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The Dynamics of Learner Participation in a Virtual Learning Environment

by

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Submitted in partial fulfilment of the requirements for the degree

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in the

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University of Pretoria

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Co-supervisor: Prof. Dr Johannes C. Cronjé

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Dedication

Ek dra die tesis op aan my Skepper, in dankbaarheid,
aan Pappa en Mamma, wat ons altyd aangespoor het om ons bes te doen,
en aan my kinders, Tymen Ryk, Mia en Frederik.

Aknowledgements

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- Prof. dr Johannes Cronjé supported me teaching a module in the M Ed (CIE) course and using it for research. He also gave permission to evaluate the previous online classrooms.
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- Mrs Bonnie K. Nelson in Minneapolis, USA edited the five articles for publication. Bonnie did more than correct mistakes. She miraculously transformed text into readable prose, suggested alternatives, explained, coached, and encouraged.
- Prof. dr Piet de Kock edited and proofread the first and last sections of the thesis.
- The class of 2004, who were the object of this study, gave their best, despite suffering the virtual hardship of long lonely hours studying. They were an exceptional community.
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- My family, who sacrificed a “normal” household, remained loyal and supportive.

I wish to thank everyone who contributed to my academic development over numerous years.

Ethics Clearance Document

ANNEXURE D

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DEGREE AND PROJECT	PhD (Computer Integrated Education) The Dynamics of Learner Participation in a Virtual Learning Environment
INVESTIGATOR(S)	L Nagel
DEPARTMENT	Curriculum Studies
DATE CONSIDERED	2005-09-20
DECISION OF THE COMMITTEE	APPROVED

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PHILOSOPHIAE DOCTOR

IN

CURRICULUM STUDIES

at the University of Pretoria, is my own work and has not previously been submitted by me for a degree at this or any other tertiary institution."

_____

Lynette Nagel

Signed on the 25th day of April 2007

Pretoria, South Africa.

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I declare that I have proofread the chapters entitled:

'The Dynamics of Learner Participation in a Virtual Learning Environment'

and

'Synopsis, Conclusions and Recommendations"

by Lynette Nagel

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To Whom It May Concern:

Certificate of proofreading and editing of five articles

I, Bonnie Kaye Nelson, hereby declare that I have proof read and language edited the five articles listed under authorship of Lynette Nagel, Seugnet Blignaut and Johannes Cronjé:

- Reviewing Metaphors for Online Learning
- Using a Soccer Tournament Metaphor in a Distributed Course on Online Learning
- Methical Jane: Perspectives of an Undisclosed Virtual Student
- Facilitating an Online Distributed Course: Virtual Jane, not an Ordinary Student
- Read-only Participants: a Case for Student Communication in Online Classes.

Sincerely,

Bonnie Nelson
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1. Permission for research
2. Nagel, L., Blignaut, A. S., & Cronjé, J. C. (2007). Reviewing Metaphors for Online Learning: submission documents
3. Nagel, L., Blignaut, A. S., & Cronjé, J. C. (2007). Using a Soccer Tournament Metaphor in a Distributed Course on Online Learning: submission document
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5. Nagel, L., Blignaut, A. S., & Cronjé, J. C. (2007). Read-only Participants: a Case for Student Communication in Online Classes: submission document
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Abstract

While online students should take charge of their own learning and form collaborative learning communities, constructivist instructors should scaffold online learning without dominating course discussions. This research continues the longitudinal investigation of web-based courses at the Faculty of Education, University of Pretoria. The mixed methodological approach this investigation followed consisted predominantly of qualitative methods, augmented with quantitative approaches. I used two distinct online tools to explore student participation in an eight-week online Masters'-level course delivered via the WebCT™ platform. First, I reviewed the use of metaphors in the literature by a framework of requirements for successful online learning. The use of metaphor supports constructivism, facilitates course interaction, helps to avoid students' initial inertia in online discussions, and contributes to the development of virtual learning communities. I researched how an explanatory metaphor as tool supported online participation and indicated that metaphors eased students' communication of important and difficult issues. Secondly, I used the tool of a covert virtual student that also acted as an additional facilitator and course helper. I examined the ethical implications of the carefully concealed real identity of the *mythical* online helper, *methical* Jane. As she took part in all course activities and assignments, as well as providing her co-students with cognitive and technical support, the students accepted and integrated her presence in their virtual learning community. I consequently analysed students' reactions to her true identity after disclosure of her origin after the course. Although the exposure precipitated students' shock, disbelief and dismay as she was a convincing virtual student, they did not object to the presence of a virtual student, but rather felt betrayed due to her hidden *real identity*. The benefits of this teaching intervention include: experts supplying technical expertise, multiple faculty enriching the learning experience, and support and teaching assistants and tutors participating with smaller groups in large online classes. I further examined how frequency of course access, discussion postings, collaborative behaviour and integration into a virtual learning community relate to learning and course completion. Quantitative indices indicated highly significant differences between the stratifications of student performance. Absent and seldom-contributing students risked missing the benefits of the online learning community. Students were discontent with peers who rarely and insufficiently contributed to group assignments. Low participation varied from only

reading, skimming, or deliberately harvesting others' contributions, to high student contributions of little value. Conclusions on the formation of an online learning community indicate that the passport to membership of the community is quality participation, rather than prior peer acquaintance. I indicated that students' learning benefited from contributing high quality inputs to online learning communities while students with poor participation did not benefit from the online learning community. Online facilitators contribute to students' learning through the timeliness and quality of tailored scaffolding. Recommendations for future research include uncovering the reasons for students' stressful experiences of online learning; the effect of online assessment on student course participation; the alignment of learning metaphors in multi-cultural learning environments; and the support of non-participating online students.

Keywords

Asynchronous learning networks
Computer-mediated communication
Constructivism
Distributed students
Metaphor
Online facilitation
Student support
Virtual learning community
Virtual student
Web-based learning

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The Dynamics of Learner Participation in a Virtual Learning Environment

1. INTRODUCTION

"Inquiry in dialogue emerges from a course design that enables them [students] to construct their own knowledge, together. The facilitated online discussion is the container for this construction of meaning and useful outcomes" (Collison, Elbaum, Haavind, & Tinker, 2000, p. 3). Interaction in a virtual community of online learners interests me personally, since participating as novice student in a course on web-based learning in 2002. During my ensuing immersion in computer-integrated education, the opportunity presented itself in 2004 to study distributed learners participating in a web-based distance course.

In this thesis, I present the understanding gleaned from presenting and investigating an eight-week course in a taught Master's qualification in Computer-integrated Education at the University of Pretoria. A unique feature of this course was that we presented no contact sessions and delivered the course entirely over the internet. This delivery mode accommodated distributed students across South Africa. The rationale was to augment and situate the course topic of web-based distance learning.

2. CONTEXTUALISING THE STUDY

This course's long research history influenced planning. Since 1993, the University of Pretoria studied the internet as a vehicle for teaching and learning in Higher Education. During the ensuing years, faculty and researchers documented the innovative work based on the Master's in Education course on teaching over the internet.

This study follows the tradition of design (development) research described by Tom Reeves and co-authors (Reeves, Herrington, & Oliver, 2005). The research focused on a complex problem. The research integrated known and hypothetical design principles. Each new course took lessons learnt from previous courses into account.

Professor J. C. Cronjé researched web-based learning and teaching for nearly a decade, focusing on metaphors, testing and refining innovative learning environments. The previous courses followed strong constructivist pedagogy, based on experiential discovery learning. Motivation is crucial for successful learning (Hwang, 2004). Visual and extended metaphors improved learning and motivation through stimulating learning activities (Cronjé, 2001). These metaphors included a virtual:

- *construction site* on learning theory where students constructed learning artefacts (http://hagar.up.ac.za/catts/ole/lro/lro2000.html),
- *classroom,* recreating a primary school class with student desks filled with their creations, a graffiti filled blackboard, notice board and other typical teaching objects (http://hagar.up.ac.za/rbo/2000/index.htm) (Cronjé, 2001),
- *rag carnival procession.* "Rag is an annual fundraising for charity. It involves an actual procession in the streets too with students building 'floats' on trucks and driving them through the streets. At the same time they collect money by shaking tins of coins under the noses of all the curious spectators. This site allowed virtual participation" (http://hagar.up.ac.za/catts/jool/jool.html) (Cronjé, 2001),
- *opera*, where students collaboratively built a site representing an opera, substituting the lyrics of arias with text containing internet and computer terms, hyperlinked to explanatory notes (http://hagar.up.ac.za/catts/learner/2000/opera/index.htm),
- *Halloween party,* where each student constructed a webpage on the theme (http://hagar.up.ac.za/catts/jool/halloween98.html),
- *Cybersurfiver,* using a game metaphor based on a popular reality television series, Survivor™, playing out on a virtual island (http://hagar.up.ac.za/catts/ole/oro/index.htm) (Cronjé, Adendorff, Meyer, & Van Ryneveld, 2006).

Assignments were not only original and individualized, but also presented novel technical challenges.

Even though they served as stimulating themes for assignments, the opera and Halloween Party were unfamiliar as learning metaphors for many South African students. Halloween was contentious and culturally alien to some and resulted in a protesting student thrashing the course site.

My analysis of the previous courses that formed the foundation of the present research, indicated the necessity of a more comprehensive investigation in choosing metaphors. My analysis also showed that researchers of the initial courses recommended changes that subsequent courses did not implement comprehensively. The most important issue was the lack of student support. The strong emphasis on constructivism played down student discontent and feedback of insufficient support. The early courses suffered from inadequate scaffolding, as well as low levels of motivation, poor completion rates and complaints of absent facilitators (De Villiers, 2001). One of the contentious outcomes of those courses was that students should experience the discomfort of online study and learn how to deal with it.

Students in the 2002 *Cybersurfiver* course learnt about e-learning, where the previous courses concentrated more on learning theory. This course served as a case study for three PhD students researching different aspects of online learning; namely the roles and competencies of the facilitator (Adendorff, 2004); the use of a game metaphor (Van Ryneveld, 2005); and the feelings of students in a game-based course (Meyer, 2005). The researchers suggested, amongst others, the following for further investigation:

- the effect of different facilitators on the same course structure
- the instructional value and role of metaphors
- the interaction between the learners in virtual learning communities
- the role of conflict in online courses.

Rauscher and Cronjé (2004) compiled a further case study on the Cybersurfiver course and recommended:

> Instructional designers should take the characteristics of their target group into consideration when they design instructional material for the online environment. The focus should not be on the cognitive aspect only, but the affective aspects should be considered in their design as well. E.g. user friendliness, their 'presence' on the screen, availability, immediacy of response (2004, p. 46).

Students persisted in the challenging Cybersurfiver course, because the game metaphor increased motivation and curiosity through the elements of challenge and fantasy (Cronjé et al., 2006). However, the highly competitive and threatening metaphor yielded a low course success rate and excessive student anxiety. Students experienced such amounts of stress and frustration, that Tom Reeves dubbed the Cybersurfiver course as "a shipwreck"

(Cronjé et al., 2006). Students also complained about technology, high internet costs and assignments requiring too much time to complete.

Looking to the literature for similar experiences, I found that poor leadership in online classes is a major source of frustration (McConnell, 2005). Lack of support and feedback as well as frustrating technology cause students to abandon courses (Hara & Kling, 1999; King, 2002). In the absence of instruction, students take inordinately long to complete tasks, or simply abandon them (Merrill, 2005). We suspected that the high stress levels in the Cybersurfiver game and other courses were probably due to poor student support and feedback, an aspect that henceforth prompted serious rethinking.

The research on previous courses focused on the online facilitator and reasons students persist in challenging online learning, with several studies addressing the use of metaphor in the online classroom. There was insufficient investigation of student support and participation. Therefore, these aspects required more research focus. The prime research question that propelled this study was therefore:

What are the dynamics of learner participation in a virtual learning environment?

The following literature survey served to contextualise the identified concerns. The other goal of the literature survey was to suggest design solutions and strategies I could implement in a new course. I then researched the influence those strategies had on students' reality and different dimensions of their online participation. The literature was an integral part of all stages in the research.

3. LITERATURE SURVEY

The literature survey addresses learning from the perspective of the classic learning triangle: content, instructor and student. I used the literature to contextualise the concept of online learning, because of fast changes and new research in the field, and unique characteristics not present in traditional education. Online learning serves as both context and content of the investigated course. I address the current debates on instructor and student participation and survey known models of online student participation. The

objective of the intervention is successful online learning; therefore, this concept weaves through the survey. These dimensions also informed the research.

- Online learning
- Facilitator participation
- Student participation
    - Communities of practice
    - Virtual learning communities
    - Group dynamics
- Success in online learning.

3.1 Online Learning

There is an explosion of internet delivered learning material worldwide. At all levels of formal education, educators are using the world wide web (www) (Richards, 2005). Since the mid 1990's the use of information and communication technologies and particularly the internet has increased enormously. Traditional contact teaching institutions are progressively exploring and incorporating e-learning and web-based material to augment classroom learning in a blended learning approach. Small and large universities adopt flexibility in their learning programmes for the benefit of demographically changing student populations (S. L. Howell, Williams, & Lindsay, 2003; Ngwenya, Annand, & Wang, 2004; Woodill, 2004).

Educational practitioners debate about the benefits of e-learning, as there are clearly some pitfalls. The biggest challenge after high initial cost is the disappointing student through-put rate (Chyung, 2001; R. E. Clark & Feldon, 2005; Frankola, 2001; C. S. Johnson, 2001; Terrell, 2005; Wild & Ebbers, 2002). Factors that frustrate online students to the extent of abandoning their studies are: technological problems, insufficient and tardy feedback from the instructor; and confusing instructions (Hara & Kling, 1999). Transferring methods and pedagogy from a traditional to an online classroom, does not necessarily produce good learning (Hwang, 2004; Pelz, 2004; Reeves, 2002; Robertson, Grant, & Jackson, 2005; Schank, 2001). Early online courses relied heavily on innovative computer technology rather than the needs of the users (Fussell & Benimoff, 1995; S. L. Howell et al., 2003). Unfamiliarity with and unreliability of technology also contribute to poor course

completion (King, 2002). "While information systems and applications promote access to a wide-reaching range of resources, they do not, by design, facilitate *learning"* (Hill & Hannafin, 1997, p. 37).

On the other hand, there are unique features and tools online to assist students to complete courses (Kettner-Polley, 2005; King, 2002; Klemm, 1998; Palloff & Pratt, 2001). To improve success and avoid the pitfalls, many institutions adopt a blended learning approach (Burgos et al., 2005; Vaughan & Garrison, 2005). "Blended learning has added value only when facilitated by educators with high interpersonal skills, and accompanied by reliable, easy-to-use technology" (Derntl & Motschnig-Pitrik, 2005, p. 111). Social factors are more responsible for the success or failure of an online course than the technology (De Cindio, Gentile, Grew, & Redolfi, 2003; Dougiamas & Taylor, 2003; Ngwenya et al., 2004; Reiser & Ely, 1997; Richardson & Swan, 2003; Woodill, 2004). Learning in a virtual environment requires interaction with the technology, learning content, peers and teacher (Chen, 2003; Richards, 2005; Swan, 2003). These four interrelating dimensions of student participation in an online classroom contribute to the academic puzzle. I start by exploring the role of the online facilitator in the puzzle.

3.2 Facilitator Participation

As many restrictions of the traditional classroom disappear with the introduction of online learning, the roles of teacher and learners change and new interactions and dynamics develop (Collison et al., 2000; Mazzolini & Maddison, 2003; Pelz, 2004). "The social dynamics in online learning environments make certain demands on the technological and interpersonal skills of both instructors and students" (Ngeow, 2001, p. 53).

Online facilitators have a multitude of roles, some inherited from contact teaching and others dictated by the online environment. The proper balance is not yet sanctioned by course administrators (Blignaut & Trollip, 2005). An online facilitator has to fulfil an administrative role, a cognitive teaching role that includes conducting Socratic questioning and providing corrective feedback, as well as an affective supportive role (Baker, 2004; Blignaut & Trollip, 2003; Coppola, Hiltz, & Rotter, 2002; Richardson & Swan, 2003; Taylor & Maor, 2000).

An interesting debate continues over the necessity of an instructor in the online classroom. System-generated facilitation in large online classes comprises the extreme facilitator non-participation. Playing down the visibility of the instructor sometimes stems from convenience, whereas some designers of online instruction see the instructor as superfluous or even detrimental in online learning. Constructivist pedagogy places students in control of their own learning, develops thinking and reasoning skills and helps them become independent, self-directed learners (Savery & Duffy, 1995). Ip and co-workers strongly advocate a learner-centred milieu with the instructor or moderator in a restrained position.

> The ideal MOD [moderator] however, intervenes little, and lets participants work it out for themselves. The Zen of being an effective moderator has to do with empty spaces he/she leaves after intervention - the more empty space that can be effectively filled by participants, the more they will learn for themselves (Ip et al, 2002, p. 1).

Circumstances, like role playing, dictate that the facilitator should keep a low profile to let students "interact freely and directly without any instructor involvement" (McClure, 1998, p. 211). The online facilitator has to plan, observe and analyse student activities carefully without dominating the discussions (Pelz, 2004; Petford & Scott, 1998; Reeves, 1997). "The instructor should let go of some of the micromanaging of the course and let the students work together to find their way" (DiRamio, 2005, p. 6).

Mature students in post-graduate courses appreciate the freedom of self-directed learning when a course follows an adragogical learning philosophy (Knowles, 1984). A facilitator manages the leadership in online groups with circumspection. Other than contact groups, distributed students in online groups prefer to rotate the leadership (S. D. Johnson, Suriya, Yoon, Berrett, & La Fleur, 2002). "Chaos theory helps us recognise that authoritarian and controlling leadership, in any form, severely curtails the creative potential of groups" (McClure, 1998, p. 212). When the online instructor only presents content like a *sage on the stage* (Collison et al., 2000; Mazzolini & Maddison, 2003) *shaman* or *raconteur* (Thornburg, 2001), it does not encourage student participation. In extreme cases of constructivism, the absent instructor is like a *ghost in the wings* (Mazzolini & Maddison, 2003).

Contradictory to this, many advocate that online instructors should contribute more extensively. "Online instructors often go absent from their classes for spans of time simply not tolerated in the traditional classroom. The irony is that the current model of e-learning sets student needs and instructor workload in opposition – online students need interaction

with their instructors far more than their face-to-face counterparts" (Smith & Taveras, 2005, p. 1). Course administrators also wish for a high cognitive teaching input and more online contributions than course instructors can realistically produce (Blignaut & Trollip, 2005). More facilitator-student interaction is one of the reasons students prefer online learning. Absence of the facilitator leads to loss of motivation and course abandonment (R. E. Clark & Feldon, 2005).

The instructor or facilitator has the key role in learning, as unguided instruction in most instances does not work (Kirschner, Sweller, & Clark, 2006). Kirschner and co-workers further present evidence that unguided or minimally guided instruction as employed in constructivism, is less effective than teaching with a strong guiding component. Bloom (1984) originally reported that students working with individual human tutors reach achievement levels as much as two standard deviations higher than students in conventional instruction. Students can also attain this ideal performance by mastery learning coupled to tutoring. Recently "cognitive tutors have closed the gap with and arguably surpass human tutors" (Corbett, 2001, p. 137). New evidence indicate that open, student-driven, problem based and experiential learning are less effective (Kolb, Boyatzis, & Mainemelis, 2000). One reason is that students do not know how to structure their learning experiences to create effective mental models (Dewey, 1938). The other reason is that exploration of a complex environment generates a heavy working memory load (R. Clark & Harrelson, 2002; Grace-Martin, 2001; Van Merriënboer, Kirschner, & Kester, 2003). When instructors do not follow the first principles of design, including guidance, the complexity of the task overwhelms students and they take much longer to complete assignments, some abandoning the task (Merrill, 2002). Merrill also sees the instructor as central to learning, "directing students to appropriate learning activities; guiding students to appropriate knowledge; helping students rehearse, encode, and process information; monitoring student performance; and providing feedback as to the appropriateness of the student's learning activities and practice performance" (2005, p. 2).

In attempts to consolidate the benefits of constructivism without the downside of students feeling lost and abandoned, the concept of online scaffolding surfaced. According to the cognitive apprenticeship model, a facilitator should provide scaffolding to support students.

> Scaffolding is the support the master gives apprentices in carrying out a task. This can range from doing almost the entire task for them to giving occasional hints as to what to do next. Fading is the notion of slowly removing the support, giving the apprentice more and more responsibility (Collins, Brown, & Holum, 1991, p. 2).

A popular portrayal of the online instructor is that of both content presenter and participant in the learning process. Di Ramio (2005, p. 6) advocates to "design courses so that the instructor is more of a mentor and guide than a disseminator of information". The online facilitator therefore has to enact the role of *guide on the side* to enable a constructivist learning environment (Collison et al., 2000; Mason, 1991; Mazzolini & Maddison, 2003; Schank, 2001; Waterhouse & Rogers, 2004). Students become more involved in an online conference when the facilitator participates, providing extensive critique, feedback, and encouragement (Klemm, 1998). Collison (2000) advocates that facilitators should use different online voices and tones, as well as critical-thinking strategies, to effectively moderate online discussions.

In addition to cognitive teaching, a facilitator's social presence further contributes to the integration of an effective learning community (Cox, Carr, & Hall, 2004). The facilitator's social presence and immediacy behaviour contributes to student motivation (Coppola et al., 2002; Richardson & Swan, 2003) and learning quality (Garrison, Anderson, & Archer, 2001).

The literature promotes the social, cognitive and managerial roles of the online instructor. The facilitator should foster communication, participation and learning without being too dominant. Because facilitation was not consistently prominent in the previous courses, we had to design the intervention with sufficient, though unobtrusive, scaffolding. The research then had to address facilitator presence and contribution, both in quantitative and qualitative terms. Facilitator interaction involved online students, who further contributed to the conversation.

