaboration (4.0). There was strong agreement that the environment provided opportunities for participants to get to 'know' each other (4.75). The third criterion was phrased to provoke discernment, as it suggested that the Group was suitable for collaborative projects. The experts pondered and, while acknowledging it provided a medium – as indicated by one expert – '*to facilitate projects and get*

ideas together, they acknowledged that Facebook Groups and Forums lack facilities for producing projects; there are no editing or word-processing features and participants cannot work simultaneously on a product. This resulted in a negative score, 2.25. To generate projects, a supplementary Web 2.0 application is required, such as a wiki or blog.

The section on the *social climate* investigated whether, despite the academic purpose of the Forum, it induced social interaction and relationships. Ratings on the *social climate* averaged 4.33. Evaluators regretted that participation was not higher, but in open-ended responses, summarized this academic Facebook venture as a *'very positive experience'*, *'informal method of sharing ideas on studies'*, *'novel way of using social media'*, *'friendly and conducive environment'* where *'students got to know each other'*. The experts recognised the community as a *'platform of trust'* with *'positive vibes'*, *'an energetic vibe'*. In evaluating management and facilitation, two evaluators assigned '3', and two '4', averaging 3.5 and indicating a well-facilitated Forum, yet primarily student-led. There was *'enough moderation to ensure correct feedback without dampening the student voice'* and *'the thread was stimulated by encouraging comments from the course leader'*. On the spectrum between 'solely social' and 'serious studies', two chose '3' and two chose '4', averaging 3.5, right of centre and indicating balance, but stronger on academic aspects. The low participation, whereby some members just 'watched', was considered unfortunate. One evaluator suggested that the constructivist nature might make some students uncomfortable, while another believed that participants could be deterred from posting by content already posted, similar to what they planned. Evaluators believed that the members who hardly contributed, would have benefitted by reading postings, though without the socio-emotive value of personal activity.

6. Conclusions

This section summarizes the findings by re-visiting the two research questions and comparing certain results with findings from the literature.

Did the collaborative learning environment enhance both social relationships and academic pursuits?

In triangulated, mixed-methods data collection and analysis, the findings of Study 1 (qualitative analysis of students' free-text perceptions in an essay and exam question) and Study 2 (heuristic evaluation of interactions on the Facebook discussion forum), confirmed each other. Both sets of results indicated a harmonious *social culture*. Students' reflective writings indicated that the Facebook Group fostered inter-personal relationships between formerly isolated distance learners, who learned to know each other as individuals within a virtual community, sharing insights and information. The expert evaluators rated the social climate highly and noted the positive ethos, although they regretted that not all the students in the cohort had joined or contributed actively. Regarding *academia*, participants found it intuitive to learn on Facebook which, for many, was part of their lifestyle. They initiated discussion topics; posted thought-provoking content; responded; shared resources found in their independent research; and exercised personal participation styles. They benefitted mutually from each others' contributions and gained insights from social negotiation. Some hardly participated, yet appreciated learning within the Group. The expert evaluators analysed the learning environment, and described it as well facilitated, while fostering student-initiative, good communication and interpretation. It effectively implemented human-centred learning paradigms: cognitivism, social constructivism, customized learning, creativity and innovation.

The study showed a synergy between social aspects and academia, conducive to studies and to social engagement, but with a stronger focus on academia.

Can the Facebook Group be viewed as a Web 2.0 application?

The environment represents good progress towards eLearning 2.0 due to content generation by users but, as some students explained, it lacked dynamicity and content that others can change. If supplemented by wikis, blogs, podcasts, etc., the broader context could implement Web 2.0 functionality and support generation of collaborative projects. The experts agreed that, although it can provide a milieu for planning and managing projects, Facebook is not intended for artifact production, editing of contributions or simultaneous work on tasks. Facebook Groups cannot be considered full-scale Web 2.0 applications.

Relationship to other findings

According to Wang, Woo, Quek, Yang and Liu (2011), contact learners did not get to know their peers better in a Group. However, the distance learners in this research, formerly isolated from peers, came to know each other as they formed relationships on-Forum and outside of the Group.

Findings of Junco (2012) and Kirschner and Karpinski (2010) indicate that Facebook engagement affected academic performance negatively. In the present findings, however, the most active Facebook participants also achieved the highest academic grades. This is possibly because they were mature professionals, and because of their Facebook engagement in an academic Group, as well as Facebook socialising.

Bosch (2009) and Schroeder and Greenbowe (2009) established that student activity was higher on Facebook than on official institutional sites. Our findings correspond, with 10 posts in 4 discussion threads on the official course forum, and 192 posts under 21 topics on the Facebook forum.

Jimoyiannis and Angelaina (2012) applied the Community of Inquiry Model to analyse online learning experiences. The concepts evaluated in the present studies correspond with two of their components: *social presence* – how learners express themselves socially, and *cognitive presence* – construction and confirmation of meaning via discourse and sharing.

In conclusion, the findings of this dual-evaluation study – which analyzed students' textual reflections and conducted expert evaluations of forum discussions – should encourage academics to establish groups and discussion forums on social networks. Facebook served well as a collaborative learning environment, but does not provide full Web 2.0 capabilities. With supplementary tools, e.g. wikis, blogs and SharePoint, a comprehensive Web 2.0 or eLearning 2.0 environment could result.

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