3.3 Student Participation

A facilitator should deliberately foster the development of an online community, as interactivity does not occur spontaneously. Scholars, however, debate the necessity for distributed students to participate actively in online discussions in order to complete

courses successfully. I discuss in broad terms the large body of research showing that active participation results in successful outcomes. Rovai and Barnum (2003) found that passive interaction, analogous to listening to, but not participating in discussions, does not contribute significantly to learning. Using communication tools for interaction with peers can significantly improve distributed students' chance of successfully completing courses (Terrell, 2005). Learning from peers in a structured way can ameliorate online students' social isolation (Boud, Cohen, & Sampson, 1999; Spitzer, 1998; Wegerif, 1998). Online instruction has to contain students' feelings of isolation, anxiety, confusion, and general negative attitudes toward interaction (Collison et al., 2000; King, 2002).

> Participation in online discussion forums serves a dual purpose: to improve learning and to provide support.… The frequency of the interactions are likely to be more important in providing support, whereas quality and dynamics of the interactions may be the more important influencing factors in learning and performance (Davies & Graff, 2005, p. 663).

Online discussions accommodate even introverted students, allow high levels of interactivity and deep learning (Cox et al., 2004; Prammanee, 2003) and provide more opportunity for non-native language speakers to participate (Biesenbach-Lucas, 2003).

From another viewpoint, Beaudoin (2002) opposes the assumption that non-participatory students do not learn sufficiently. His theory supports Sutton's (2001) premise that students can benefit from vicarious interaction and learn nearly as much by observing other students interacting. Williams (2004) advocates using the term *read only participants* (ROP) rather than the derogatory *lurker* for non-participatory students. These students may be satisfied that their learning needs are met. Others arguments against encouraging participation come from Williams (2004), who observed that using grading as motivation to encourage participation, can result in large volumes of poor quality contributions. English second-language speaking (ESL) students find it challenging to participate in fast-paced synchronous chats, even if they learn as well as the others (Carr, Cox, Eden, & Hanslo, 2004).

Researchers propagate divergent approaches towards encouraging online participation, some proposing more social interaction. Mason (1991) first described the social role of online facilitators as creating a friendly, social environment for learning. Lave and Wenger (1990) showed that learning requires social interaction and collaboration. Salmon (2003) proposes the gradual introduction of novice students into online discussions. She

emphasises that a foundation of social interaction is necessary to progress towards contextual discussions. Although social or ludic interaction is a necessary component of community building, other researchers contend that cognitive challenges strongly encourages online participation (Agostinho, Oliver, Harper, Hedberg, & Wills, 2002). Online learning is seen as a social constructivist process as learners actively construct their knowledge and then exchange ideas with others to expand their knowledge (Richardson & Swan, 2003). Contextual interaction such as peer review is a good vehicle for building trust in a community and bringing groups closer. Students can learn much from unfamiliar others, even through blind peer-review (Boud et al., 1999; Gehringer, 2001), a view that does not support the importance of social interaction.

While some literature claims that students can learn successfully without participation, a large body of literature indicates the necessity of active student participation in order to achieve learning success. I decided to encourage participation, as the historical context also indicated such an intervention. Because this debate is not conclusive, I researched participation juxtaposed to non-participation. Because the literature indicated the necessity of both social and contextual interaction in the online class, this position influenced the design of the course and the tools to foster interaction.

Criticism against online learning declares that isolated students often abandon courses. Strategies to retain students, foster interaction and improve learning point to the necessity of forming a community.

3.3.1 Communities of Practice

Common goals serve to bind online learning communities of different forms and composition. In the cognitive apprenticeship model of learning, a community of practice consists of "participants [who] actively communicate about and engage in the skills involved in expertise" (Collins et al., 1991).

Successful communities of practice have three characteristics: "(1) different levels of expertise that are simultaneously present in the community of practice; (2) fluid peripheral to centre movement that symbolizes the progression from being a novice to an expert; and (3) completely authentic tasks and communication" (C. S. Johnson, 2001, p. 45). In a

community of practice, the novice learners learn from the experts by observing authentic tasks and executing progressively more advanced tasks themselves under an expert eye. In the cognitive apprenticeship model suitable to learning complex tasks, the experts support novice learners through several teaching methods (Collins et al., 1991). They model the task, coach the learners with hints, scaffolding and reminders and pass on "the tricks of the trade". While observing the students, the experts provoke students to articulate what they think and understand in order to refine their perception of the concepts, and making thinking visible (Collins et al., 1991). In a community of practice, students learn from the expertise of both facilitators and peers.

The literature indicated the benefits of students learning with and from peers in a community. I realised the benefits of designing the course to enable a community of practice that integrated expertise from the facilitator and expert peers, and implemented these recommendations in the intervention.

3.3.2 Virtual Learning Communities

> Consistency in course design, interaction with course instructors, and active discussion - have been consistently shown to significantly influence the success of online courses. It is posited that the reason for these findings relates to the importance of building community in online courses (Swan, Shea, Fredericksen, Pickett, & Pelz, 2000, p. 513).

Frequent, meaningful, valued and dynamic discussions in an online course lead to the formation of virtual learning communities where students interact and support each other. In collaborative learning groups, students solve problems, share and clarify ideas (Cox et al., 2004). Panitz (1996) defines the difference between collaborative and cooperative learning as:

> Collaborative learning … suggests a way of dealing with people which respects and highlights individual group members' abilities and contributions. There is a sharing of authority and acceptance of responsibility among group members for the groups actions.
>
> Cooperative learning is defined by a set of processes which help people interact together in order to accomplish a specific goal or develop an end product which is usually content specific (Panitz, 1996).

The interaction and consequent fusion of online learners to become effective learning communities are preconditions for effective learning. According to Collison and co-authors, the characteristics of a healthy online learning community are:

- Participants post regularly
- The online community meets its members' needs, and participants express honest opinions
- Participant-to-participants collaboration and teaching are evident, and spontaneous moderating occurs among the participants.
- Reasonable venting about technology, content, and even the facilitator is acceptable and evident.
- Participants show concern and support for the community (2000, p. 77).

Group interaction and online socialising help to develop and maintain the community (Porterfield, 2001; Rovai & Wighting, 2005). It is necessary to design courses that require students to help each other in order for the virtual community to remain intact (DiRamio, 2005). Literature shows the importance of student interaction and support as dimensions of online learning (Borges & Baranauskas, 2003). The Greek word for *participate* also means *share* and *sympathize*. Participants who engage in the highest level of interdependence in communication "see" things from each others' viewpoints culminating in *empathy* (Berlo, 1960).

From the literature, it was clear that a healthy online learning community is the holy grail of online learning. Its presence is evident in Collison's (2000) characteristics. As designer, I had to design the circumstances most likely to enable such a community, employing suitable strategies and tools. Before employing group work to bring students together, I had to survey the literature on the suitability and dynamic effects of group work.

3.3.3 Online Group Dynamics

Dynamics, derived from the Greek word for power, are forces that influence, change or cause development. The dynamics of learners' participation suggest that participation represents forces or powers. In education, group dynamics is a force that influences the formation and functioning of groups of students (Allan, Barker, Fairbairn, Freeman, & Sutherland, 2002). Mc Connell (2005) advocates organising online students into learning groups. The effective working of such collaborative e-learning groups depends on the place of identity, control, ontological security and guilt in the group dynamics. According to McClure's (1998) chaos theory, group dynamics are evident in the formation stages of a group, initially characterised by increasing chaos and conflict. Before being able to work together effectively as a group, members have to pass through the crucial conflict stage. At this turning point the responsibility shifts from the leader to the members, as "students

are now the experts teaching me about their group's dynamics" (McClure, 1998, p. 210). After the group forms, the group members assume responsibility and a group identity emerges. In such groups, members can reclaim, assert and express their individuality. The ascent signifies the reclamation process. The resulting well-functioning group discusses and interacts freely, self-organises and becomes highly motivated (McClure, 1998). This description resembles the characteristics of Collison's (2000) healthy online learning community.

We do not yet know whether all successful virtual communities first negotiate a disharmonious conflict phase. Some online groups experience chaos and turmoil, while others bypass this stage (S. D. Johnson et al., 2002). Online learning creates a reflective and social environment where students are willing to be vulnerable, feel a sense of camaraderie with their peers. "Students readily shared their feelings, critically examined course issues, extended their support in helping peers … and embraced many of the challenges of taking an online course" (Barab, Thomas, & Merrill, 2001, p. 135).

The literature showed that working collaboratively differs from merely working in groups; neither are all online groups virtual learning communities. Growing such beneficial communities requires skill due to the potential for conflict in groups, therefore I scheduled group work relatively late in the course. The philosophy of this intervention was to ensure optimal learning resulting in successful course outcomes.

3.4 Success in Online Learning

Ideal learning cycles consist of experiencing, reflecting, thinking and acting (Mainemelis, Boyatzis, & Kolb, 2002). Creativity relate to adaptive flexibility in integrating experiencing and conceptualizing learning styles. Conceptualising relates to analytic skills, whereas experiencing relates to developing interpersonal skills (Mainemelis et al., 2002). In the online environment, students require opportunities and guidance to develop both learning dimensions, as analysis indicates deep cognitive learning (Bloom, 1956) and interpersonal skills help to develop online learning communities (Kreijns, Kirschner, & Jochems, 2003; Spitzer, 1998; Wegerif, 1998).

Different kinds of dynamics or forces influence online learning. "Asynchronous discussions can be used to enhance student participation in CS [computer science] courses; increased participation leads to learning effectiveness, rich involvement with the course content, and student satisfaction" (Bhagyavati, Kurkovsky, & Whitehead, 2005, p. 111). Astleitner and Keller (1995) propose a relationship between motivation dynamics and cognitive learning. According to Hwang (2004) learning dynamics also refer to learning energy. The mechanism for achieving learning success further resides in the nature of online learning.

> Various dynamics will influence the learning speed. These dynamics include the traits of the learners, the traits of the learning materials, and the stimulation of the learning activities. How to use different dynamics to motivate the learners is crucial to the success of learning (Hwang, 2004, p. 267).
>
> Asynchronous computer mediated communication tools actually promote reflective and critical thinking, allowing for deep and meaningful learning to occur … [because the process] fosters the ability and opportunity for students to reflect on, and revise their work" (Barab et al., 2001, p. 135).

Immediate feedback from peers and instructors built into the online discussions and social interaction contribute to learning success (Collins et al., 1991; Vygotsky, 1978). The deep cognitive processes that underlie deep learning readily occur in online discussions (Agostinho et al., 2002; Kreijns et al., 2003; Prammanee, 2003). Student participation improves when the questions are interesting and thought provoking and they receive clear instructions and timely feedback about their contributions.

Collaborative learning contributes to deep learning, critical thinking skills, a shared understanding and long term retention (Garrison et al., 2001; C. S. Johnson, 2001). Interactive learning shows the instructor where students have misconceptions, difficulties, conceptual problems and verbal pitfalls. Asking leading questions gives more insight into what students understand, than simply telling them the answer.

Some activities associated with learning take place outside the visible online course environment (Beaudoin, 2002). Thornburg describes different phases of learning, initially learning from experts, thereafter learning from and with peers and then learning alone and deeply, as "learners [need], on occasion, to isolate themselves from others in order to gain special insights" (2001, p. 3). It seems that the deepest levels of learning might occur in a solitary state following a phase of dynamic interaction.

The literature shows that dynamics in the learning environment contribute to student participation, whereas high quality participation is a dynamic that promotes formation of a virtual learning community and better cognitive outcomes. I planned to create a learning intervention incorporating the above suggestions and promote student participation. The results of the research of students' participation in this event will show how effective the tools are and how dynamics of participation influence online learning.

4. DESIGN (DEVELOPMENT) RESEARCH

Analysis of previous research on web-based courses presented at the University of Pretoria uncovered a number of suggestions for future research. In order to address those I designed a new approach for a course, and incorporated the successful features of the previous courses. As part of development research (Reeves et al., 2005), I designed the instruction and the research simultaneously. The objective of this document is to focus on the outcomes of the research, therefore I give only rudimentary information regarding the course design. The design and moderation team consisting of the supervisors and myself heeded the suggestions and directions indicated in research of previous courses. My role was designing the instruction, facilitating the online discussion, conducting the concurrent research relating to gathering of data, analysing emergent findings and reporting the conclusions. After I proposed this research approach to the Faculty of Education, the Faculty's Ethical Committee approved the research, as documented in addendum 1.

Development research asserts that qualitative research in isolation can make few claims to generalisability, as so far, it has made little impact on the practice of instructional technology on all levels of teaching. Because of the sterility of many studies, they generally do not result in any follow-up. "There is considerable social relevance in instructional technology research studies that are largely focused on making education better (and which in the process may also help us understand more about how instructional technology works)" (Reeves et al., 2005, p. 101).

I conducted the investigation in phases, wherein I

- researched the historical web-based courses at the University of Pretoria to ascertain their research questions, challenges, conclusions and suggestions for future courses and research
- analysed other studies to ascertain the challenges that persisted in the courses after previous attempts to rectify them (Adendorff, 2004; Cronjé & Clarke, 1999; De Villiers, 2001; Meyer, 2005; Rauscher & Cronjé, 2004; Van Ryneveld, 2005)
- analysed the literature to locate frameworks, theories and recommendations to inform the intervention and research
- analysed the theories and frameworks from the literature to compile a plausible and informed intervention and academic puzzle relating to the dynamics of learner participation in a virtual learning environment
- formulated the type and scope of the web-based tools for fostering online participation
- implemented the intervention
- explored and described the dynamics of student participation
- analysed the course artefacts and documents and interpreted the findings through theoretical frameworks gleaned from analysis of the literature
- validated the research questions against the backdrop of the literature to analyse the intervention
- formulated new theory based thereon to inform practice of future web-based courses and to contribute to the knowledge base.

Figure 1 summarises the design (development) research approach and the stages of the investigation.

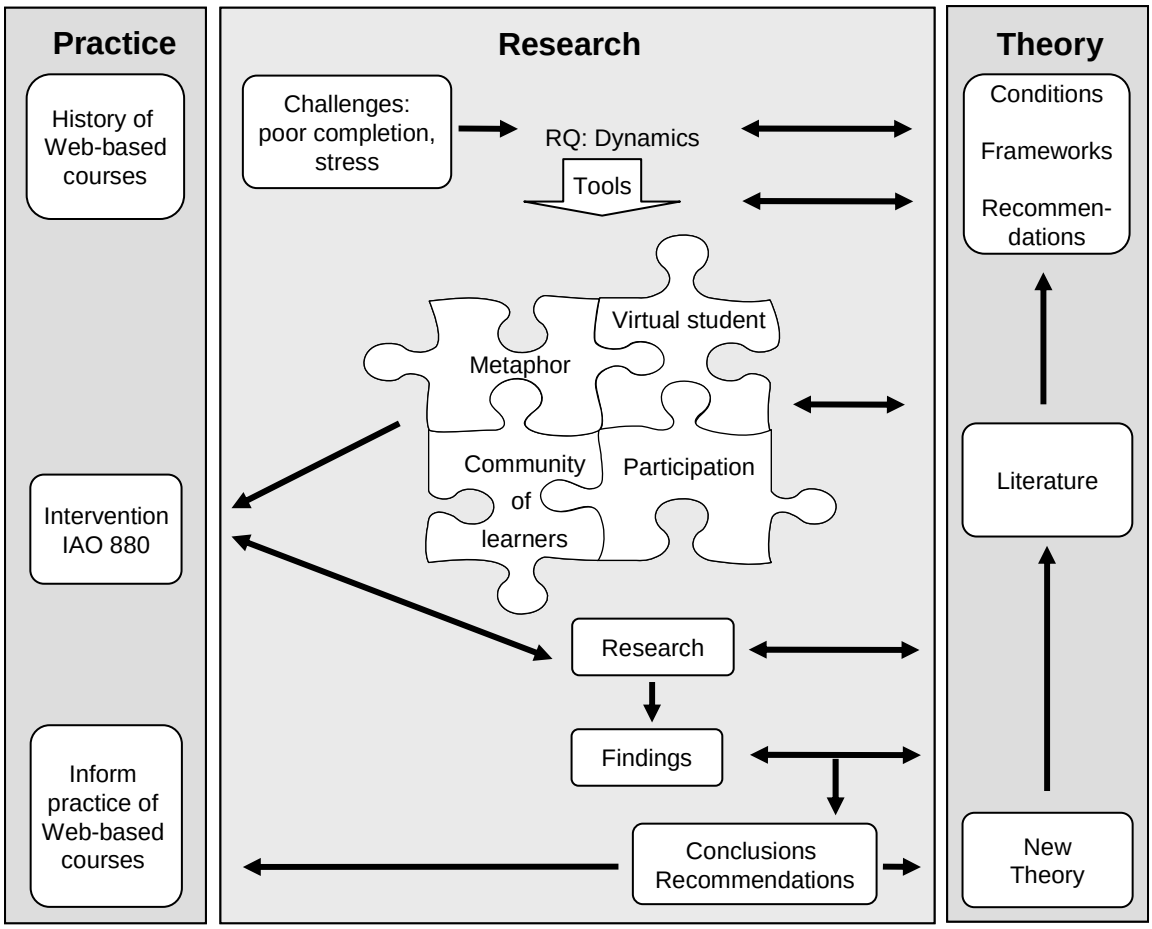

Figure 1: Design of Development Research Approach

4.1 Planning the Intervention

4.1.1 Planning the Objectives

The object of study was the MEd (Computer-integrated Education) course IAO 880 in Information Technology for Distance Education. The experiential validity of the course was evident in the relevant context (Reeves, 1997). This course focuses on establishing and maintaining virtual learning communities where learners experienced the stresses, strains and dynamics of online education. We explored various techniques to facilitate online learning.

Previous web-based courses dictated that we address the problems of ineffective communication and student support. The instruction incorporated tools to stimulate communication and provide support while retaining the social constructivist pedagogy in a

responsible way. In this course I also aimed to observe the formation of the virtual community (Collison et al., 2000) and investigate the different aspects thereof, and establish how the community relates to students' successful completion of the course.

Indications from using metaphor in previous courses were that not all students identified with the metaphors. The metaphors did not explicitly support learning. I further suspected that those metaphors did not exploit all benefits of metaphor. A comprehensive literature review confirmed my initial hunch. The resulting theoretical framework contributes independently to the e-learning literature, as presented in the article *Reviewing Metaphors for Online Learning* (Nagel, Blignaut, & Cronjé, 2007d), with submission documentation (addendum 2). This framework supported us in choosing a metaphor for the intervention. The research would have to indicate if it was successful and non-threatening, whether it sustained asynchronous communication, collaboration and student support. The first online tool was a soccer tournament metaphor.

The other tool to augment participation was a virtual student who acted as second facilitator (King, 2002). This student would have to contribute to all facets of interaction and support students. Both tools had the function to improve student online participation.

In order to elucidate the context of the investigation, I briefly describe aspects of the course structure in the next section.

4.1.2 Planning the Metaphorical Framework

The instructional design and moderation team planned an appropriate metaphor that would support students. We selected a non-threatening sport metaphor to accommodate the multicultural, multilingual, and divided student group. At the point of course design, the world soccer federation, FIFA, announced South Africa's successful bid to host the 2010 World Cup Tournament, and with the hype of enthusiasm for soccer, we selected a *World Cup Soccer Tournament* as metaphor. The metaphor was particularly valuable as it encouraged

- interaction between students, as well as the facilitator
- competition, as well as working together in learning teams
- training as metaphor for instructional aspects of course content

- practice and perfecting of web-based as well as other contextual skills
- coaching of students on unfamiliar web-based procedures
- using various WebCT™ tools beneficial to online learning.

As the course included a number of black students, we anticipated that employing their most popular sport, soccer, would accommodate and inspire them.

I describe the implementation of the soccer metaphor in more detail in the article *Using a Soccer Tournament Metaphor in a Distributed Course on Online Learning* (Nagel, Blignaut, & Cronjé, 2007e), presenting submission documentation (addendum 3). In the investigation, I specifically focused on the students' experience and use of the metaphor in online discussions and other course documents.

4.1.3 Planning the Instruction

I had to plan the instruction within the constraints set by the University. The curriculum, course objectives and outcomes of this course were the same as the previous courses and had been determined and approved by the Faculty of Education (addendum 4) (http://hagar.up.ac.za/catts/rgb_resources/modules.htm) (figure 2).

Purpose statement of this module

- This module focuses on establishing and maintaining virtual learning communities. Learners are placed in a virtual learning community and experience first hand the stresses and strains as well as the dynamics that develop during distance education courses via the Internet. Attention is also given to the various techniques and technologies that are available to facilitate such learning. While various functionalities of WebCT will be used, students will also explore the use of free tools available on the Internet.
- Throughout this time a balance will be sought between the theoretical framework, the mastering of the technical aspects of web-based learning and teaching, and the affective "lived experience" of distance learning.

Figure 2: Purpose Statement of the IAO 880 Course

The previous courses also had a well-proven and successful structure. They all followed a constructivist learner-centred approach, with emphasis on originality and innovation to accommodate fast-changing technology and the diversity of students. I situated the course within the University framework and retained proven successful practices of my

predecessors. I also gleaned interesting new technical approaches and innovations from faculty responsible for similar courses (J Knoetze, personal communication, 7 June, 2004).

To obtain first-hand information on the aspects that contributed to the success of the previous course I interviewed the instructional designer of that course. I posed questions on the emotional demands and technical challenges that the previous group encountered in the Cybersurfiver course (Van Ryneveld, 2005):

> Linda: "the learning content concerning distance learning is of prime importance. It is more important than the technical competencies. One can allocate less than half the weight to mastering the technical side."
>
> Lynette: "Things have to be difficult enough to challenge them, otherwise everybody can do everything without asking help and then we have no communication and no research material." Finding the right balance in the course design was evident.

I chose eight topics that were important in online learning and suitable for demonstrating appropriate technical expertise, as shown in figure 3.

Over the next eight weeks, the following topics will be explored

Unit 1	A virtual learning community
Unit 2	Globalisation
Unit 3	Cultural dimensions on the web
Unit 4	Games
Unit 5	Collaborative learning on the web
Unit 6	The role of the online facilitator
Unit 7	Online testing
Unit 8	Reflective learning and portfolios

Figure 3: Topics Addressed in the IAO 880 Course

Students gathered grades in both theoretical and technical assignments. The course structure loosely resembled the structure used at Capella University (Rossman, 1999), consisting of 8 weekly topics with suggested readings followed by asynchronous discussions where students learnt from each other's contributions. The technical challenges of building web pages applying the theory, carried about half the weight. Assignments and assessment were contextualised and authentic. For example, students contributed discussion postings on the theory of rubrics as related to online testing. Students then compiled their own collaborative rubrics to assess collaboration, online support or web pages (http://hagar.up.ac.za/catts/rgb_resources/groupwork.html.) The

following week they used those rubrics in practice to assess their own and peers' web pages and collaborative activities.

4.1.4 Planning Student Communication and Participation

I used the LMS discussion tool primarily for submission of compulsory short assignments on the weekly topics. Students then critiqued two peers each as threaded discussions, giving formative and summative feedback. I posted rosters for peer review as "matches", ensuring rotation. Students also posted other short contributions to allocated discussion topics when instructed. They also had an open topic, or "locker room" for social, off-topic communication, helping and requesting help and generally airing views as necessary. The LMS synchronous whiteboard did not initially work well due to Java constraints and firewalls at students' workplaces. I encouraged students to use the synchronous chat facility, dubbed the Gym, and created dedicated rooms and discussion topics for group projects. Because Jane was not a real student and for ethical reasons we had to prevent the others to communicate with her in private, we strongly discouraged communication outside the course tools. The communication embargo also served to let everybody share in the learning benefit of all communication.

Meyer (2005) mentioned that students in the Cybersurfiver study deliberately broke communication embargoes. She observed that support structures interlinked with communication, and students phoned each other, despite the rules. Ensuring that students keep to the rules of the online course right from the beginning was therefore a high priority; else, the ethical justification of using the virtual student would fail. Linda therefore recommended removing the e-mail tool from the course. She also recommended that students should compile the rules of communication using the chat room or bulletin board, and recommended creating a credo that students had to sign and publish in the LMS promising not to communicate outside the course. Combining the credo with a steep technical challenge should encourage students to keep to the instruction. I incorporated her suggestions.

Group work in previous courses that enabled students to pass without merit led to residual resentment in the cohort (A. S. Blignaut & J. C. Cronjé, several personal communications, personal observations, June 2004). I therefore decided to include formal group work in the

intervention, but scheduled it late in the course to minimise negative impact. One of the techniques to work through the chaos of group formation was requesting students to keep an online diary to record how they experienced their peers, as McClure suggested: "They are asked to record their feelings about the experience, along with their observations of the group's dynamics. They are encouraged to integrate their assigned reading material into their writing" (1998, p. 211). We likewise encouraged students to integrate their blog entries (journal) into their reflective essays.

I structured the course on peer interaction, using a variety of interactive practices: peer review, collaborative and cooperative learning, teamwork and peer assessment. I encouraged students to participate in all activities as I rewarded individual contributions, group contributions, peer assessment and peer support with grades. Grading was a credible component of the soccer game metaphor as teams played virtual matches and earned points. We explain in the article *Read-only Participants: a Case for Student Communication in Online Classes* (Nagel, Blignaut, & Cronjé, 2007c) how participation influenced student grades, submitted for publication (addendum 5).

De Villiers (2001), researching the early virtual classroom courses, suggested that stress originated when students had insufficient time to complete important assignments. She suggested setting frequent deadlines for smaller assignments to spread the workload more evenly and reduce stress. I heeded her suggestions, as other researchers (Bhagyavati et al., 2005) found distributed deadlines resulted in superior participation in online discussions. Designing the course around frequent deliverables constituted good teaching practice to make thinking and learning visible, and assess formatively (Collins et al., 1991). This tactic also produced abundant researchable course artefacts. In this study, we designed the intervention as an integrated event, the effects of the tools being visible throughout the course. Participative activities, the use of metaphor and the presence of a virtual student to improve the teaching presence, are design factors present for the whole course that became research topics.

4.1.5 Planning the Facilitation

Following a legacy of constructivist student-centred pedagogy, the facilitator profile was non-dominating and low-profile, practising "wait-time" and acting as a *guide on the side*

(Collison et al., 2000; Coppola et al., 2002; Mazzolini & Maddison, 2003). Students also required adequate support and scaffolding, and effective monitoring of group work. Bangert investigated the suitability of Chickering and Gamson's seven principles for learning when teaching online: "Instructional practices identified for improvement included…better instructor monitoring of study groups to ensure equal participation" (Bangert, 2004, p. 217).

In spite of some contact sessions with the instructors, previous courses had low student engagement, while low support levels caused discontent and stress (De Villiers, 2001). The challenge was even greater to maintain engagement and active learning among the distributed students without contact sessions or facilitation in person. Addressing the problem of online support led us to *Virtual Joe, not an Ordinary Student* by King (2002). Joe Bags O'Doughnuts was a virtual online student created and manipulated by the course instructor who, apart from fully participating as a student, also acted as a second facilitator. We designed our own unique virtual student, called Jane Malan, to blend inconspicuously into our student cohort. Although, like Joe, she acted like a real student, she concentrated on stimulating interaction, facilitating discussion, supporting students technically, cognitively and affectively.

The article *Facilitating an Online Distributed Course: Virtual Jane, not an Ordinary Student* (Nagel, Blignaut, & Cronjé, 2007a) describes Jane's role as student and facilitator and how she accompanied the class to form a virtual community of learners. The submission of this article is documented in addendum 6.

Because I did not tell the class upfront that Jane was not really a student, the deception constituted ethical concerns. I researched the *ethical* concerns of a *mythical* online student in *Methical Jane: Perspectives of an Undisclosed Virtual Student* (Nagel, Blignaut, & Cronjé, 2007b), with proof of submission (addendum 7). Literature suggested that research interventions should not harm students and researchers should inform them afterwards of the underlying realities (Boeree, 1998). Disclosing Jane's real identity after the course closure yielded data rich on ethical concerns.

4.2 Research Questions

I designed the research to assemble an academic puzzle composed of several building blocks. The pieces of the puzzle interlock with each other and with the surrounding framework that anchored it in the literature (figure 1). Together they portray the tools as distinct objects in the landscape that, together, constitute a larger picture.

4.2.1 The Prime Research Question

The purpose of this research is to assemble the constituent parts of the academic puzzle that portrays the following landscape:

What are the dynamics of learner participation in a virtual learning environment?

Two components in this picture oblige further clarification:

- Participation means taking a part or sharing in something larger. This describes the individuals' relationship with the context. Online participation represents a process of learning interactively with others and becoming part of an interactive learning network. Learning in a virtual environment therefore requires interaction with the learning content, teacher, peers and technology (Chen, 2003; Richards, 2005; Swan, 2003). These *dimensions* of interaction are interrelated and inseparable.
- Dynamics are forces that stimulate development or change within systems or processes. Dynamics imply that we investigate the forces that stimulate development of a virtual learning environment, namely the forces at work between the dimensions. The literature tells us that a virtual community supports better learning. Therefore, I had to investigate the interactions that contributed to formation of a virtual community and successful course outcomes.

4.2.2 The Sub-questions

The lessons learnt from previous courses and the literature jointly shaped the research question. In order to address the main question, we respond to the following sub-questions:

1. How does one choose a suitable metaphor for online learning?

2. How did the soccer tournament metaphor contribute towards the formation of the online community?
3. What are the ethical issues affecting the use of a virtual student in an online class, first withholding and then revealing her real identity and how did she affect the visible role of the course facilitator?
4. How did a virtual student who played the role of second facilitator affect the learning community?
5. What is the effect of read-only participation on student performance and on the formation of the online community of learners?

4.2.3 The Theoretical Framework

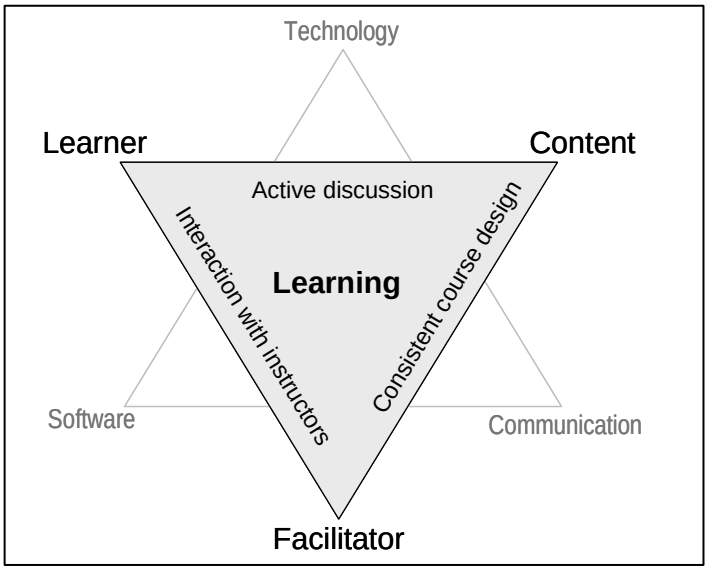

Figure 4: The Dimensions and Dynamics of Online Learning

Figure 4 depicts different concepts that contribute to and influence online learning, as previously discussed in the literature review.

- The classical learning triangle of learner-teacher-content is evident with learning in the centre (Salerno University, 2003). The teacher acts as online facilitator. These three constitute the first three dimensions.
- "The goal, the raison d'être, the stuff of education is learning" (Swan, 2003). This also holds true in online learning. Learning is central to all dimensions.

- A technology dimension encompassing computer software, communication, connectivity and other technological issues affect all other dimensions of online learning.
- Research showed that three factors "consistency in course design, interaction with course instructors, and active discussion – have been consistently shown to significantly influence the success of online courses" (Swan et al., 2000, p. 1). Extrapolating these factors to learning, suggests that they loosely represent the dynamics or interactions between the three learning dimensions.

Course design represents the facilitator interacting with the learning content. The other dynamic of instructor interaction is with students. These represent the facilitator's participation (§3.2). Students interact with the facilitator and the learning content (§3.3); both these dynamics indicate significant contributions to online learning success. In online learning, a technological dimension consisting of technology, communication and software influence the learning experience. For this study, I grouped those three as technology. While reliable, easy-to-use technology contributes to learning success (Derntl & Motschnig-Pitrik, 2005) (§3.1), technology without suitably adapted pedagogy and teaching support, achieves nothing (Schank, 2001). I explored how to create an environment that enables and encourages active participation with the content, peers and facilitator, contributed to learning.

This report contains five independent articles, each investigating one of the mentioned sub-questions (§4.2.2). The titles of the five articles that resulted from this research are:

- Reviewing Metaphors for Online Learning
- Using a Soccer Tournament Metaphor in a Distributed Course on Online Learning
- Methical Jane: Perspectives of an Undisclosed Virtual Student
- Facilitating an Online Distributed Course: Virtual Jane, not an Ordinary Student
- Read-only Participants: a Case for Student Communication in Online Classes.

Table 1 indicates the relationships between the five sub-questions and the main question, translated to the four interdependent dimensions of interaction in an online classroom. The dimensions of interaction of facilitator and learners represent student participation. All articles contribute towards explaining this question. The articles indicate the importance of

the role of the facilitator to guide and support, as well as the formation of a virtual community of students to help and support each other. Table 1 also shows the close correspondence between technology and course content, illustrating how technology influences the delivery of content. The final Synopsis, Conclusions and Recommendations section indicates the relationship of the various articles to the main question.

Table 1: How the Research Questions in the Separate Articles Relate to the Dimensions of Interaction

	Dimensions of Interaction			
Articles	**Technology**	**Content**	**Students**	**Facilitator**
Metaphors	√	√	√	√
Soccer	√	√	√√	√
Methical Jane			√	√
Virtual Jane			√	√
ROP	√	√	√√	√

4.2.4 Epistemological Stance

Burrell and Morgan (1979) propose that we view and analyse the world through the four key paradigms that assume the nature of social science and society. This paradigm provides a frame of reference for social theory and research. We can make ontological assumptions on the reality of research: is this reality concrete and objective, or is it a product of the mind? A second assumption is epistemological, or on the grounds of knowledge. We should decide whether it is a real, hard, external reality that one can acquire, or is it a softer, subjective spiritual reality based on personal experience. A third set of assumptions concern the relationship between humans and their environments. It is either a controlled relationship wherein the environment shapes or changes humans, or one where humans control and create the environment.

<table>
<tr><td></td><td colspan="2">The Sociology of Radical Change</td><td></td></tr>
<tr><td rowspan="2">Subjective</td><td>Radical Humanist</td><td>Radical Structuralist</td><td rowspan="2">Objective</td></tr>
<tr><td>Interpretive</td><td>Functionalist</td></tr>
<tr><td></td><td colspan="2">The Sociology of Regulation</td><td></td></tr>
</table>

Figure 5: Four Paradigms for the Analysis of Social Theory (Burrell & Morgan, 1979, p. 22)

In figure 5, the horizontal axis represents the ontological and epistemological reality ranging from subjective to objective. The vertical axis presents a continuum between sociology of regulation to radical change.

In the interpretivist paradigm, researchers aim to explain the stability of behaviour. The social world from this viewpoint is a developing process, where individuals shape the process. Researchers of this paradigm aim to observe and uncover "on-going processes" to better understand individual behaviour and the spiritual nature of the world (Burrell & Morgan, 1979). The interpretivist paradigm also resembles the poststructuralist (Hatch, 2002).

> In interpretive research, education is considered to be a process and school is a lived experience. Understanding the meaning of the process or experience constitutes the knowledge to be gained from an inductive, hypothesis- or theory-generating … mode of inquiry. Multiple realities are constructed socially by individuals (Merriam, 1998, p. 4).

The functionalist paradigm frames academic sociology, rooted in the sociology of regulation, but approaching the subject from an objectivist viewpoint. It explains the status quo, social order and integration, solidarity and satisfaction of needs. Functionalist research is problem-oriented while providing practical solutions to practical problems. Researchers focus on maintaining order, equilibrium and stability in society, whereas the interpretive researcher uncovers emerging and dynamic processes (Burrell & Morgan, 1979). The constructivist paradigm described by Guba and Lincoln (Hatch, 2002) have similar views on the existence of a subjective reality being constructed experientially.

The main research question concerning the dynamics in an online classroom assumes a subjective ontological reality that learning is an ongoing process. We assume that the dynamics of online learning is a process wherein online students control and shape the learning environments, rather than one where the learning process controls them. Participation with its connotations of sharing and taking a part in a large whole, also dictates a qualitative approach that does not isolate the individual, but views it as part of a whole (Hatch, 2002). The research question mainly resides within an interpretivist paradigm. The more objective viewpoint taken on occasion was mainly to challenge positivist claims by other researchers. My conclusions confirmed the validity of the subjective approach to the research.

The selected paradigm also implicates the methodology used for the research. Both the functionalist as interpretivist research approaches are suitable for the small number of subjects in the group studied. Interpretive sociology embraces the traditions of hermeneutics, phenomenology and phenomenological sociology (Burrell & Morgan, 1979).

5. METHODOLOGY, STRATEGIES AND PROCEDURES

This research followed the principles of *Design* or *Development* research, integrating known and hypothetical deign principles (Reeves et al., 2005) using a predominantly qualitative methodology approach. While the research question resides in an interpretivist paradigm, but borders on elements of functionalism, it suggested the use of a predominantly qualitative methodology as a way of thinking about and studying the social reality. The diversity of subjects precluded generalization and further indicated the use of qualitative approaches.

5.1 The Population

The studied cohort initially consisted of twenty-three students. In all aspects, this was a very diverse group. Of the 25 students who initially registered for the course, two never started: one because he realised that he had enough credits to graduate, and the other when she realised that she would not have access to internet in her new house. Females, numbering 18, dominated the class of 23. There were 9 black students in the course. Their ages were as diverse, ranging between 30 and 50, representing different generations (Oblinger, 2003). Table 2 shows the full-time occupations of the students. Their previous qualifications were in diverse disciplines, with only a few in education. While all had a common interest, some had a stronger education grounding than others who compensated by being more practically inclined. Some students were innovative users of technology, while others were recent digital immigrants (Prensky, 2001). Their computer literacy, available computer hardware and connectivity, and support systems varied tremendously, as they had reported in their blogs (addendum 8).

Table 2: Distribution of Students in Diverse Occupations

Sector	Occupation	Number of students
Schools	Teaching	12
	ICT, Information science	2
Higher Education	Teaching	1
	ICT, Information science	3
E-learning industry	Consultants	5
	Total	23

The cohort therefore represented diverse strengths, skills and talents, and was emminently suited to form a community of practice (C. S. Johnson, 2001). The small size and diversity of the group made a qualitative research methodology desirable, as there was no point in correlating student demographics to their participation.

As both the designing of the instruction and facilitating the learning on this scale were new experiences for me, they represented a steep learning curve, echoed in the students' own. I modelled my facilitation activities on theory and intuition as higher education lecturer, rather than from experience. Having participated as student in a similar programme, provided me with insight into their experience, and enabled me to "play" Jane, as Strauss believed that "persons are actors who take an active role in responding to problematic situations" (Strauss & Corbin, 1998, p. 9).

5.2 Mixed Methodological Strategies

As indicated by the interpretivist approach that suggested methodologies and methods, the dominant methodology I used was qualitative with a smaller proportion of quantitative methods, resulting in mixed methods of investigation.

> Mixed method designs can yield richer, more valid, and more reliable findings than evaluations based on either the qualitative or quantitative method alone. A further advantage is that a mixed method approach is likely to increase the acceptance of findings and conclusions by the diverse groups that have a stake in the evaluation (Sharp & Fretchling, 1997, chapter 5).

Researchers can combine qualitative and quantitative methods for supplementary, complementary, informational, or developmental reasons. Counting, measuring and statistical procedures can usefully supplement, extend or test the ways of doing research (Strauss & Corbin, 1998). This mixed methodological approach allowed me to describe certain relationships in my findings and uncover the significance of specific phenomena.

> The research paradigms can complement each other. When using only statistics, a researcher can not be certain of having captured the essence of a situation. The interplay and exchange between the two modes are useful in building theory (Strauss & Corbin, 1998).

Mixed methods checked the validity of results through triangulation, improved the instruments to collect data and helped to explain findings. Qualitative methods provided understanding of the context of the intervention, and quantitative data provided some measure of generalisability of findings (Sharp & Fretchling, 1997). The multiplicity of methods increased robustness and contributed to crystallisation (Tobin & Begley, 2004).

5.2.1 Qualitative Methods

Qualitative research consists of three steps, first gathering the data, then using qualitative procedures to interpret and organize the data, and lastly the analytic process resulting in building new theory (Strauss & Corbin, 1998). While qualitative *methodology* can include numerical manipulation and frequencies, qualitative *methods* preclude this. "By the term 'qualitative research' we mean any type of research that produces findings not arrived at by statistical procedures or other means of quantification. It can refer to research about persons' lives, lived experiences, behaviors, emotions, and feelings" (Strauss & Corbin, 1998, p. 10). Some data may be quantified to give background information about the persons studied, but the bulk of the analysis has to be interpretive.

> Some researchers ... code the data in a manner that allows them to be statistically analyzed. They are in effect quantifying qualitative data. In speaking about qualitative analysis, we are referring not to the quantifying of qualitative data but rather to a nonmathematical process of interpretation, carried out for the purpose of discovering concepts and relationships in raw data and then organizing these into a theoretical explanatory scheme (Strauss & Corbin, 1998, p. 11).

Merriam (1998) proposes that a qualitative researcher uses interviewing, observing and analysing as tools to gain understanding in the phenomenon of research. The researcher is the prime instrument for data collection and analysis. A characteristic of qualitative research is that the researcher observes behaviour in its natural setting, usually involving fieldwork. Although qualitative researchers at times quantify their findings, this process is not mandatory, as the meaning and relationships of understanding is more important.

I followed a predominantly qualitative approach (LeCompte, 2000) to investigate the dataset consisting of course documents and student artefacts through an ethnographical

content analysis approach. I became intimately familiar with the studied phenomena by being a participant observer *in situ*, also enabling me to understand the phenomena from the students' perspective, constituting the *emic* viewpoint. "Qualitative research primarily employs an inductive research strategy" (Merriam, 1998, p. 7), when existing theory fails to explain findings.

5.2.1.1 Content Analysis

Capturing electronic data from an LMN is convenient, comprehensive and accurate, conditions not always evident in other collection methods, like transcribed interviews (Kvale, 1996). Content analysis is a strategy to examine a wide range of texts through a process of coding, where the researcher first deconstructs data with codes, then reconstructs them to make meaning (Rubin & Rubin, 1995). "Coding is the process of grouping interviewees' responses into categories that bring together the similar ideas, concepts, or themes you have discovered, or steps or stages in a process" (Rubin & Rubin, 1995, p. 238). The procedures "usually consist of conceptualizing and reducing data, elaborating categories in terms of their properties and dimensions, and relating through a series of prepositional statements. Conceptualizing, reducing, elaborating, and relating often are referred to as coding" (Strauss & Corbin, 1998, p. 12). The researcher searches for the presence, meaning and relationship of phrases relating to concepts and then infers meaning from these quotations. The procedure demands describing the communication systematically (Merriam, 1998).

Content analysis can be conceptual or relational. During *conceptual analysis*, also known as thematic analysis, the researcher explores the concept types before coding a text. The researcher thereafter quantifies the frequency of a specific concept. I used this method to review the literature on the type and application of online metaphors (Nagel et al., 2007d). and in the analysis of the origin of postings (Nagel et al., 2007b, 2007e). "Perhaps the strongest claim that can be made is that it maintains a high degree of statistical rigor without losing the richness of detail apparent in even more qualitative methods" (Bush, 2005, p. 9). *Relational or semantic analysis* focuses on finding meaningful relationships, as individual concepts in themselves have no inherent meaning. I used semantic analysis to explore the relationships among the different uses of metaphor, for student perceptions of the virtual student and their views of peer participation.

Content analysis examines words or phrases within a wide range of texts. The researcher quantifies and analyses the presence, meanings and relationships of these words and concepts and infers meaning from the messages in the texts. "At the heart of theorizing lies the **interplay** of making inductions (deriving concepts, their properties, and dimensions from data) and deductions (hypothesizing about the relationships between concepts" (Strauss & Corbin, 1998, p. 22).

> The researcher uses logic to analyze and weave together the ideas, concepts, and themes … organize [and]… combine ideas to gradually build a theory grounded in the data we heard, and how we interpret what we have discovered in the light of other theories in our field (Rubin & Rubin, 1995, p. 227).

After the initial exploratory ethnography, I selected themes, refined and developed them further; sometimes deductively, according to existing or custom made theoretical frameworks; at other times inductively, building new theory.

The students created a variety of valuable texts that I could analyse, as shown in table 3.

Table 3: Course Communication Used for Content Analysis

Sources	Type	Addendum
Feedback on Jane	Semi-structured e-interview	9
Social video	Informal conversations	10
1615 Discussion Postings in WebCT	Discussions	11
Synchronous Chat in WebCT	Informal conversations	12

5.2.1.2 Document Analysis

Merriam (1998) uses the term document as "the umbrella term to refer to a wide range of written, visual, and physical material relevant to the study at hand" (p. 112). I performed document analysis on the following types of documents and artefacts (table 4):

Table 4: Course Artefacts used for Document Analysis

Sources	Type	Addendum
Webpages: student homepages	Artefacts	4
21 Blogs	Diaries	8
1615 Discussion Postings in WebCT	Course assignments	11
17 Essays	First-person narratives	13
5 Webpages: collaborative assignments	Artefacts	14
Facilitator diary	Field notes	15
Open ended survey questions in online test	Artefacts	16

Written documents as well as other forms of data not gathered through interviews or observations are suitable objects for document analysis. Due to the wide range of interactions taking place in the discussions, some (especially the open and group discussions) contained conversations, whereas many discussion topics were mere repositories for short assignments, therefore I used them for both kinds of analyses.

Educational ethnography often deals with the culture of a learning community (Merriam, 1998). Ethnographic fieldwork does not necessarily depend on physical displacement and face-to-face encounters. It can be conducted in textual communities (Eichhorn, 2001). I applied ethnographic methods to collect data through document analysis, examining histories, creating an investigator diary and observing participants, followed by a sociocultural interpretation of the data (Dick, 2005; LeCompte, 2000).

5.2.1.3 Observation

Observation in its broadest sense denotes "being aware of", rather than "seeing", when applied to "online" observation. Participant observation enables the researcher to participate firsthand in the happenings of the setting.

> Immersing oneself in an alien way of life in order to gain knowledge, an understanding, of that way of life is called participant observation. … Although some knowledge can be acquired by observation, it is difficult to get the depth we are looking for from that detached perspective. Involvement is the price for getting at the meanings people give their social environment and behavior (Boeree, 1998, chapter 11).

Atkinson and Coffey describe the benefits of participant observation as an additional method to interviews. "Participant observation makes it possible to check descriptions against fact and, noting discrepancies, become aware of systematic distortions made by the person under study" (Atkinson & Coffey, 2003, p. 419). In this study, I used my own observations to check descriptions in discussions and essays, as they constituted student conversations.

Field notes represented by the facilitator's diary recorded much of my participant observations. I also frequently checked the truth and context of student postings and essays against other documents and my own observations, as students sometimes misread communications and reached erroneous conclusions. Jane, the virtual student, was another

useful research instrument, as she could observe the interaction from a viewpoint different from that of the facilitator.

While participant observation enables the researcher to observe from the inside, Atkinson and Coffey (2003) warn that the researcher may affect or contaminate the setting or become too much of a participant, and thereby lose the capacity to observe critically. This is a methodological limitation of the research.

5.2.1.4 Preparing the Data for Analysis

I also used the end-of-course student reflective essays from the LMS for content analysis. As facilitator, I documented the daily progress of the course in a diary, and the students maintained their reflective diaries as online blogs that we also analysed. After conclusion of the course, I captured the first informal social gathering where the students could mingle and communicate freely on videotape, conducted semi-structured focus-group interviews and later e-mailed them a short questionnaire. I compiled and downloaded the student and facilitator discussion posts in WebCT™ from the server according to discussion topic. Transcripts of relevant sections of the conversations then joined the other course artefacts for analysis. I did not transcribe, analyse or include the focus-group interviews in this thesis. Though I studied the interviews, their only relevance were in confirming that students never mentioned knowledge of Jane's real identity in Methical Jane (Nagel et al., 2007b).

I saved all documents as listed in table 2 as well as the essays, blogs, diary and survey questions (table 3) as unformatted text files suitable for analysis with ATLAS.ti™ version 4.2, a computer-based qualitative analysis program. I coded and analyzed texts using ethnographical theory (Bush, 2005; Dick, 2005; LeCompte, 2000). The ATLAS.ti™ hermeneutic unit is included as addendum 17.

5.2.2 Quantitative Methods

Student tracking data from WebCT provided a multitude of data on student logins, their numbers of original and reply posts in the discussions (addendum 18). The course

gradebook (addendum 19) was another rich source of numerical data, as it contained the marks they accrued for different course artefacts, activities, culminating in pass grades.

The population was diverse. Statistic description of the population was necessary to infer meaning from the differences between groupings of stratifications in the population. I excluded use of normal parametric tests due to the small population, high standard deviations, and data not displaying a normal distribution. Non-parametric or distribution-free tests use the ranks of observations (D. C. Howell, 1989). Their advantages over the equivalent parametric tests are:

- being simple to calculate
- not requiring equal population sizes
- not requiring the same variance or a normal distribution of the population
- being more sensitive to the median than to the mean
- not being affected by very extreme scores (outliers), as such scores do not shift the mean or inflate the variance.

After I ranked the subjects according to their grades and divided them into three independent groups, I could apply the Kruskal-Wallis test to describe the statistics. I used this test to indicate the significance of the analysed relationship between students' success in completing the course and their online participation (addendum 20). I initially derived one of the variables (online collaboration score) qualitatively. I built theory on both the quantitative and qualitative findings.

The chi-square test deals not with measurements of data values, but with categorical data (D. C. Howell, 1989). I categorised students according to posting of voluntary e-mail responses and calculated the significance of the difference in response among grade stratifications, using the chi-square test (addendum 20). In line with the interpretivist nature of the research, I based the main conclusions and theory emanating from this part of the research also on qualitative findings, encompassing mixed methods research.

6. VALIDITY AND RELIABILITY

Criteria for evaluating qualitative research differ from empirical, as those "standards are quite inappropriate for judging the merit of qualitative studies. ... [These] must at least be modified to fit qualitative research" (Strauss & Corbin, 1998, p. 266). Only rigorously conducted studies can have any effect on educational theory or practice. Conducting an investigation in an ethical manner ensures validity and reliability (Merriam, 1998).
As in other types of research, one should examine its constituent parts for appropriateness and rigour, confirming that the researcher followed procedures faithfully and based conclusions on data. While positivist criteria include internal and external validity, reliability and objectivity, objective qualitative judgments rest on credibility, transferability, dependability and confirmability (Hatch, 2002).

6.1 Internal Validity

Internal validity shows that the research findings match reality (Merriam, 1998). The meaning of reality assumed in the epistemological stance and words are only the symbols representing the reality, not reality itself.

Table 5: Basic Strategies to Enhance Internal Validity (Merriam, 1998)

Strategies	Application
Triangulation	Multiple sources of data, often document analysis confirmed the findings from content analysis Multiple methods confirmed emergent findings ensuring a holistic understanding of the phenomenon
Member checks	Not relevant, as content analysis sources were electronic
Long-term observation	All possible data gathered comprehensively for the whole period
Peer examination	Co-authors of articles examined the findings as they emerged
Participatory or collaborative modes of research	Co-authors were involved from the conceptualisation through the preparation of the articles and the final manuscript
Researcher's biases declared	I declared my assumptions, worldview and theoretical orientation from the proposal phase and listed the limitations of the study in the synopsis

Table 5 summarises how this study incorporated Merriam's six strategies to enhance internal validity. On these accounts, the present study represents high internal validity. I collected a comprehensive dataset since the initial planning phase up to the resolution and final debriefing phase.

The multiple documents helped to validate the findings. High internal validity in ethnographic research results from "living" among participants and collecting data over a long period, using empirical categories derived from the participants; and conducting participant observation in natural settings (Boeree, 1998; Hatch, 2002; Merriam, 1998). A detailed audit trail describing "how data were collected, how categories were derived, and how decisions were made throughout the inquiry" (Merriam, 1998, p. 207), also improves internal validity. The facilitator's diary (addendum 15) recorded the audit trail and contributed to the validation of findings.

6.1.1 Researcher-participator

The investigator's position has to be clarified to ensure dependable findings (LeCompte, 2000). "Because human beings are the primary instrument of data collection and analysis in qualitative research, interpretations of reality are accessed directly through their observations and interviews ... internal validity is a definite strength of qualitative research" (Merriam, 1998, p. 203). During the historical phase of the research, I participated as student in the online course preceding this one (Cybersurfiver). I lived virtually in the online classroom with the students as a student and a facilitator, experiencing everything that happened among them, observing their participation in the original natural setting. My position as participant observer was integral to the research. "Through active reflexivity we should recognize that we are part of the social events and processes we observe and help to narrate … we are a part either through participant observation or as facilitators of shared accounts and narrative strategies" (Atkinson & Coffey, 2003, p. 426).

Explaining the assumptions and theory framing a study also ensures dependable findings (LeCompte, 2000). Assumptions concerning the use of the soccer metaphor and students' relationship with Jane did not bear out and indicated the limits of interpreting this study across cultures. I further address the validity of the assumptions in the final discussion.

6.1.2 Triangulation and Crystallisation

Triangulation is an established way to improve both reliability and internal validity (Hatch, 2002; Merriam, 1998), despite criticism of its positivist origin and suitability for qualitative

research. From empirical research we glean an explanation: "Triangulated measurement tries to pinpoint the values of a phenomenon more accurately by sighting it from different methodological viewpoints" (Brewer & Hunter, 1989, p. 17). Methodological triangulation consists of combining methods "to draw on the methods' complementary strengths and offset their respective weaknesses" (Atkinson & Coffey, 2003, p. 420). They warn against simply integrating methods, treating their outcomes in an additive way. Triangulation on its own is limited, because "we cannot assume a unitary and stable social world that can simply be viewed from different standpoints or from different perspectives" (Atkinson & Coffey, 2003, p. 421).

Tobin and Begley (2004) elucidate the valid use of both triangulation and crystallization as terms to establish *completeness* in qualitative research, extending its use to more than methodological. "Triangulation involves 'two or more' theories, methods, approaches, instruments or investigators providing data on the topic. The 'more' is limited only by resources available and can be so numerous as to constitute crystallization" (Tobin & Begley, 2004, p. 394).

Reflexivity in the choice of research methods increases the reliability or rigour of a study. The research methods we use depend on particular kinds of transactions and engagements with the world. Each kind of transaction therefore generates a distinctive set of descriptions, versions, and understandings of the world. "[Reflexivity] requires us to address the distinctive and intrinsic attributes of particular methods, to retain some fidelity to those methods, and their products" (Atkinson & Coffey, 2003, p. 422). I illustrate reflexivity, as each research question generated a unique set of methods for investigation, consisting of different types of qualitative and also quantitative methods as shown in table 3. Tobin and Begley also advocate using "more pluralistic approach as a means of legitimizing naturalistic inquiry. In particular, the concepts of a triangulation state of mind and search for goodness that should permeate a study from beginning to end are to be commended" (2004, p. 394).

6.1.3 Evidence of Crystallisation

The study used multiple strategies (table 6) consisting of a combination of inductive and deductive qualitative approaches, conceptual and semantic analyses coupled with

quantitative methods. These methods illustrate reflexivity in employing the most suitable methods for each question. They further contributed to the robustness of the research and served to crystallise the findings. Each article describes details of the applied methodology.

Table 6: Evidence of Crystallisation

	Inductive	Deductive	Conceptual	Semantic	Quantitative
Metaphors		√	√		
Soccer	√	√		√	
Methical Jane	√			√	√
Virtual Jane		√	√		
ROPing Students	√	√		√	√

The literature review on metaphors is a deductive theoretical study as I analysed the literature on metaphors used in e-learning through a framework for successful online learning and a distillation of current metaphor theory. This theory also framed discussion of the ethnographic analysis of the use of the soccer tournament metaphor.

Investigating the contribution of Methical Jane and the students lurking behind the digital divide, I added quantitative methods and perspectives to the qualitative perspective. The two articles on Jane complement each other as they describe different themes derived from a common initial content analysis. In the Methical Jane article I also used a theoretical analysis of the literature on identity and deception in online learning and applied the resulting framework deductively. I validated the qualitative findings relating to the visibility of the online facilitator with quantitative data (addendum 21). The article on student perceptions of virtual Jane develops a new theoretical framework based on the literature and compares this framework with ethnographical themes derived from the course documents, responding to an article by King (2002).

In the article on the read-only-participating students I again followed mixed methodology consisting of qualitative analysis of selected themes derived from ethnography of course documents crystallised with statistical analysis of student tracking data from the learning management system, similar to the analysis of Davies and Graf (2005), shown in addendum 20. This article replies to an article by Beaudoin (2002) on lurking students in online classes.

Merriam (1998, p. 162) advises to "plan data collection sessions according to what you find in previous observations". Having multiple perspectives on the data was important both in analysing what was happening, but also in planning the strategy of how and what to collect next. In the article on Methical Jane (Nagel et al., 2007b), interim findings resulted in adaptation of the research strategy. Using a variety of data-collection instruments to source the material used for content analysis, contributed to validity. A multi-perspective approach ensured crystallisation of findings. This process also aided reliability, as we confirmed the findings of different methods of analysis.

6.2 External Validity

External validity indicates how readily the findings of the study are applicable to other situations. In qualitative research, we did not try to find out what is generally true of many circumstances, but we tried to understand this particular one in depth. Reliability indicates whether it is possible to replicate findings, a problem in social sciences due to the non-static nature of human behaviour. "The question then is not whether findings will be found again but whether the results are consistent with the data collected" (Merriam, 1998, p. 206).

Qualitative studies gain generalisability when they yield substantive theory. "The real merit of a substantive theory lies in its ability to speak specifically for the populations from which it was derived and apply back to them" (Strauss & Corbin, 1998, p. 267). When a study is reproducible, it extends its meaning. Future application and research is the only way to test theories under similar circumstances. "It is reaffirming when we read the research reports of others when their findings are consistent with ours" (Strauss & Corbin, 1998, p. 266). A study is reproducible when another researcher should come to a similar theoretical explanation when "given similar theoretical perspective, general rules for data gathering and analysis, assuming a similar set of conditions" (Strauss & Corbin, 1998, p. 266). Adequate description of the set of conditions is therefore of prime importance. Readers might be interested to compare the study context to their own situation.

> Good qualitative reports are rich and nuanced. A research narrative is rich when it presents not only the main themes, but also variations and refinements, each illustrated with clear examples. … A rich study keeps on asking questions like when, why, how, and under what circumstances (Rubin & Rubin, 1995, p. 265).

Because the "product of a qualitative study is richly descriptive" (Merriam, 1998, p. 8), I provide evidence of the theoretical concepts of themes found in the analysis. I also provided sufficient rich thick description for the reader to decide about the utility of comparisons or similarities. The researcher could also describe how typical the programme or event was, compared with similar others (Strauss & Corbin, 1998). I described the similarities and differences to courses that preceded this one, as they also constitute the development research angle.

Strauss and Corbin (1998) also suggest judging the fairness and rigor of a research project by using negative case analysis and testing for rival hypotheses. The last article in the series, investigating read-only participation (Nagel et al., 2007c), used a negative hypothesis to contribute to an understanding of the prime research question concerning online student participation.

"One way of beginning to establish credibility is to demonstrate the researcher's familiarity with the overall field by putting the study in the context of professional literature" (Rubin & Rubin, 1995, p. 263). Literature perspectives reinforced my research, joined by abundance of rich data that allowed multiple perspectives, and with the researcher's participant status, to increase the validity of the study.

7. HOW TO READ THE THESIS

This thesis does not follow the traditional five sections format. As I tried to avoid unnecessary duplication, each section has its share of new information. This broad introduction to the study poses the overarching research question of how the dynamics of interaction influence learning in an online classroom, as well as broadly introducing the sub-questions of the articles.

Following Louw and Fouché's (2002) recommendations of writing a thesis in article format, I discuss the subordinate research questions in detail in articles co-authored by the supervisors that I submitted to journals accredited by theThomson's ISI Web of Knowledge^{SM}. The versions of the articles in the thesis reflect their status at the time of

submission of the examination copy. Addenda 2 and 7 contain more detail of the current review process.

The five articles submitted to journals are the following:

- Reviewing Metaphors for Online Learning
- Using a Soccer Tournament Metaphor in a Distributed Course on Online Learning
- Methical Jane: Perspectives of an Undisclosed Virtual Student
- Facilitating an Online Distributed Course: Virtual Jane, not an Ordinary Student
- Read-only Participants: a Case for Student Communication in Online Classes.

The following section is:

- Synopsis, Conclusions and Recommendations.

The concise format and writing style imposed by the journals limited the number of words and the extent of reference citation. An extensive bibliography therefore follows the last list of references. I used a similar writing style in the opening and closing sections to ensure continuity. I also retained the formatting style of the articles as prescribed by the various journals they were submitted to. This implies that the formatting style of these sections may seem inconsistent, further brought about by the two language editors' different approaches. I structured the last section (Synopsis, conclusions and recommendations) according to Mouton's (2001, p. 124) guidelines for the final chapter in a thesis. I briefly summarised the conclusions of each article. Here I also address the prime research question drawing upon findings presented in the separate articles. I show how findings concerning the tools (figure 1) investigated in the articles, address the four dimensions of interaction (table 1). This section also draws new conclusions from the findings mostly represented in the articles, but not confined to those. I conclude with a concise theory of dynamic online participation, the delimitations of the study, and a summary of recommendations.

A joint reference list serves this section as well as the synopsis, conclusions and recommendations section, followed by a bibliography serving the whole thesis.

Reviewing Metaphors for Online Learning

1. ABSTRACT

This article theorises on how metaphors can improve online learning. Literature on online learning reveals little theoretical background about metaphor and its functions, or criteria to choose, implement or evaluate metaphors. Metaphors' unique cognitive functions allow transfer of characteristics from a known concept to the unknown or abstract and vividly, compactly illustrate the otherwise inexpressible. Examples of metaphoric expressions are classified and assessed for online learning in constructivist student-centred learning environments, interaction of the student with the interface, content, peers and the facilitator. Metaphoric models in online learning are not always advantageous; nor do they always address prime online learning requirements. Instructional designers need an integrated theory to guide the selection of metaphorical concepts to strengthen learning outcomes in a constructivist online learning environment. Appropriate metaphors can support navigation, foster understanding, create enthusiasm, facilitate communication with online instructors and students while promoting the establishment of a virtual learning community that supports online learning goals.

2. INTRODUCTION

While planning an online course around a metaphor, we discovered that literature on online learning does not adequately deal with the basic principles of using metaphors. Few studies reported using metaphors in the support of online learning communities and constructivist learning environments. Also, we found little evidence of theoretical grounding of the use of metaphors in learning interventions to improve online learning. An analysis of online courses that use metaphors indicates they lack the unique characteristics of metaphors, and that they are window-dressed with embellishments and irrelevant imagery like wizards and balloons. The cognitive benefits of some metaphors therefore become suspect as they probably hinder learning by complicating course interfaces.

An extended search in the literature of education, business and marketing leads to the founders of contemporary literature on metaphors and the contribution of scholars such as Ortony (1975), Lakoff and Johnson (1980). This article aims to examine the principles of metaphors in terms of online learning and to provide a theoretical framework and practical guide for using metaphors in online learning.

The central question for this investigation is: Can metaphors improve online learning? Five questions propelled this investigation:

1. Why do we use metaphors in learning?
2. What are the characteristics of a metaphor?
3. How are metaphors used in online learning?
4. What can we learn from using metaphoric expressions in online learning?

3. THE CHALLENGES STUDENTS FACE IN ONLINE LEARNING

In accordance with social-constructivist pedagogy (Vygotsky, 1978), the four ways students engage with learning environment indicate the social aspects central to collaborative online learning. Moore (1989) defines three interdependent modes (Swan, 2003) of interaction in distance education: interaction with content, with the instructor, and with peers. A fourth mode of interaction, the course interface, evolves when distance education progresses to an internet-delivered mode. The clarity of design, interaction with instructors, and active discussion among course participants significantly influence students' learning and satisfaction. Individually and collectively, these four components contribute to the success rate of online courses.

The prominence of the instructor's role in education varies. Collison et al (2000) propose that the role of *guide* is the most appropriate style of facilitation for online learning communities. While not interfering in the flow of the course, guiding requires the facilitator to focus participants on the learning, deepen the dialogue, and foster the online learning culture. This ensures that participants become responsible scholars with the instructor overseeing students' developing expertise (Collison et al., 2000; Mason, 1991). However, both learners and instructors need guidance to understand their new roles in the online classes (Blignaut & Trollip, 2003). Perhaps the appropriate use of metaphors can

soothe learners' fears of treading on unfamiliar online terrain with comparisons to familiar situations.

In a constructivist learning environment, active student-participation is essential to achieving learning outcomes (King, 2002; Swan, 2003). A strong sense of community provides learners the support to deal with challenges and difficulties (Rovai & Wighting, 2005). Group interaction promotes the achievement of joint goals (Heppell & Ramondt, 1998). Metaphors may provide a framework guiding learners in engaging with peers, inspiring them to better the scope and quality of online communication, and contributing to a collaborative learning experience.

Students abandon online courses when they consistently feel lost in cyberspace (Chyung, 2001). A detailed analysis of the target audience as the starting point for the design of a learning intervention is advocated in the ADDIE model of instructional design (Dick & Carey, 1978). This analysis will also inform the choice of metaphor. The popular belief that visual metaphors such as icons improve students' online performance remained anecdotal until the late 1980s. Smilowitz (n.d.) provides empirical evidence that some metaphors, when used as navigational aids, can facilitate interaction with the interface, while others remain completely ineffective.

Learners construct knowledge by matching new information with pre-knowledge (Merrill, 2002). Engagement with the learning material does not take place in isolation from interaction with other modes of internet delivered courses. Instructional designers should plan for a wide spectrum of interaction (Moore, 1989).

4. LEARNING WITH METAPHORS

It is not possible to experience everything first hand. Well-known phenomena can help explain novel or abstract concepts:

> Metaphorical concepts are those which are understood and structured not merely on their own terms, but rather in terms of other concepts. This involves conceptualizing one kind of object or experience in terms of a different kind of object or experience … abstract concepts are defined metaphorically in terms of concepts that are more concrete and more clearly structured on their own terms (Lakoff & Johnson, 1980, p. 195).

Hence, when knowledge is de-contextualised it becomes inert and difficult to apply during problem-solving. When teaching new or abstract concepts that do not resonate with students' frame of reference, the use of metaphors can contribute to contextualising the information.

5. THE CHARACTERISTICS OF METAPHORS

Since antiquity metaphors have informed literature. The word metaphor has its origin in Greek, from *metapherein*, 'to transfer' (Oxford Dictionary). A metaphor is essentially a comparison between a *vehicle* (the known) and a *tenor* (the unknown) (Ortony, 1975), whereas Lakoff and Johnson (1980) use the corresponding terms *target and source.* Ortony (1975) recognises no cognitive differences between similes, metaphors and analogies, even though similes compare using *like* or *as*, and metaphors draw direct comparisons.

One chooses a metaphoric vehicle because of its experiential base and its familiarity to the student (Lakoff & Johnson, 1980). The vehicle embodies some un-described, but well-understood qualities; some are literal and some are not. Some conceptual correspondence (mapping) may pre-exist between the vehicle and the unknown topic. The qualities *transferred* or mapped *onto* the topic or target domain are termed entailments (Kovecses, 2003). A good metaphor awakens a network of entailments from pre-experience and serves as a guide to understanding and learning. The qualities that the vehicle and topic have in common are called the *ground* and those that are dissimilar are called the *tensions*. The *salience* of a metaphor refers to a distinctive set of plausible and appropriate characteristics that have the potential to be transferred, excluding those that give rise to tension (Lakoff & Johnson, 1980; Ortony, 1975).

Contemporary authors recognise three hypotheses for using metaphor (Lakoff & Johnson, 1980; Ortony, 1975). Due to their *compactness*, they replace long descriptions. The *inexpressibility* hypothesis states that metaphor is used when it is hard to find the proper literal words in the particular language: "whereof one cannot speak literally, thereof one should speak metaphorically" (Lakoff & Johnson, 1980; Ortony, 1975). The *vividness* of

metaphor relates to reconstructing perceived experiences, recalling emotive, sensory and cognitive aspects.

Metaphor notation has evolved from Lakoff's (1980) use of capital letters: A IS B, without use of quotation marks, to the contemporary version using capitalised italics in quotation marks: "*A IS B*" (Kovecses, 2003; Low, 2003; Ritchie, 2004). Ortony originally notates his metaphors with small letters in quotation marks (1975), and later italicises them (1987) for instance "*a is b*" which is also generally used for metaphorical expressions as illustrated by Thomas et al (2001).

In the sample metaphor, "*COMPUTER IS BRAIN*" (figure 1), a computer can be described in terms of a brain to someone who does not know about computers, but knows about a brain. It therefore conjures up thoughts about the qualities and functions of the brain. The characteristics or potential entailments of a brain include *inter alia*: a brain does mathematical procedures; it consists of a network of nervous connections; it is instrumental in interpreting sight and hearing; it is capable of abstract thought, music etc. The listener will try to imbue the computer with the salient or distinctive transferable characteristics of a brain; discarding aspects such as being walnut-shaped, soft, capable of abstract thought (all giving rise to the tension) but retain the ground consisting of mathematical calculation and structure of a network. The provision for understanding lies therein that the creator of the metaphor should know that the listener has enough pre-knowledge of the entailments of a brain.

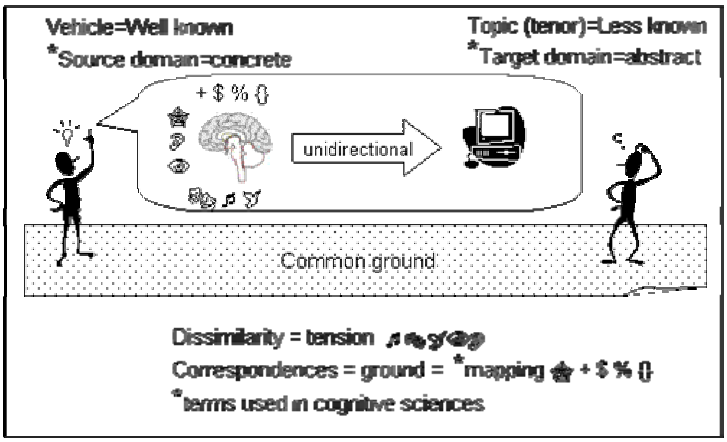

Figure 1: Illustration of the components of the metaphor of "*COMPUTER IS BRAIN*"

The unidirectional metaphor illustration in figure 1 rests on the common ground that the receiver knows a little about computers, but is not a computer scientist, as the context influences understanding of the metaphor (Ritchie, 2004). What the vehicle and topic share, Ortony (1975) originally termed *ground* whereas Ritchie (2004) describes *common ground* as the mutual *cognitive environment* between the participants (figure 1).

Table 1: Classification of Online-learning Metaphors

Type	Definition	Example	Reference
Conceptual	Understanding of one conceptual domain in terms of another	"*ARGUMENT IS WAR*"	(Lakoff & Johnson, 1980, p. 203)
Primary metaphor	General physical experience underlying metaphor	"*PERSISTING IS REMAINING ERECT*"	(Boers, 2003, p. 233)
Complex conceptual metaphor	Combination of different primary metaphors	"*THEORIES ARE BUILDINGS*" "*ORGANIZATION IS PHYSICAL STRUCTURE*" "*PERSISTING IS REMAINING ERECT*"	(Boers, 2003, p. 233)
Extended metaphor	Comparisons between additional related topics carried by the same metaphor	"*ONLINE LEARNING IS A SHIP*" "*students are crew*" "*instructor is captain*"	(Cronjé, 2001; De Simone, Lou, & Schmid, 2001)
Frozen metaphors	Idioms derived from historical situations or phrases that have become conventional phrases	"*KICK THE BUCKET*" "*WARM FEELINGS*"	(Deignan, 2003, p. 270; Fainsilber & Ortony, 1987, p. 248)
Implicit metaphor	Tenor not specified but implies similarity and comparison	"*CLEARING THE (RECYCLE) BIN"*	(Cornelissen, 2003)
Interface metaphor	Symbols that aid navigation on computer screen	"*INFORMATION STRUCTURE IS FILE, FOLDER, DESKTOP*"	(Smilowitz, n.d.)
Spatial metaphors	Exploiting the human ability to organise objects in space, to recall and reason about their locations and other space-related cognitive abilities	"*COMPUTER IS DESKTOP*"	(Dieberger & Frank, 1998)

5.1 The Relevance of Metaphors

Metaphors provide the building blocks of language. Since Aristotelian times, the unique features of metaphors have been known and studied by academics in many different fields, using them for widely differing reasons. Some researchers are very rigid in their classification requirements, while others argue that metaphors simply represent the one end of a continuum of language where no exact boundary exists, with literal language on the other end (Thomas & Mareschal, 2001). The latter view is also held by cognitive scientists

who argue that understanding of a concept is always in context; and the context often borrowed (Lakoff & Johnson, 1980). Online learning is likewise a field that uses expertise from and resonates with other disciplines. Therefore to study metaphors in an online learning context presupposes studying it in the fields where online learning originated.

5.1.1 Metaphors in Computer Science

Because of the abstract nature of software and the problems associated with bringing together programmers and their computers, computer scientists have been using metaphors throughout their work. They are continually developing novel concepts in terms of known or everyday phenomena. "The use of appropriate navigation metaphors can help to make the structure of modern information systems easier to understand and therefore easier to use" (Dieberger & Frank, 1998, p. 597). Dieberger and Frank list some user interfaces commonly based on implicit metaphors – real-world objects: mouse, desktop, cut-and-paste, the Web, files, folders, notebooks and trash cans. Anthropomorphic metaphors are also well-embedded in computer science. "Everyday computing terminology includes terms such as neural networks, master and slave, sleeping, killing, dying and being alive, artificial intelligence, memory, agents, viruses, parents, siblings and relatives" (Tedre, 2006, p. 212). In the field of semiotics, where signs and symbols are used in human computer interaction, the user interface frequently contains metaphors (Mick, 1986). "Interestingly, the metaphor advantage appears to be carried in the language or terminology [i.e., function labels] ... not through the graphics" (Smilowitz, n.d.). Metaphors are also extensively used in programming – an application beyond the scope of this paper.

5.1.2 Metaphors in Business

Business and marketing use Metaphors in the cognitive sense, as described by Lakoff and Johnson (1980). Searches for innovative metaphors as marketing strategies and teaching of marketing courses continue (Cornelissen, 2003; Dodd, 2002; Lakoff & Johnson, 1980; MacCormac, 1985; Weinrauch, 2005). Metaphors also articulate individual mental models, for instance when entrepreneurs wish to explain their situations to a wider audience. Due to obvious ethical concerns, metaphors research must be concise as well as highly descriptive (Dodd, 2002).

5.1.3 Metaphors in Cognitive Science

Cognitive science is a highly interdisciplinary area of research, encompassing psychology, linguistics, computer science, and neuroscience. Investigators from many disciplines build their knowledge and interpretation of metaphors on the contemporary academic literature. In cognitive science, different terms describe metaphors, but the concepts are similar to the philosophical and literary model.

In order to avoid ambiguity, a brief synopsis of the use of some specific terms used in cognitive science is provided: A conceptual metaphor consists of two conceptual domains in which one domain is understood in terms of another. Metaphorical linguistic expressions come from the language or terminology of the more concrete conceptual domain. Conceptual metaphors tend to be pre-linguistic and make basic assumptions regarding space, time, moving, counting, controlling, and other core elements of human experience. The *source* domain is the conceptual domain from which we draw metaphorical expressions, corresponding to the *vehicle*. The *target* domain is defined as the conceptual domain that we try to understand, and it corresponds with the *topic* or *tenor* (Ortony, 1975). Conceptual metaphors typically employ a more abstract concept as target and a more concrete or physical concept as their source. The principle of *unidirectionality* states that the metaphorical process typically goes from the more concrete to the more abstract but *not* the other way around. Accordingly, abstract concepts are understood in terms of prototype concrete processes. Metaphors involve both analogy and dissimilarity. *Mapping* describes the systematic set of correspondences between constituent elements of the *source* and the *target*. To know a conceptual metaphor is to know the set of mappings that applies to a given *source-target* pairing. The idea of mapping between source and target describes analogical reasoning and inferences.

MacCormac (1985) claims that the central aspects of metaphors are cognitive and not linguistic, implying that the source of metaphor resides at a deep cognitive level. This sentiment is confirmed by Fainsilber (1987, p. 249): “One would have to reject the classical Aristotelian view of metaphor as merely linguistic decoration, in favour of a view that accords it an indispensable communicative function”. The consensus is that the

conceptual abilities in terms of thinking and acting are fundamentally metaphorical in nature (MacCormac, 1985; Ritchie, 2004).

Thomas and Mareschal (2001) also propose a cognitive model stating that metaphor comprehension is a type of categorisation process and requires no special processes over and above literal language comprehension. Metaphors and literal statements take the same amount of time to process, also one is not easier than the other, provided both rely on common ground between speaker and listener (Thomas & Mareschal, 2001). They suggest that both forms of language are merely differing points on a continuum of changing meaning and show that literal and metaphorical languages are used to update comprehension in different ways. The literature, however, does not inform us whether people with limited literal language skills will find or lose the intended mapping between the target and the source.

5.1.4 Metaphors in Pedagogy

We are surrounded by metaphors, even without recognizing them. According to Lakoff (1980), most of our ordinary conceptual system is metaphorical. Scientific thought depends on metaphorical concepts to understand what we can directly experience (Lakoff & Johnson, 1980). Comparisons can help students learn (Smilowitz, n.d.). Conceptual metaphors can be adapted for pedagogic purposes:

- vivid imagery encourages memorability and generates better understanding
- effective device moves from the well-known to the less-known; from vehicle to topic, thereby supplementing knowledge about both well-known and unfamiliar topics (Ortony, 1975).

Metaphors have been used to great effect in the teaching of language, business, marketing, science, mathematics, and computer science. Ortony (1975) summarises why it is necessary to understand and use metaphors in education:

> The great pedagogic value of figurative uses of language is to be found in their potential to transfer learning and understanding from what is known to what is less well-known and to do so in a very vivid manner. To appreciate these facts may be to make better use of them and to better understand them. Metaphors are necessary as a communicative device because they allow the transfer of coherent chunks of which is known to a topic which is less so. In so doing they circumvent the problem of specifying one by one each of the often unnameable and innumerable characteristics; they avoid discretizing the perceived

> continuity of experience and are thus closer to experience and consequently more vivid and memorable (Ortony, 1975, p. 53).

It seems that little research on metaphors in education has been interpreted according to the principles or characteristics of metaphors. The justification for using particular metaphors is likewise lacking in many research reports as the function of the metaphors are also not explained (Low, 2003). In order to justify the categorisation of something as metaphoric, calls for validation of its hypothesised *source* and *target*. To claim that a metaphor is used by students, also requires evidence that they have a structured mental model (Low, 2003). "The failure to justify the metaphor identification or specification procedures has led … to metaphors that are literal summaries of the data, metonymies, or over-interpretations" (Low, 2003, p. 248). Such use can justly be termed *non-metaphors*. With time and change in cultures, some metaphors lose their vividness and become conventional language, and become dead or frozen (Fainsilber & Ortony, 1987) or fossilised (Deignan, 2003). Many well-known idioms became clichéd long ago, for example "*one horse town*" (p. 267) and are not transparent to contemporary audiences any more; therefore, they fail to transfer any special characteristics (Deignan, 2003).

5.1.5 Metaphors in Online Learning

Online learning inherits metaphors from its parent disciplines. The generic nature of online learning should resonate with students' subject domains that contribute to the array of metaphors. Online learning therefore draws on metaphoric expertise from a number of disciplines such as language, cognitive science, computer science and pedagogy. Online learning practitioners should understand the nature of metaphors to be able to apply metaphors effectively. Even though online learning fits the appeal of Ortony's well known title *Why Metaphors are Necessary and Not Just Nice* (1975), it comes as a shock that nowhere in contemporary online learning does literature explicate the use of metaphors.

Although metaphors are used in the design of online learning, they are generally applied in an informal, non-systematic way, and they are inadequately classified (Low, 2003). Due to the central role of language in CMC, metaphor conventions of language teachers are important in online learning. The spatial metaphors used by computer scientists are generally presented as semiotics or symbols and manifest as navigational aids. Electronic

games frequently incorporate navigational metaphors to explain gaming procedures. Prasolova-Førland and Divitini (2002) describe examples where different types of metaphors operate in virtual learning environments (VLEs): "The virtual environment provided by any collaborative virtual environment can be classified according to the metaphor(s) that it adopts for resembling real space and of the metaphors that are underlying its intended purpose" (Prasolova-Førland & Divitini, 2002, p. 262). VLEs also exhibit the inexpressibility hypothesis of metaphors in the elements of fantasy (Woods *et al.*, 2005).

6. EXAMPLES OF METAPHORS IN ONLINE LEARNING

Various authors (Cronjé, 2001; Cronjé & Clarke, 1999) hint at the advantageous use of metaphors in online learning but do not address the underlying mechanisms. Some students need scaffolding to ease them into unfamiliar learning environments. Such support may require lengthy explanations. Concise metaphors may economically transfer large chunks of information to represent similarities in students' realities. Metaphors can contribute the following to online learning as they:

- assist students in navigating between different components of interventions (Prasolova-Førland & Divitini, 2002; Smilowitz, n.d.)
- create context and orientation for students to situate their learning (Merrill, 2002)
- explain students' active role in a virtual online learning community and encourage them to participate in meaningful dialogue on learning content (Swan, 2001)
- clarify the role of the online instructor (Blignaut & Trollip, 2003).
- create the opportunity to act as real people and communicate socially when online (Erickson & Kellogg, 2001).

In the next section, we discuss reports of online learning using metaphors and examine whether they conform to the abovementioned uses of metaphors. Table 2 provides an executive summary of metaphors used in online learning according to the metaphoric vehicle, mapping topic, hypothesis and four online learning conditions.

Table 2: Executive Summary of Online Metaphors

Metaphor		Hypotheses			Online Learning				Reference
Vehicle	Mapping Topic	Inexpressible	Compactness	Vividness	Communication: Peer	Communication: Facilitator	Space, navigation	Content learning	
De Bono's Hats	emotions	√	√	√	√	√			(Belfer, 2001)
Disney Research Park:	research		√				√		(Chenail, 2004)
game ranger, game guides	facilitator		√		√	√		√	
Survivor:									(Cronjé, Adendorff, Meyer, & Van Ryneveld, 2006)
island	constructivist learning		√	√			√	√	
tribes	collaboration		√		√				
challenges	motivation	√	√			√			
rewards, voting, immunity	motivation	√				√			
Classroom:	constructivist learning			√			√		(Cronjé & Clarke, 1999)
desk	personal workspace		√		√		√		
blackboard	study guides		√		√		√		
posters, notice board	collaboration		√		√	√	√		
Ship:							√		(De Simone *et al.*, 2001)
captain	instructor		√	√		√		√	
crew	student role		√	√	√			√	
Corner pub, virtual glass, alpine lodge, student bar	interaction		√	√	√				(Heppell & Ramondt, 1998)
Settlements:	CMC records		√	√	√	√	√		(Jones, 1997)
cyber-archaeology	research		√						
Garden:	teaching					√			(May & Short, 2003)
sun and shade	individualism		√						
soil conditioning	motivation		√			√			
watering	feedback		√			√			
weeding	avoid overload		√						
Celestial bodies:						√			(Niemi, 2002)
balloons	seven intelligences			√		√			
suns	self efficacy			√		√			
planets	learning strategies			√		√			
stars	learning skills			√		√			
Virtual campus	information, communication		√		√		√		(Prasolova-Førland & Divitini, 2002)
Frontiers:	power, competition, collaboration, status	√	√	√	√	√	√		(Prasolova-Førland & Divitini, 2002)
Active Worlds	meeting people		√	√	√	√	√		
Euroland	information spaces			√	√	√	√		
Dome City	power, identity			√	√	√	√		
Campfire	learning space		√	√				√	(Thornburg, 2001)
Watering hole	interaction	√	√	√	√	√		√	
Cave	reflection	√	√	√				√	
Neverwinter Nights	global warming			√		√	√		(Woods *et al.*, 2005)

6.1 Metaphors for Course Introduction

When unravelling the possibilities of metaphors a whole new world of learning possibilities unfolds. Thornburg (2001) reminds us that one of the distinguishing features of human communication is storytelling. Introductions of new learning content use the metaphor of the *campfire*, carrying entailments of a primordial way of learning by encountering new, exciting stories. Thornburg also uses the metaphors of the *storyteller*, *troubadour* and *shaman* (source of information) to convey a new tale (learning event) and carry entailments of expertise to spellbind an audience (Thornburg, 2001). These metaphorical expressions embody strong cognitive, affective and cultural entailments and resonate with the popular description of the *sage on the stage* role of teachers (Mazzolini & Maddison, 2003). The first impression of competent and inspiring teachers (Schank, 2001) has an enduring effect on the motivation of students. Such motivation widely contributes to the success of hybrid learning models in higher education where courses regularly begin with contact sessions (Burgos *et al.*, 2005; Derntl & Motschnig-Pitrik, 2005).

When the campfire metaphor represents online learning, students encounter new information passively. This corresponds with the lowest level in Bloom's taxonomy of the cognitive domain (Bloom, 1956). Powerful metaphorical expressions attract the attention of students to actively engage them in online courses.

6.2 Metaphors for Navigating to Virtual Places

Technical issues such as connectivity, navigation and online tools must function without hiccups, or else students lose heart and abandon learning. Metaphors can help novices find their way. However, Smilowitz (n.d.) expresses doubts on the efficacy of such a popular assumption and presents evidence that not all metaphors provide navigation. She also indicates that the benefit of metaphors lies in the label and not in the symbol (icon) associated with it. Dieberger (1998) describes a *city* metaphor, as cities have complex infrastructure like roads, bridges and other transportation facilities, and the analogy can support navigation in complex information spaces. Some online learning environments use buildings and campuses as metaphor for the virtual space. Institutions recreate virtual representations of themselves to provide an analogy in the real world.

> The analogy with the physical campus allows creating a virtual environment that is familiar to users and where they can easily move to meet people, access learning materials, and retrieve information (Prasolova-Førland & Divitini, 2002).

Many students familiar with educational environments intuitively know what to expect from online navigational entities. "Spatial metaphors can be characterized along two orthogonal dimensions: their resembling of a real space, and the intended purpose of the space that they provide" (Prasolova-Førland & Divitini, 2002). Some metaphors are more explicit in their presentation of space, while others orient towards an action. Often the two cannot be separated. When a VLE is presented as interconnected buildings, it encourages students to move between the buildings, meet and work with other students, and use discussion forums to foster the founding of online communities (Johnson, 2001; Prasolova-Førland & Divitini, 2002). Due to their navigational properties, VLE's are essentially spatial metaphors as their spatial organisation of information aids memory (Prasolova-Førland & Divitini, 2002). VLEs are also metaphors for *purpose* or *activity* as they inform the user what to do while navigating specific screen areas: how to communicate, how to work collaboratively in groups, or how to find information. The arctic exploration game *Neverwinter Nights* for learning about global warming serves as an example. Woods and co-workers (2005) purposefully use captivating and immersive images from the vivid arctic world to frame their learning agenda. The metaphor is applied as a *kind of semiosis* that students have to learn and use for interpretation of the game itself (Woods *et al.*, 2005). The authors do not classify the metaphor, nor do they explain its components. The cognitive metaphors used in *Neverwinter Nights* depict monsters representing abstract information like environmental threats, wizards cast frost spells and add drama. The mapping is not immediately evident and has to be constructed with some guidance. Using unknown concepts as a vehicle for metaphors increase student's cognitive load and will not elucidate the topic (Lakoff & Johnson, 1980). The hypotheses of vividness looms in the threats to the environment, and provide both the fantasy and inspiration of metaphors. The intended learning goal of the game is "learning about global warming", pursuing informal or incidental learning, the lowest category of learning (Bloom, 1956). It is difficult to define online learning outcomes, as the only interaction is with the environment itself.

VLE systems also use the metaphor of frontiers to represent the virtual landscape as a place where territories can be claimed. Social experiments conducted in these landscapes

relate to the exploration of power, status and competition on real frontiers. Students are given different powers to build or to create new places or to *claim* the land. Prasalova-Førland and Divitini (2002) discuss examples of *DomeCityMOO*, a text-based MOO, *Active Worlds Universes*, *Euroland* and *Playground*.

> The metaphor of frontiers provides a significant amount of control on the structuring of space, which is often not present in the real world. Users get the opportunity to extend the limits of the space, acquiring new areas and establishing new places. The power of this metaphor is also in offering possibilities for interesting social simulation and experiments and creating an arena for exploration of power and identity, as in the case with DomeCityMOO (Prasolova-Førland & Divitini, 2002).

Extending the frontiers serves as a metaphor for creation of new knowledge and conquering new worlds in learning space "which is often not present in the real world" (Prasolova-Førland & Divitini, 2002), using the inexpressibility hypothesis of metaphors. Virtual environments inspire and serve the hypothesis of vividness. In these examples virtual communities and collaborative teams serve as the extended metaphors to support communication with peers and facilitators. The pioneering qualities of the metaphor also support cyber navigation (Prasolova-Førland & Divitini, 2002).

6.3 Metaphors for Learning New Information

6.3.1 Gardening

Metaphors should be dictated by the learning outcomes. In some cases, the intention and the conveyed result of the metaphor differ. As online instructors are not in immediate control of an online class, a constructivist approach to teaching becomes expedient. May and Short (2003) maintain that many instructors grapple with understanding and implementing the pedagogy of constructivist Web-based learning, the associated technology, and the increased demands on their time. In such cases metaphors also guide online instructors.

May and Short (2003) address sound teaching practices and design the online environment to support both the learners and instructors. The metaphoric expression *gardening in cyberspace* is about creating an environment that fosters learning and personal growth. The practices of good gardening – *positioning*, *conditioning soil*, *watering*, and

controlling weeds and pests – all serve as useful analogues to good online pedagogic practices such as addressing individual differences, motivating students, providing feedback, and avoiding information overload (May & Short, 2003).

Both the *positioning* and *watering* entailments indicate a flexible course design that influences the students' encounters with the learning content. *Soil conditioning* and *weeding* are mostly teacher-centred metaphor expressions that foster teaching practices, including facilitation practices. They also speak to individual learners and do not involve collaborative work or peer interaction. It is, however, not clear how meta-cognitive skills and personal growth are supported. Mapping the metaphor is not immediately evident and probably requires some familiarisation, as it is doubtful if all students are avid gardeners and familiar with the vehicle. This metaphor exhibits the compactness hypothesis as it improves teaching practice and inspires instructors in a concise way.

6.3.2 Classroom

Cronje follows a well-established and successful extended metaphor of an online virtual classroom (Heppell & Ramondt, 1998) for a course on online learning. It represents the space as well as the activities of real classrooms. It includes a virtual chalkboard where students can write, virtual learner' posters, and virtual desks that "had to be filled with the virtual equivalents of what students in an actual class would have in their actual desk" (Cronjé & Clarke, 1999, p. 6). Learning content presented to students in the form of a resource cupboard offers links to subject matter and website construction programs. The blackboard divulges comprehensive on-line study guides. The students' virtual desks represent their workspace housing important links to information on the WWW and to a virtual portfolio of completed coursework. The desks as metaphor promote higher order learning (Bloom, 1956) through the creative activities (Cronjé & Clarke, 1999). Though the extended metaphor is not particularly vivid, it involves navigation support, finding online content and collaborative peer-assisted activities. This metaphor does not guide communication with peers and an instructor who might just as well have been Mazzolini's "ghost in the wings" (2003), as he was seldom featured and entirely absent from the discussions. A virtual playground or sandpit could have encouraged some social community building. This application of metaphors does not foster virtual learning

communities, but nevertheless it supports a constructivist approach where the *desks* encourage creative activities and learning.

6.4 Metaphors for Communication

6.4.1 Metaphors forPeer Communication

Thornburg (2001) uses the metaphor of the *watering-hole* to illustrate learning through communication. It represents the place people informally gather to share information and news with their peers. Everyone becomes both the learner and the teacher. Telecommunications represent a vast global watering-hole. Communication around the *watering-hole* as metaphor carries entailments of a safe place where information can be rehearsed, reviewed, refined and practiced and ideas explored. This resonates with online activities that typically involve peer and instructor interaction where the instructor plays a meaningful and supportive role (Moore, 1989).

According to Thornburg (2001) digital depositories of information provide food for thought from which we can synthesise our own wisdom. This happens in the virtual *cave* as metaphor for the online environment where we interact with the learning content in solitude, in contrast to learning collaboratively. Synthesising our knowledge and wisdom inevitably occurs alone, where the pedagogical conversation with self takes place (Moore, 1989). Deep learning is usually associated with self-evaluation, introspection and metacognition (Hill & Hannafin, 1997). Metaphors to support deep learning need to encourage personal creative activities and critical evaluation of own and peers' artefacts. Thornburg's three metaphors (*campfire*, *cave*, and *watering hole*) represent interaction with content, facilitator and peers, and also suggest deepening levels of learning taking place, akin to those described in Bloom's taxonomy of the cognitive domain (Bloom, 1956).

The asynchronous nature of CMC produces persistent records of the online interaction, an invaluable resource. Metaphors also describe diverse aspects of this interaction. Virtual communities live online and create artefacts of virtual settlements (Jones, 1997). These settlements have a specific culture and definite boundaries. Jones proposes research of the history of the virtual community by examining the remaining artefacts. The process of

exploration into these artefacts is termed cyber-archaeology (Jones, 1997). This metaphor depicting CMC supports peer mediated activities. *Virtual settlements* carry entailments of a security, belonging, identity and commonality of purpose – all providing important insights into the functioning of virtual communities. As a CMC research metaphor, the term *cyber-archaeology* entails systematic scientific method, validity and credibility of findings. This is a valuable metaphor on a post-graduate and research level, and exhibits the compactness and vividness hypotheses.

6.4.2 Metaphors for Social Communication

Heppell and Ramondt (1998) use *First Class*™ as a communication tool for a diverse group of students. This tool "offered a strong visual metaphor and some help with understanding the structure and threads of discourse" (Heppell & Ramondt, 1998, p. 21). The designers also facilitate communication by encouraging the formation of core groups, so students would not be "awash in a sea of anonymous names" (Heppell & Ramondt, 1998, p. 21). Students could also establish dialogue with others outside professional groupings. They address interaction, communication and collaborative work, though not with a metaphor.

To encourage communication and collaboration, students create metaphors for informal dialogue and group identity in a *corner pub chat area*, a *virtual glass*, or *an alpine lodge* (Heppell & Ramondt, 1998). The students then expand the metaphors to describe other online phenomena, using terms such as: *waxing your skis, blizzard, warning about slippery slopes, cross country* (Heppell & Ramondt, 1998). The students identified with the metaphor and used it in their communication. The authors also comment on some of the limitations they encountered in over-enthusiastic interpretations of the metaphor:

> … the 'virtual glass' provided a common ground and comforting sociable framework, it also allowed digression and may therefore have prevented serious discourse at times (Heppell & Ramondt, 1998, p. 22).

This comment also underscores that, next to formal coursework, students learn better when learning is enjoyable (Baker, 2004) – one of the contributions of metaphors to online learning. Learners should at all times be protected against feeling alone and unsafe in the online discussions (Johnson, 2001). Williams (2004) believes that more attention should be given to virtual *student bars*, *homesteads* and similar venues for spontaneous, off-topic communication in the virtual learning environments and learning platforms. To cater to

off-topic interaction and to avoid digression, Erikson and Kellogg (2001) deliberately compartmentalise their discussion forum (*Babble*) into three parts; one is devoted to social or ludic interaction, where participants greet, socialise and joke. The metaphor in this instance supports online peer-to peer interaction rather than facilitator interaction.

6.5 Metaphors for Collaboration

6.5.1 The Disney Research Park

The design of an online collaborative qualitative research park for university students and faculty is designed along the lines of Walt Disney's "Experimental Prototype Community of Tomorrow" (EPCOT) (Chenail, 2004). This includes resources in the form of contextualized learning objects that aids users construct knowledge and technology and design experiences to meet lifelong learning needs. This community metaphor extends to include *park guides* and *rangers* who accompany visitors on their explorations (Chenail, 2004). The metaphor supports facilitation, scaffolding, navigation, deep learning activities and collaborative learning. The vividness and compactness hypotheses are evident, and the metaphor is consistent with promoting constructivist learning principles.

6.5.2 A Ship

De Simone (2001) designed a course for linguistically and ethnically diverse students, using the metaphor of a *ship* to create an online learning environment and cultivate a learning community. The teacher serves as the captain and the students, assigned to groups of three to five, are the *crew*. According to the author, the use of the *ship* metaphor provides students with meaningful coping strategies. Students adopted the compact and vivid metaphor for their own use and warned each other about new or difficult material with alerts of *icebergs* ahead. The researchers concluded that the use of metaphors, structured activities, and group collaboration provided a framework to support meaningful online learning (De Simone *et al.*, 2001).

In summary, providing space and a metaphor to allow and encourage students to engage in unstructured communication is important. Students have need for a place where they feel

safe, can socialise, joke and informally communicate without external pressure. When students can identify with a metaphor and use it, it provides a coping strategy.

6.5.3 CyberSurfiver

A course on web-based learning (Cronjé *et al.*, 2006), employed a metaphor to represent a modification of a well-known reality television series, *Survivor*©. They captured the spirit and atmosphere of *Survivor*© in the background and design of the course by integrating aspects of the game into *group composition, isolation on the virtual island, tribal and individual activities, rewards, immunity challenges, voting each other off the island,* and *a grand prize*. The study demonstrated how the *CyberSurfiver* design provided students and the facilitator with opportunities for collaboration. It challenged students to achieve new levels of competence and create novel applications for the technology – activities associated with higher order learning. A strong constructivist philosophy underlies the course with the facilitator in a supportive role. The extended metaphor strongly indicates collaboration and opportunities for deep learning.

6.6 Metaphors for Student Support

6.6.1 Hats

Metaphors guide thought and practice as well as influence behaviour. Karen Belfer (2001) describes how Ed De Bono's very well known metaphor of six thinking hats provides a model in organising communication in a computer mediated classroom. According to Belfer, the metaphor encourages expression of feelings, emotion and intuition, allowing problem solving, taking abstract dimensions into consideration (Belfer, 2001), thereby fitting the inexpressibility and compactness hypotheses of metaphor. This is an example of a vehicle students are unfamiliar with, as learning the metaphor increases the cognitive load. The application of the metaphor supports ongoing peer-interaction and supplies a useful mediation tool for online facilitators, and facilitates higher-order thinking.

6.6.2 Celestial Objects

Niemi (2002) describes how information technology applied at the Virtual University of Finland creates an encouraging learning atmosphere for distributed students. She advocates proper student support, especially for online learning:

> An empowering learning environment is a holistic one which is intended to enable learners. It involves supporting self-management skills, social and collaborative communities, interactive technological solution and all the small details (Niemi, 2002, p. 27).

These online students use *IQ Form*, an adaptive and interactive assessment tool that also provides tutoring. This tutoring service "focuses on increasing students' awareness of themselves as learners and improving their management of the learning process" (Niemi, 2002, p. 2). The following metaphors in students' test profiles indicate increased awareness:

- *Rising balloons* for seven intelligences, giving an image that we all may grow and develop
- *Shining suns* for self efficacy emphasise the importance of self-confidence and the will to win in learning tasks
- *Flying planets* for learning strategies make visible the power of learning strategies …. By clicking on a planet a learner receives information and guidance on how, for instance, to improve time management
- *Shining stars* in the dark sky symbolise learning skills and reflect an image of our learning (Niemi, 2002, p. 26).

The mix of metaphors in IQ Form is quite complex: two sets of layered metaphors, each with unclear or limited unidirectional mapping. The the celestial metaphors are inspiring, but they are not compact, and students will have to adapt to them, as they may initially be more of a barrier than an aid. Albert Corbett (2001) shows that digital agents or cognitive tutors can effectively augment the role of the facilitator in an online learning environment. In this instance the digital agent supports metacognitive strategies for higher order learning. The philosophy of the learning environment is sound, but the use of the metaphor is limited and does not extend to other online learning activities, nor would it foster the development of community.

6.7 Metaphors for Different Cultures

Metaphors do not invoke a single meaning. For example, one cannot directly translate between languages (Ortony, 1975), for example, translating "work like a horse" into Japanese would not be understood, as they use the simile "work like an ant" (Deignan, 2003, p. 265). Metaphors exist in context. Individual understandings of common ground should be established for interpretations to match up (Ritchie, 2004). Constructing common ground becomes increasingly more important for larger and heterogeneous audiences. Understanding of concepts emerges from interaction with the environment as well as from cultural membership (Lakoff & Johnson, 1980). Some older metaphorical expressions representing part of a shared cultural history can be understood without being experienced (Deignan, 2003).

> Most metaphorical concepts, however, are clearly dependent on culturally relative activities and experiences. One would not expect to encounter the same metaphors for ideas or the mind across widely divergent cultures, nor would the same metaphor … have the same meaning across cultures (Lakoff & Johnson, 1980, p. 201).

Boers (2003) describes three common inconveniences of cross-cultural metaphorical use.

- Speakers of two different languages can display the same source-target mapping, but demonstrate different degrees of productivity or conventionality. For example, although *sport* metaphors are generally popular, different cultures display differences in preferences for a sport. For Example, Europeans prefer soccer and Americans love baseball.
- Value-judgments associated with the source domain, the target domain, or the appropriateness of the metaphor may differ. Students may misunderstand culture-specific connotations, which can lead to communication failure. Littlemore (2003) describes how different uncertainty avoidance and power distance indices as defined by Hofstede (1967), caused Bangladeshi administration students to misunderstand workplace-related metaphor and associated attitudes. The disdain of their British lecturers with steep hierarchies implied by "we have these top-down, bottom-up forms of assessment" (Littlemore, 2003, p. 278) was misinterpreted by the Bangaladeshi who preferred a high power distance and were unfamiliar with the concept of bottom-up assessment.
- Different degrees of persistence across cultures can cause variations in understanding. This is less evident for primary metaphors that are more universal,

whereas complex metaphors can be common in one cultural and rare in another. "As a result, such a particular domain may not be (equally) available for metaphorical mapping in all cultures" (Boers, 2003, p. 233). In British English, sailing, gardening and horse metaphors abound, whereas in French, metaphors around food are more widespread. To convey the message, the English metaphor eating like a *horse* would need to be *wolf* in Russian, *dog* in Korean and *tiger* or *cow* in Chinese (Deignan, 2003).

Boers (2003) maintains that educators should be aware how metaphors influence students' perceptions of language and communication in multi-cultural settings. He advocates the selection of culturally neutral metaphors as the choice of a specific metaphor may appeal to one culture and simultaneously offend another. For example, the adoption of the *student pub* metaphor could offend Muslim students (Heppell & Ramondt, 1998).

7. LESSONS FROM USING ONLINE METAPHORS

Metaphors provide useful tools for both instructional designers and facilitators; they convey difficult concepts (Ortony, 1975). Appropriate metaphors enhance understanding by transferring characteristics to the new or abstract concepts (Thomas & Mareschal, 2001). They can be grouped as:

- Metaphors for *virtual places* that support navigation and guide students to information like virtual classrooms, campuses
- Metaphors for *virtual activities* that guide students to interaction or creation of learning artifacts (Dieberger & Frank, 1998) like extending virtual frontiers, crewing a ship.

Metaphor can successfully guide students towards online activities (Prasolova-Førland & Divitini, 2002), because students often do not have adequate pre-knowledge of online interaction. Metaphors activate or create mental models for student interaction in online classes (Dodd, 2002) and also emphasize the importance of active participation.

7.1 Themes for Metaphors

Classification of the metaphorical topics of literature-based online learning metaphors yields a diverse array, as shown in table 2. Further grouping yielded the following categories: people (students), teaching practices and motivational strategies, online dynamics, groups, learning content and information, research, constructivist learning and the facilitator. Some of these categories reflect important constructivist online-learning principles with *people* as the most central across all metaphors. Metaphors relating to human interaction in online communication reflect the challenge of collaborative activity in online learning. Research indicates that a virtual learning community is one of the most important pre-requisites for successful online learning. Departing from the behaviourist role of information source and authority in online classes, the complex role of the online facilitator is clarified by using clear metaphors. Online instructors, however, must select the most relevant learning content from a vast pool of web-based information (Coppola, Hiltz, & Rotter, 2002; Schank, 2001). Many opportunities emerge to increase the use of metaphors for challenging facets of communication in online learning. The contribution of social interaction in the development of online learning communities is not yet generally recognised. Extended metaphors do not necessarily incorporate this antecedent. The paucity of vivid, inspirational, introductory metaphors may be the result of a preference for hybrid learning; in the initial stages of a course, a real instructor welcomes and meets students in a real learning environment. Many metaphors still point towards an instructor-centred view of online learning, indicating the online persistence of traditional pedagogy, deplored by Reeves (2002). This gives the impression that many metaphors guide students toward practices important to the instructor and not necessarily towards elucidating key principles of interactive online learning.

Using metaphors as introduction to unfamiliar environments of online learning can soften the digital landscape with familiar signposts. With the exception of VLE's, this was generally not the case in online courses. Higher order or "deep" learning remains another elusive aspect in online courses not frequently supported by metaphors. Deep learning also remains a difficult area to design, monitor and evaluate (Reeves, 2002). Instructors like to stay in control and resist breaking free from pre-packaged courses or adopting constructivist approaches to course delivery (Dewey, 1938). It therefore comes as no surprise that few learning environments extend into the metaphoric *virtual cave*.

7.2 Functions of Metaphors

On the continuum of literal to metaphoric language, a good metaphor represents a concept; that is, a term that helps classify and describe items or characteristics. Metaphors arise from well-known or concrete vehicles and transfer to new or abstract topics. A gold-standard test for a good metaphor – does it adhere to one of the three basic hypotheses: inexpressibility, compactness and vividness (Ortony 1975) (table 3).

Table 3: Functions of Online Metaphors

Function	Description	Reference
Inexpressibility hypothesis	Permits expression of what is difficult to express "the function of metaphor is to express succinctly what can only be said very circuitously if, indeed, it can be said at all"	(Ortony, 1975, p. 50)
Compactness hypothesis	Enables conveying of a much information succinctly Implies characteristics that otherwise would require a long list Metaphors "allow large 'chunks' to be converted or transferred; metaphor constrains and directs particularization"	(Ortony, 1975, p. 47)
	Conserve screen space with navigational symbols conserves computer screen space	(Smilowitz, n.d.)
Vividness hypothesis	Captures the vividness of a phenomenal experience Invokes perceptual and sensory images, retaining emotive aspects	(Ortony, 1975)
Transfer	Reassigns information from the known to the unknown	(Ortony, 1975)
Classification	A type of B Functions as the conceptual nature of metaphors	(Dieberger & Frank, 1998)
Specification	Influences how one thinks about previous experiences	(Weinrauch, 2005)
Reinforcement / Disguise	Presents something in a more or less acceptable light Conceptual transfer never complete, manipulates the inexpressible	(Ortony, 1975)
Offer insight	Guides future action Reinforces experiential coherence	(Dodd, 2002)
Enlivenment	Entertainment Edutainment	(Purdue University, n.d.).
Concealment	Embellishment (in Aristotelian terms).	(Fainsilber & Ortony, 1987
Addition of interest	Adds interest to – unknown content/topics uninteresting content/topics	(Cronjé & Clarke, 1999)
Motivation	Contributes to the motivation of online learners	(Cronjé *et al.*, 2006)
Imagination	Allows users to use their own imagination	(Purdue University, n.d.)
Support of memory	Vivid imagery – encourages memorability generates better understanding	(Ortony, 1975)
Indication of emotions	Depicts intense emotions	(Fainsilber & Ortony, 1987)
Humanising of online learning	Contains feelings of unfamiliarity Helps to personalise and humanise online learning experience Anthropomorphic metaphors humanise computer use	(Cronjé, 2001; Heppell & Ramondt, 1998; Thornburg, 2001)

Various authors contribute to the list of metaphoric functions: Enabled transfer (Ortony, 1975), more concise classification (Dieberger & Frank, 1998); support reinforcement (Lakoff & Johnson, 1980); increased insight (Dodd, 2002); enlivened text (Purdue University, n.d.); added interest (Cronjé & Clarke, 1999); increased motivation (Cronjé *et*

al., 2006); reinforced memory (Ortony, 1975); indicative of emotions (Fainsilber & Ortony, 1987); and humanised online learning (Thornburg, 2001). This list is not exhaustive and more metaphoric functions may exist.

7.3 Inappropriate Metaphors

Finding the most appropriate metaphors for the task at hand is tricky as there is no such thing as the Perfect Metaphor that provides a complete mental model or picture of reality. Each can only attempt at representing one side or aspect of the information. Metaphors dependent on interpretation skills are not useful in education as they increase the cognitive load for the students. Online students may misunderstand instructions or lose heart. Choose metaphors that represent sufficient common ground to be easily recognised and understood.

7.3.1 Non-metaphors

Metaphors in any setting can be flawed. Ortony (1975) cautions against metaphors when nothing prevents one from saying what one wants to say using literal language, like "*oranges are the baseballs of the fruit-lover*", for oranges are round (Ortony, 1975). Failed metaphors fall into three groups: non-metaphors, metaphors inappropriate for the audience, and metaphors not serving the intended outcomes. Some online-learning applications do not use actual metaphors, but attractive imagery, and even though it may create interest, does not guarantee that it functions as a conceptual metaphor.

A learning metaphor can be flawed if it represents a narrow or shallow view (Belfer, 2001). Metaphors fail due to insufficient or invalid similarity (Cornelissen, 2003) for example wizards that manipulate the weather (Woods *et al.*, 2005), not explaining any of the scientific components involved. Insufficient ground provides a common failure (Ortony, 1975) when the vehicle cannot contribute sufficient relevant information, as the examples from gardening (May & Short, 2003) and the coloured hats (Belfer, 2001) show. Some literature examples become non-metaphors as they do not pass the three-hypothesis test (table 3), do not elucidate concepts, or increase the students' cognitive load, like rising balloons indicating seven intelligences implying growth (Niemi, 2002), and players transformed into penguins to investigate krill (Woods *et al.*, 2005). Most of these images,

as literary stylistic devices, aid learning as they add drama and interest to the learning environment, not because they are metaphors.

7.3.2 Misunderstood Metaphors

Before using metaphors in online learning, two basic instructional design principles should be acknowledged: the pre-knowledge of the intended audience and the intended learning outcomes. The widely-used ADDIE model emphasises, "During analysis, the designer develops a clear understanding of the 'gaps' between the desired outcomes or behaviours, and the audience's existing knowledge and skills" (Kruse, online). Designers of metaphors should know how much they can assume about their audience's knowledge of the proposed metaphoric source to ensure understanding of the metaphor. Failing in this can lead to inappropriate metaphoric characteristics, like associating rising balloons with festivity and not with growth (Niemi, 2002). Instructors should take care to choose metaphors for learning, as metaphors can increase the cognitive load of students if the vehicle is not part of their experiential basis (Lakoff & Johnson, 1980). A good metaphor simplifies understanding and does not complicate learning.

7.4 Supporting Learning Outcomes

In addition to considering cultural differences among speakers and listeners, instructional designers should also pay attention to clearly formulated learning outcomes. They should ensure that the metaphor supports learning outcomes. In online learning, single and extended metaphors should generate enthusiastic discussion (Low, 2003). Incorporating elements of creative metaphors only for entertainment (edutainment) does not support the intended learning outcomes (Cronjé, 2001). On the other hand, learning should be fun and inspiring, especially in online classes that lack the regular social interaction of contact tuition (Heppell & Ramondt, 1998). Therefore, design clear purposes for using a metaphor.

To inspire enthusiasm in an online class, the metaphors should be culturally suited to, well-understood by, and popular with the target students (Boers, 2003). Inadequate interpreting skills may allow a metaphor to fall short of its learning potential (Cameron, 2002), like not explaining the significance of the colours in De Bono's hats (Belfer, 2001). This holds

especially true for complex conceptual metaphors where the mapping is dependent on characteristics of both the vehicle and the topic. Students' inability to identify with the metaphor can confuse and alienate them; and they may withdraw from the learning context (Belfer, 2001).

8. SYNTHESIS

It is important to capture students' attention in the introductory phase of online learning. Vivid and appropriate metaphors create new mental models to anchor learning. The stage can be set as a *wild frontier*, *island*, *ship*, *theme park*, *arctic region*, *garden*, *campus* or *classroom* where the *sage, shaman, troubadour* or virtual *guide* welcomes them. Metaphors aid navigation in cyberspace, especially at the onset to point to digital learning resources. The next level of online learning transpires at the metaphorical *watering-hole*, *village*, *corner pub*, *alpine lodge*, or any other place where students' congregation, social communication and collaborative learning take place with other *pioneers*, *survivors* and the *ship's crew,* wearing a multitude of *coloured hats*. Learning should be guided from the side and supported by online facilitators disguised as *game rangers*, *ship's captains*, *weeding and watering gardeners*. With appropriate guidance or *soil conditioning* and engagement, a virtual learning community or *settlement*, *classroom* or *theme park* roots with learning and knowledge exchange. As students take responsibility for their learning, the *stars*, *planets*, *sun* and *shade* guide and protect them. After inflating a few virtual *balloons*, students, now *cave dwellers,* retreat to their *desks* where they create and evaluate online artefacts and apply their new skills. They learn best as they reflectively retreat into their virtual *cave* with their insights.

Metaphors convey context for new or abstract knowledge that cannot be experienced first-hand as well as for activities in online learning that include communication and collaboration with peers, formative coaching by the online facilitator, and creation of inspired learning artefacts. Successful designers of online courses use metaphors to support students through well-selected learning material. They assist cyberspace navigation. They encourage meaningful discussions moderated by a supportive facilitator. Finally, metaphors challenge students to synthesise learning artefacts as evidence of their mastery.

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Using a Soccer Tournament Metaphor in a Distributed Course on Online Learning

1. ABSTRACT

This paper reports on using a sport metaphor (soccer) in a constructivist eight-week online Masters'-level course delivered via WebCT™ at the University of Pretoria. We address two main questions: How does a metaphor support constructivist online learning? How does a metaphor contribute towards the development of a virtual learning community? We analysed the use of a metaphor in delivery of the course against the theory of metaphors and the requirements for online learning. We qualitatively analysed all instances where the students used the metaphor according to a grounded-theory approach. We consequently built a model that reflects the topics that students use metaphorical language for in a constructivist online learning environment. Through the use of metaphors students indicated the importance of various aspects in their learning experience. The model indicates characteristics of a typical student-centred constructivist learning environment. The choice of design metaphor should take the communication needs of students into account to express issues difficult to address and to facilitate course interaction. This research examines how instructional designers might incorporate metaphor in online learning programs.

2. INTRODUCTION

Despite the universality of the Internet to deliver and support learning, problems still challenge online learning: initial and escalating costs, faculty workload (Blignaut & Trollip, 2003; Reeves, 2002), low course success rates (Frankola, 2001) and the inflexibility of learning management systems (LMSs) (Feldstein & Masson, 2006). Higher Education Institutions, in particular, use LMSs extensively for course delivery and student support. They tailor courses within these constraints to meet students' learning needs and expectations. In addition, online students consistently report feelings of loneliness and lack of support in their courses before they drop their classes (Chyung, 2001).

On the other hand, the online environment allows high quality student interaction and collaborative activities that stimulate higher order learning (Hafner & Ellis, 2004). The development of a virtual learning community also contributes towards successful online learning (Banerjee & Kittleson, 2002). Practitioners should research new ways to foster learning virtual communities successfully. Although metaphors often familiarise students with the online environment, few reports evaluate using metaphors as a technique tool to support virtual learning communities. Ritchie (2004) proposes that the ultimate test for metaphors should be the extent to which it integrates cognitive, social and communicative processes.

This article reports on metaphor used in an eight-week distributed course on web-based learning at Masters'-level at the University of Pretoria. We investigated the appropriateness of a soccer tournament metaphor and the effect it had on the virtual community. The course followed a decidedly constructivist pedagogy wherein students experienced the stresses and strains of web-based learning. No contact sessions took place as some of the students were geographically distributed over the country. For everybody's benefit all online communication took place via the WebCT™ platform. This article focuses on how students use an extended metaphor for communication in the online classroom. Several questions guided the content analysis of discussions and course artefacts:

- How does a metaphor support successful online learning?
- What characteristics of a metaphor contribute towards success in an online classroom?

3. LITERATURE REVIEW

3.1 Requirements for Successful Online Learning

In social constructivist learning environments the principle of knowledgeable individuals supporting other learners (*scaffolding)* is widely accepted (Vygotsky, 1978). Scaffolding has evolved to include all forms of cognitive and logistical support (Johnson, 2001; Sims, Dobbs, & Hand, 2002). Students should receive appropriate feedback or scaffolding, or else they become disinterested, bored, or frustrated (Rieber, 1996). Many advocate using

the pedagogical principles of constructivism for online learning. The conventional teacher role is then replaced by a guide who facilitates the asynchronous discussion and learning processes (Pelz, 2004; Sims et al., 2002). The ideal facilitator should not dominate the discussion but encourage students to participate actively in the course (Ip, Linser, & Jasinski, 2002; Mason, 1991).

Many promote a student-centred teaching and learning approach (Dewey, 1938; Palloff & Pratt, 2001). They believe that students construct knowledge by fitting new information into pre-existing knowledge and learn best when they actively engage in experimentation, exploration, and collaboration (Papert, 1993). In collaborative online learning, students engage and interact in four ways: with the content, the instructors, their classmates (Moore, 1989), and the interface (Hillman, Willis, & Gunawardena, 1994; Swan, 2003). The biggest challenge in online classes is to encourage and facilitate meaningful interaction among all participants (Moore, 1989). In a student-centred constructivist online environment the instructor facilitates, becoming the *guide on the side* (Collison, Elbaum, Haavind, & Tinker, 2000; Mazzolini & Maddison, 2003). The culture of virtual learning communities encourages participants to take charge of their learning.

Metaphors can create a familiar environment for novice online students (Cronjé, 2001; Heppell & Ramondt, 1998; Thornburg, 2001). Online instructors have the challenge and responsibility to facilitate asynchronous discussions to promote interaction and meaningful communication between students (Collison et al., 2000). Many believe that online instructors should be available at all times to encourage course participants to readily comment on each other's postings (Collison et al., 2000; Swan, 2003). They have to deal with students who do not participate with fervour or interact with shallow contributions. Low quality participation shows up in discussion forums and does not contribute to the development of virtual learning communities (Collison et al., 2000; Johnson, 2001). Within a successful learning community, students negotiate meaning and share responsibility for creating artefacts, problem solving and learning. "Often learners help each other in a peer-who-knows to peer-who-doesn't-know relationship, which is extremely beneficial for both parties" (Cicognani, 2000, p. 14).

Mason (1991) highlights the value of social interaction in online classes. Students frequently feel isolated and lonely, and lose motivation (Galusha, 1997). Social discourse

promotes interaction within the class and serves as an effective learning strategy (Heppell & Ramondt, 1998). Erikson (2001) argues for taking social processes into account when planning learning as it promotes a sense of community between students that, in turn, helps other students to deal with online learning challenges (Rovai & Wighting, 2005). The role of social or ludic interaction simultaneously enhances a student's feelings of belonging and competence. This leads to a richer and a more rewarding online learning experience (Erickson & Kellogg, 2001; Williams, 2004). Nevertheless, Biesenbach-Lucas (2003) cautions against excessive, superficial interaction by expecting students to contribute too often.

3.2 Metaphors in Learning

Educators use metaphor to elucidate foreign, unknown or abstract content. Its compactness and understandability or memorability through its vividness also attracts instructional designers to use metaphor in online communication. A few words or an image evokes a wealth of information. Metaphor also allows expression of what is otherwise hard to express literally, when it is hard to find the right words. Metaphor means *to transfer or to carry over* and is essentially a comparison between a vehicle or *source* (a known entity) and a *target* (the unknown) (Ortony, 1975). For successful application the listener should have a good understanding of the source or vehicle (Lakoff & Johnson, 1980). Qualities of the source (entailments) are *transferred* or mapped onto the topic or target (Kovecses, 2003). The learning value from a metaphor resides in these transferred qualities or entailments. In conceptual metaphors the target is an abstract concept and the source a concrete or physical concept. Metaphors are unidirectional, meaning that the process typically goes from the more concrete to the more abstract but *not* the other way around. Therefore, abstract concepts are understood in terms of prototype concrete processes.

According to Lakoff and Johnson (1980, p. 454), "most of our ordinary conceptual system is metaphorical in nature", implying that we seldom recognise all the metaphors that surround us. Ortony summarises the necessity of understanding metaphors and using them in education:

> The great pedagogic value of figurative uses of language is to be found in their potential to transfer learning and understanding from what is known to what is less well-known and to do so in a very vivid manner. To appreciate these facts may be to make better use of them and to better understand them. Metaphors are necessary as a communicative device because they allow the transfer of coherent chunks of which is known to a topic which is

> less so. In so doing they circumvent the problem of specifying one by one each of the often unnamable and innumerable characteristics; they avoid discretizing the perceived continuity of experience and are thus closer to experience and consequently more vivid and memorable (Ortony, 1975, p. 53).

Metaphors supply *compactness, inexpressibility* and *vividness*. Metaphors permit expression of what is difficult to express through literal language and may transfer of unnameable characteristics. "The function of a metaphor is to express succinctly what can only be said very circuitously if, indeed, it can be said at all" (Ortony, 1975). *Compactness* of metaphors allows large chunks of information to be constrained or bound together and transferred (Ortony, 1975). The *inexpressibility* of metaphors offers insight, guide future actions and reinforces experiential coherence (Dodd, 2002). As conceptual, transfer is never complete; this hypothesis presents a concept in an acceptable light; thereby, adding reinforcement or deliberately hiding aspects of the target concept (Lakoff & Johnson, 1980). Intense emotions lead to copious metaphorical use when describing feelings because metaphors also indicate emotionality (Fainsilber & Ortony, 1987). The *vividness* hypothesis posits that metaphors capture the brightness of a unique experience; they conjure up perceptual and sensory images and emotions in the listener (Ortony, 1975). The *vividness* and *compactness* of metaphors can help students to understand and learn better because they:

- classify: A is type of B (Dieberger & Frank, 1998)
- contribute to motivation (Cronjé, Adendorff, Meyer, & Van Ryneveld, 2006)
- encourage memorability and generate better understanding (Ortony, 1975)
- enliven the text (the entertainment value of the metaphor) (Purdue University, n.d.).

3.2.1 Cultural Differences in the Understanding of Metaphors

Nobody has reported the influence of cross-cultural differences in metaphorical use in a South African online learning context before. Therefore, such understanding of metaphors is yet uncharted territory.

Metaphors do not have a single, specified meaning as the context in which they are used influences their interpretation, and metaphors represent different ideas across cultures (Boers, 2003). Although languages display the same source-target concept mapping, they are neither well-understood nor universal. "Although sport metaphors abound, cultures

differ with respect to the kinds of sport that are especially popular. Baseball, for instance, is evidently more popular in the United States than in Europe, and consequently American English is likely to produce more baseball-based figurative expressions" (Boers, 2003, p. 234). Differences in the values associated with the source domain, target domain, or the appropriateness of the metaphor can hinder students' grasp of the connotation. Online instructors should be wary when using metaphors in multi-cultural settings, because language consists largely of metaphors for the description of abstract concepts, and different cultures express differently these concepts with their own unique metaphors (Boers, 2003; Lakoff & Johnson, 1980).

3.2.2 Selecting Metaphors for Online Learning

Due to the lengthy descriptions, it is difficult to describe the elements of online learning events to students using literal language. Metaphors are concise and can concisely transfer large chunks of information, if they represent familiar concepts from the student's world. Metaphors should be appropriate for the particular student target group. The larger the class and the more heterogeneous the students, the harder it becomes to find familiar metaphors. Cultural differences create misapprehension of the metaphor and evoke unsolicited affective and cognitive responses (Boers, 2003; Heppell & Ramondt, 1998), and can even generate confusion and despair (Ortony, 1975).

A good metaphor should simplify understanding, not be a barrier. If literal language can convey the message, metaphors should not clutter the context (Ortony, 1975). One should test the cultural aspects of metaphors used in online learning environments beforehand, as students' online reaction to the metaphor is not visible as in contact settings. Therefore, one should select metaphors that represent adequate commonality.

4. CONTEXT OF STUDY

For almost a decade, the University of Pretoria has researched metaphors supporting online post-graduate courses. Previous metaphors yielded varying degrees of success. They include a virtual *classroom* and a *Rag carnival procession*, (Cronjé, 2001), a *virtual opera*, (http://hagar.up.ac.za/catts/learner/2000/opera/index.htm), a *Halloween party*

(http://hagar.up.ac.za/catts/jool/halloween98.html) and a *CyberSurfivor* game on a virtual island (Cronjé et al., 2006).

We follow the tradition of development design described by Tom Reeves et al. (2005). Lessons learnt from previous courses are taken into account for subsequent courses. Even though they served as stimulating or contentious themes for assignments, the opera and Halloween Party were unsuccessful metaphors (Ortony, 1975). Both are culturally alien to the South African students; Halloween was particularly objectionable. None corresponded to familiar student terrain enabling them to understand the online learning environment; they did not display any of the vividness or compact characteristics of metaphor. Other metaphors had only limited effect, as neither the classroom nor *die Surfivor Island* successfully supported an online learning community. Students persisted in the highly challenging online course based on the *Survifor* reality show, because the game metaphor increased motivation and curiosity through the elements of challenge and fantasy (Cronjé et al., 2006). However, the highly competitive and threatening metaphor yielded a low course success rate and excessive student anxiety.

4.1 Choosing a Metaphor

In this article we report on the use of a non-threatening sport metaphor in the same learning environment. We selected a metaphor that would unite the multicultural, multilingual, and divided student group. At the point of course design, South Africa's successful bid to host the 2010 World Cup Tournament was announced, and on the hype of enthusiasm for soccer, we selected a *World Cup Soccer Tournament* as metaphor. Soccer is the most popular sport among the black South Africans, and international participation of any national sport team unifies citizens. We used the metaphor "*ONLINE LEARNING IS SOCCER TOURNAMENT*". We aimed to transfer characteristics from *Soccer Tournament* as vehicle onto the target or unknown domain of *online learning*. Our analysis will also examine the metaphor in establishing a successful learning community.

Initially 23 students enrolled for the course on web-based learning. The group comprised eighteen female and five male students: nine students were black, fourteen were employed at schools either as teachers in ICT or information science, five in the e-learning industry and four in the higher education sector. Their ages ranged between thirty and fifty. Three

students dropped the course for personal reasons and one because of non-access to the internet.

4.2 Designing the Course for the Soccer Tournament Metaphor

We designed the course for the WebCT Campus Edition 4.0™-platform as it was the LMS platform of choice of the University of Pretoria at the time. We customised the default interface around the extended *Soccer World Cup Tournament* metaphor (addendum 4). To foster interactive communication, we explored and used all available WebCT™ functionalities.

Each student represented a country that would take part in the 2010 FIFA Soccer World Cup Series. The following non-English speaking countries qualified for our *Soccer World Cup Tournament*: Argentina, Brazil, Cameroon, China, Costa Rica, Denmark, Ecuador, France, Germany, Italy, Korea, Mexico, Nigeria, Paraguay, Poland, Portugal, Russia, Saudi Arabia, Senegal, Slovenia, Sweden, Tunisia, Turkey and Uruguay.

Salmon (2003) identifies five stages of e-learning: online access, motivation and socialisation, exchange of information, knowledge construction, and development. In our case, most students have used WebCT™ before and knew each other from previous contact courses. We could therefore leapfrog to information exchange, while continuing with social conversation as a separate concurrent discussion thread. The first strategy for mobilising students' online communication was to post some small tasks to the discussion forum, like a short paper of 200 words of scholarly nature on a course topic. This first posting constituted the *kick-off* in the match. We allotted two *opponents* to each student who had to reply with commentaries or critiques on the initial post. The *ball* was literally rolling, and in quick succession the students also had to post information to the WebCT™ interactive whiteboard and access the chat room. These synchronous tools became the *gym* where peer-based intellectual exercises took place.

We used the WebCT™ discussion forum for all asynchronous communication in the course. This included both content-related and social postings on different topics. The *coach* required weekly student posts, critiqued by two *contenders*. They kept Accumulated *scores*. Just as in a real match, strict deadlines did not allow opponents to *become cold*

through waiting. In true social constructivist fashion, everybody read each other's contributions in the *main pitch* where the match played in front of a *grandstand of spectators*. The topic for week two was 'Rules of Communication', in which students had to research, discuss and negotiate *rules* for the remainder of the course. Students also used the *practice field* or *locker room* for open discussions on any topic like jokes, moaning-and-groaning, requests for and offers of help and encouragement and the *coach* had no say.

Students created a *promotional* page for their respective countries as homepages on both WebCT™ and an experimental server of the University. They accessed the WebCT™ homepages via a collective page in the *clubhouse*. The homepage linked to course projects and to *customer relations* pages (http://hagar.up.ac.za/catts/rgb_resources/). The rationale was that students could explore the challenges of designing in both the WebCT™ and WWW environments. New *training exercises* in the form of course artefacts were added weekly. For example: an interactive jigsaw puzzle of their country's flag, online converters for the local time and currency, links to their country's weather forecast, appropriate text and speech converters and translators, a tag board, hit counter, a slogan as a sound file, and a floating clickable java image displaying a motivational message. The customised artefacts fitted seamlessly into the look-and-feel of their countries' promotions pages.

During the *teamwork* (addendum 14) the students created rubrics for assessment of web-pages, student collaborative behaviour and student support. We named the cooperative teams according to typical South African soccer jargon: *Bafana-Bafana* (the nickname of the South-African national soccer team), *Laduuuuuma*! (a triumphant slogan of the national team) and *Vuvuzela* (a horn blown loudly at matches). Other team projects sought free scholarly peer-reviewed journals and links to new interactive technologies for online learning. All teams had access to dedicated chat rooms and private discussion topics for private *team talks*. Throughout the course students reflected on their learning as a *training log* in an online blog and a narrative essay reflecting their personal learning became the end-of-course examination.

The online facilitator adhered to the model of *guide on the side* (Mazzolini & Maddison, 2003) and fulfilled the role of *coach, referee* and *trainer* without interfering or controlling the flow of discussion (Ip et al., 2002; Mason, 1991). The facilitator followed all posts but

deliberately did not respond immediately. Students therefore had the first opportunity to post responses to peers. The facilitator only intervened when problems remained unsolved. This approach fostered the development of an online learning community where students shared in course facilitation and benefited from the learning experience (Mason, 1991).

5. METHODOLOGY

To find out how the online learners interpreted and used the soccer game metaphor, we used a mixed method of investigation, both interpretivist and positivist approaches (Burrell & Morgan, 1979). We linked all files analysed in this hermeneutic unit to addendum 17. We compiled the discussion posts in WebCT™ according to topic, then copied and saved them as unformatted text files suitable for analysis with Atlas Ti™ software. Each student's electronic blog was likewise copied from the host Blogger.com and compiled to a text file. Students submitted their final essays with the Assignment tool in WebCT™. We downloaded and compiled all into a single text document. Throughout the course, the online facilitator documented the daily progress in an electronic diary. Observations regarding activities external to the LMS, like private e-mail and consultations were also noted for crystallisation. After conclusion of the coursework, the students arranged a gathering to meet each other, some for the first time, and I videotaped all these conversations. We transcribed relevant sections of the conversations for inclusion in the content analysis process.

Table 1: Metaphor Density in Open Discussions

Week no	Number of student open posts	Posts with metaphors	Metaphor density
1	32	9	28.1
2	32	10	31.3
3	29	8	27.6
4	34	12	35.3
5	34	7	20.6
6	26	6	23.1
7	45	8	17.8
8	21	6	28.6
Average	31.6	8.3	26.5

To crystallise the findings from the qualitative analysis, we also performed a simple quantitative analysis of the metaphoric expressions in the respective documents. The search function associated with the WebCT™ discussions tool enabled us to select student and facilitator posts and count the number of student discussion posts per week to each discussion topic. We identified all metaphoric expressions and developed a metric for metaphor density by calculating the percentage of weekly student discussion posts that contained metaphoric expressions. Table 1 depicts the metaphor densities in the open discussion posts per week for the duration of the course.

The primary documents consisted of 1353 student discussion postings, seventeen blogs and seventeen end-of-course reflective essays. In those we identified metaphoric expressions and coded and analysed them with Atlas Ti™. A content analysis resulted in the development of a number of categories that reflected the targets of the students' metaphoric expressions, consistent with a grounded theory methodology as interpreted by Dick (2005). We noted the number of times metaphor targets surfaced, reflecting their particular use (Bush, 2005). We then sorted the codes in order of prevalence in the discussion posts, to reflect the importance of the metaphor theme. We then compared this order of importance with the order in other source documents, analysing generalisability. Table 2 reflects this order.

Table 2: Distribution of Most Frequent Codes in Discussions and Narratives

Code	Number of metaphors in Discussion posts	Number of metaphors in Narratives
Class, co-learners	11	4
Student problem	10	0
Technical problem	10	1
Falling behind	9	2
Facilitator	8	4
Course work	7	12
Competition	2	7
New metaphors	0	6

We compared the data on metaphor appearance in narrative essays and the discussion posts by depicting the most eminent codes in all discussion topics in descending order of prevalence in table 2. The findings from the qualitative analysis of the codes are discussed and finally grouped into a few inclusive themes in the conclusion.

6. FINDINGS

The 54 extended metaphors students used in their 266 discussions posts on all topics during the first two weeks reflect spontaneity and their initial enthusiasm for the metaphor. Thereafter the metaphors were mostly used in the *open* discussions, as prescribed discussions followed a set pattern and revolved around given topics. Metaphor use was not an initial novelty, as the open discussion spanning the entire course maintained a steady average metaphor density of 26.5 % (table 1).

Boers (2003) suggests that the degree of productivity or conventionality of metaphor use in a culture can be detected through counting the frequency of occurrence and the diversity of its figurative expressions. We show that the students continued to use metaphors after the novelty wore off as an integral part of their communication.

Table 2 shows the differing frequency of codes in discussion posts and in the narratives, as students used metaphor for different topics in those sources. This indicates fundamental differences in expressing certain topics metaphorically, as the frequency of using metaphor in preference to literal language for a topic indicates the salience of the topic (Ortony, 1975). In discussion posts students addressed their co-learners and the facilitator, signifying an interactive online conversation *with* their peers, using metaphors for co-students and often also specific problems with them. Technical problems and falling behind schedule were also popular topics to kick a metaphor around.

In contrast to discussions, in the narratives students described to outsiders (the course moderator and external examiner) what was happening and wrote *about* co-students. They called co-students and problems by their literal names without using metaphors. Describing the coursework through metaphor proved popular because of its convenience and compactness. In discussions, however, this use of metaphor was placed sixth in importance. The high frequency of using metaphor for describing the course reflects how readily learners identified with and used the metaphor for their course-work, indicating general understanding and acceptance of the metaphor.

In the next section we discuss our interpretation of the metaphor's context. We examine the categories of the content analysis in relation to the classic functions of metaphor, as outlined by Ortony (1975), Lakoff and Johnson (1980) and quote a few representative examples in each instance. In conclusion, the metaphoric writings of the students relate to the identified challenges in online learning.

In the next section we will review the metaphors that contributed to developing an online learning community, as well as the social interaction and development of an online student community.

7. DISCUSSION OF FINDINGS

7.1 Metaphors for Developing an Online Learning Community

7.1.1 Using the Metaphor to Identify with the Virtual Country

One may acquire concepts through experience or through dominant cultural metaphors (Lakoff & Johnson, 1980). First, the metaphor should be familiar and accessible (Ortony, 1975). From the beginning of the course, the students incorporated the metaphor into their communication (table 1), showing they understood the metaphor. We observed the highest overall metaphor use during the initial two weeks before strict *rules* normalised the discussion categories. Students described different aspects of the course using typical soccer terms. For example, the virtual country assigned to each was a challenge and some described their feelings as *humbled, dismayed, overwhelmed* and *challenged*. In accordance with the definition of a metaphor, the students *became* their country. Their identification with their country became clear when they described their *hardships* and *triumphs* during the course: *Experience is not always the kindest of teachers, but surely is the best! – A Spanish proverb*. Their countries became part of their identity: … *our spaces on WebCT, the Hagar server and the Internet became our reality for the duration of this course.*

7.1.2 Using the Metaphor to Find Cultural Acceptance

Some students took a while to warm to the soccer metaphor, while others immediately showed enthusiasm. Students explained their experience of online learning in their blogs and concluding reflective narratives, both yielding evidence of the use of the metaphor:

> *Combining the theme distance education with the theme world cup soccer was more difficult than what I expected it would be. I looked at a lot of websites on distance education and football but none of the football sites really impressed me much, not even the site of the mighty Man United.*
>
> *I personally had difficulty at the beginning to relate to it* [the metaphor] *but very soon found it very effective.*
>
> *I love the use of metaphors – its part of my own learning style to associate, compare or tie new knowledge and concepts with something I already know. In this game the use of a metaphor is taken a step further – not only to explain a new concept, but rather to create context.*

The choice of the soccer metaphor was not generally accepted due to the cultural diversity of the cohort. In general, Whites do not have the same enthusiasm for soccer as Blacks. Our choice was strategic to accommodate Black students who have less exposure to technology than Whites but know more about soccer than Whites do. Nevertheless, our choice of metaphor could fail if the students did not find sufficient neutral ground within the broader mapping:

> *Looking back, I never thought I'd survive this "game". I never had much interest in sport, and had even less interest in soccer if possible!*
>
> *I loved the concept of the Soccer World Cup, although I could have wished for another sporting code – cricket perhaps.*
>
> *It is therefore a pleasure for me to be part of this wonderful game that is close to my heart.*

7.1.3 Using the Metaphor to Understand the Online Environment

As students warmed to the metaphor and understood the rules of the soccer game, they started describing their own learning in terms of the metaphor:

> *So I donned soccer gear for 'a kicking good time!' The next day I reported for training!*
>
> *We had to communicate openly, in front of all the 'soccer spectators'.*
>
> *What I liked about these is that the structure was fairly predictable. Like a "set piece" in a soccer game (a pre-planned set of moves on the field), we knew what we had to do, and the format it would take.*

In the discussion forum, the students consistently referred to the topic post as a *field*, *the stadium* or *pitch* where the *kick-off* would occur; they described peer review as a match.

During the critique of peers discussing each others postings, they described this interaction as a *match*. Students earned grades for their formative critiques, literally showing their assessor *muscles*:

> *Assessing each other is another ball game! Doing a proper assessment is a challenge.*

We also detected the economical use of words (the compactness hypothesis) to convey maximum meaning when referring to learning components (Ortony, 1975). The following discussion post aptly describes the nature of the metaphorical use:

> *A virtual learning community should have:*
> 1. *The precise quantity and quality players … aha ... students!*
> 2. *A ball … nicely shaped curriculum!*
> 3. *Definitely a coach … please let us learn while you facilitate!*
> 4. *The ref … the watchdog … hope this one's not missing in this game … on the other hand the more the merrier!*
> 5. *Rules … there should be no confusion!*

7.1.4 Using the Metaphor to Order Online Discussions

An initial assignment asked students to compile their own *rules of the game* for communication – an intended entailment of the soccer metaphor. Early in the course the students demonstrated mastery of the rules, and they enthusiastically enforced those *rules* to keep order in the discussions. Students spontaneously called upon the highest soccer authority: *So, unless FIFA can improve that too …* Encountering unclear instructions, students hailed the *rules*. The instructor was not the hub of authority in this constructivist learning environment, and vigilant students took control of the communication rules:

> *Don't want to kick the ball in the wrong direction* :-)
>
> *It's a bit like playing opponents who are all wearing the same shirts as your own team!*
>
> *Perhaps we need to check on the rules of this game once again. Surely this is becoming really messy in this soccer pitch.*

7.1.5 Using the Metaphor to Cope with Technology

Technology should support online learning, but often it becomes a barrier when students experience out-of-control problems. Initially unable to use the *gym*, the synchronous chat and whiteboard facilities in WebCT™, they voiced their irritation:

> *I must confess that I cannot seem to get access to either the chat rooms or the whiteboard. As these areas are = gyms, I will be arriving on the playing fields = discussion area looking rather unmuscled and unconditioned!*
>
> *… will see you on the pitch! And hopefully in the gym once those bugs have been fumigated.*

The poor service and inconsistency of the national telephone and Internet service provider soon became another major irritation. *Playing the game* contributed to the learning activities and *injuries* referred to the students' inability to contribute to the core discussion

> *Telkom playing the game... but my ADSL line is soooo slooooww!! I think at this stage you must regard me as a seriously injured player!* [Animation of two bashing baseball bats].

Many students experienced difficulty when they uploaded their web-pages to the Hagar experimental server. To many the file transfer protocol was new, and the server was down at a critical stage. They felt stressed and frustrated:

> *Next, when I test my IAO portfolio links I get a 'winword.exe' error message! Why now? I mean, really! What did I ever do to FrontPage anyway?*
>
> *The 'Hagar' is dead! Long live the 'Hagar'! Perhaps the deadline will be moved if Hagar is playing Soccer games against the wrong teams at the wrong stadiums.*

Computer science often contains anthropomorphic metaphors (Tedre, 2006), as illustrated by students who imbued the programme and the FTP server with human characteristics. In this instance the students perceived the technology as a real threat and *playing the game* did not contribute to learning, but rather the exact opposite –sarcasm in metaphor. After many trials and coaching on the discussion forum, all managed to publish their web pages. A philosophical comment followed in retrospect:

> *However, as I said before, it's no use crying over spilt html code.*

The descriptions of challenges show the importance of technical support in online learning environments (Swan, 2003). Literature reports how such challenges prompt students to abandon courses unless someone helps them (Hara & Kling, 1999). Scaffolding in the form of online help, the facilitator, or knowledgeable peers can all contribute support. Instead of literal language, metaphor expressed students' emotions and voiced their frustrations. The topics of the above metaphors became easily recognisable aspects of the online course-work. Metaphors also mapped the interaction between students.

7.2 Metaphors for Social Interaction and Development of an Online Student Community

Not all posts in the open or social discussion addressed course-related phenomena. Developing communication channels and connecting to the human side of peers also

proved a necessary component of the community, even if only indirectly related to course-work.

7.2.1 Using the Metaphor to Connect with Peers

Students used the new communication tools with confidence and explored new terminology through the metaphor. Also, they used the metaphor to get acquainted with new *players* and to reunite with *familiar faces* from previous courses. A *team spirit* developed and the students saw themselves not only as the representatives of their *countries*, but also as a team within a larger game. They identified with their role as players:

> *Glad to have you back again – this time as an opponent on the soccer field! The last time we were together we were allies, seems as though we have now become foes* -:)
>
> *… more than likely you will be the speedy right wing*
>
> *I am so happy to be a member of your team.*
>
> *Glad in any case that you would like me and O in your team? What am I ... the goalkeeper* :-)

Students also initiated the new-comers to the class, introducing them around, and strengthening the cohesive spirit of the team. Tongue-in-the-cheek gossip soon followed, remarking on each other's *fitness*:

> *… be careful of these two (O and E) they are the players who will run and run on the field and even more in extra time, just to pick up the trophy - but you'd want them in your team any day, cause they got stamina*
>
> *Finally: Strive to be a lean, mean goal scoring machine!*

Despite having learnt much about each other through constant online interaction, the students craved face-to-face contact. One expressed this wish in the end-of-course narrative:

> *Although I was aware of all my opponents in this virtual soccer game and I could "see" all their movements on my screen, I missed the physical contact and the interaction, the emotional side, the body language.*

7.2.2 Using Metaphors to Express Emotions

Students collaboratively compiled the *rules* guiding the online communication and agreed to allow emoticons in the open discussions:

> *On-line communications are stripped of the body language that adds context to your message. Satire, irony or sarcasm can often sound just plain mean. Without all the subtle cues of voice and body it is often easy for someone to misunderstand you. An on-line short hand has developed that provides some non-verbal cues but it is still greatly lacking. These, or smiley faces :-) can provide some context and can help get your point across.*
>
> *In a VLC, to properly convey the intention, this accompanying emotion can be portrayed other than verbally by the use of visual aids such as emoticons. The rule should therefore be: 'Express emotions through the use of emoticons.'*

Keyboard smilies abounded, especially in open and feedback posts. A student circumventing the firewall and the WebCT™ barriers inserted commercial smilies in her discussion posts. The class's reaction was astounding. After the first animated smiley kicked a soccer ball, more emoticons followed, motivating and encouraging each other: they cheerfully commented,

> *See the happy player (smiley) in one of Lee's postings! On the other hand - this is HEAVY . . . let's not over-simplifying . . . Still smiling, but weak.*
>
> *These smileys are the only thing that has kept me sane for the last 6 weeks.)*
>
> *There are not many things in the open discussions that drive me to participate, but this is very cute!!!*
>
> *… to make the 'playfield' interesting and interactive.*
>
> *The metaphor turned what is often regarded as monotonous and boring task into often exciting competition.*

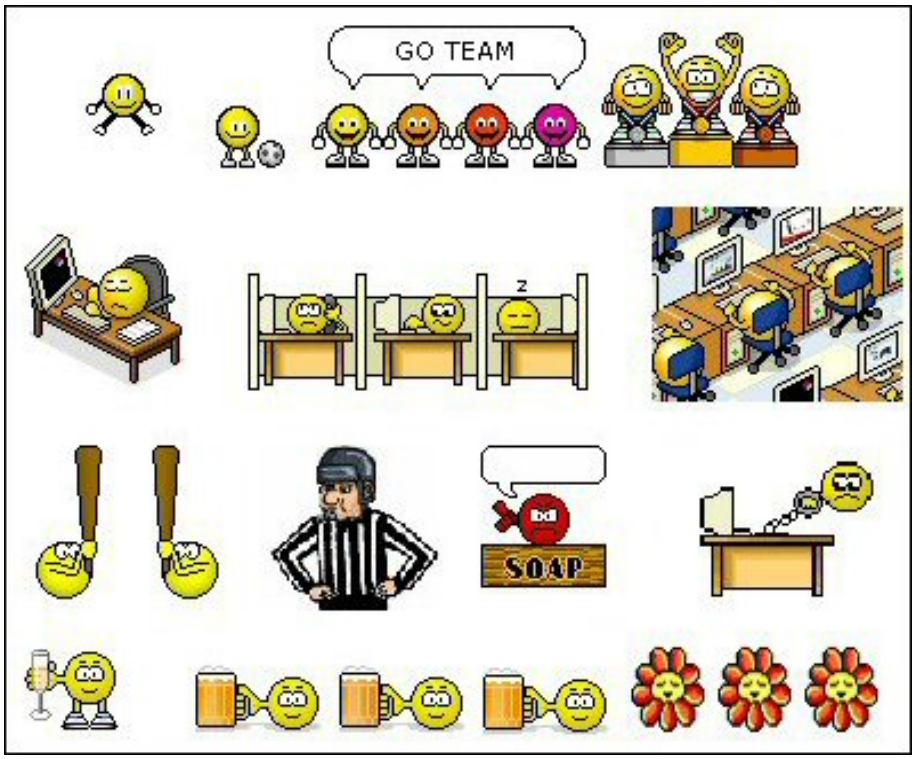

Figure 1: Smilies Used in Student Postings

To the end students adorned the open discussions with animated smilies portraying their mood and telling the story of their online experiences. In the top row of figure 1 smilies jump, kick a ball and depict a sporting team mood, to encourage and lighten each other's spirits. The next row portrays the students frantically at work at their computers, burning midnight oil, encouraging each other. The third row shows anger and frustration, and in the last row they celebrate and demonstrate empathy with others. In working collaboratively, they became a close-knit online learning community.

Learning should be fun (Heppell & Ramondt, 1998). Smiley faces became real faces, the metaphor for each other. The smiley faces graphically presented the soccer players. The smilies and the metaphors contributed humour and fun, enlivened the learning experience and made it more interesting (Purdue University, n.d.).

Active participation in a learning community, according to Ruhleder (2002) contributes to successful online virtual learning. Peer encouragement may be one of the most important strengths when a successful online virtual learning community develops.

7.2.3 Metaphors to Alleviate Stress

Throughout the course, lively conversations continued in the open discussion forum or *practice field*. This forum was the cradle of the virtual community. The students initiated threads and discussed matters without interference from the facilitator. This was the place for light-hearted banter and where they bared their souls. Erickson and Kellogg (2001) confirms the necessity for ludic or social interaction in online learning. The students counterbalanced hard work with good natured interaction. Some clever word-play and creation of new metaphors emerged. The students reflected their social discussion in metaphoric terms like *interval, break,* and *relax:*

> *The metaphor generated many puns and a lot of good humoured bantering, which led to a lightening of the tension.*
>
> *What fascinated me were the intervals, during which we could chat to our team mates, exchange ideas and complain!*
>
> *I think there will be enough time for formality in other parts of the course e.g. with our critiques, so we need a place to "chill" and relax.*
>
> *Sounds good to me! With regard to the refreshments – there is not much I can send you from Senegal - what about some peanuts?! On the other hand, peanuts are for monkeys.*

The students called for tequila to lessen the strains induced by time constraints and technical challenges:

> *I was really beginning to sweat and in need of extra, stronger refreshments to keep me going. I am sure this is where I sent my e-facilitator a post card with Tequila being a talking point.*
>
> *Let us call it a mid-term / mid-game break. Hope someone is serving some refreshments. Lee sent me some tequila from Mexico.* ;-)

7.2.4 Metaphors to Express Emotions

The metaphor created a contradiction as it evoked game playing, though things were not always as light-hearted. The excerpts below, captured during a conversation between a *player* and the *coach* during a *practice session* in the open discussion after the *coach* complimented the *player* on a job well done:

> *Dear Coach I would just like to make a correction with regard to the comment you made on my fitness. I am not super fit because I play soccer, walk/run - I surf .... :) Your Player.*
>
> *Fitness: Beware of sharks! Some can be quite nasty ;-) your life-guard.*
>
> *Dear life-guard, A good surfer knows the sea - it is the two-legged sharks they are afraid of :) Surfer.*

The student's metaphor-dense reply to the coach's compliment possibly signalled a high emotional state. According to Fainsilber and Ortony's (1987) hypothesis, metaphor use increases when people experience intense emotions. Ortony's (1975) inexpressibility thesis is illustrated with a shark – the metaphor for the peer who critiqued her harshly. Metaphors also allow expression of comments that are difficult or should not be publicly exposed, or hide certain aspects of a topic by selective transfer (Lakoff & Johnson, 1980). By referring to the *shark,* the episode with the peer remains hidden, showing nothing more than clever word-play to the general amusement of other students.

7.2.5 Metaphors Disguise the Unmentionable

Students frequently mentioned their own *fitness*, especially when they referred to their technical prowess. The constructivist learning approach of the course provided little initial guidance and students were expected to elicit help if and when needed:

> *At this stage I don't find myself fit enough to be a key player in any match.*

Towards the end of the course, the technical aspects of some of the artefacts became quite daunting, and even the most competent students found these assignments challenging. They no longer saw their peers as their main adversaries. They needed assistance with WebCT™, the server, HTML or Java code. They referred to their lack of instant achievement, technical difficulties or falling behind schedule as *injuries.* Injuries are to be expected in a soccer game; whereas, for most adults, admitting defeat is embarrassing and humiliating. The metaphor allowed them to present their inadequacies in a more acceptable light (Lakoff & Johnson, 1980). The metaphor became a euphemism: "the substitution of an agreeable or inoffensive expression for one that may offend or suggest something unpleasant" (Merriam-Webster Dictionary):

> *I sustained a few minor injuries during some of our training sessions (fortunately not too severe). My first injury was on field… when I bumped into JavaScript!*
>
> *I did, however, also learn something in my encounter with JavaScript (apart from the fact that you should never underestimate your opponent!*

The students often pointed out mistakes by using the soccer metaphor. Similar to real soccer, mishaps are inherent to the game, and they are dealt with quickly, efficiently and without hard feelings so the game can continue. This proved especially convenient in providing negative feedback to peers. Metaphors saved many awkward situations when used for their inexpressibility properties as "they create new meanings; they allow you to write about feelings, thoughts, things, experiences, etc. for which there are no easy words" (Purdue University, n.d.). Students often recognized their own mistakes and could make amends without losing too much face:

> *I just made a BIG mistake, I critiqued the wrong person (it's the cold weather... need to play with my thermal kit).*
>
> *Yup. I do need to go to the gym ...* [after making a mistake].
>
> *Gee whiz - I think I am heading for the Z team.*

7.2.6 Metaphors to Ease Feedback

The inexpressibility aspect of metaphors is evident when certain things should not be said or when they are emotionally charged. The metaphors ameliorated situations, softened communication when inadmissible posts slipped through, or when the perpetrator made mistakes through ignorance or carelessness of the *rules*. All work was not exemplary: they missed deadlines, wiped out peer's files, misunderstood instructions, or produced sloppy work:

> *This frivolous line of communication may be frowned upon in this category (tennis ball on a soccer field)*
>
> *…are we playing rugby or soccer???*

Providing constructive feedback was easy with quality work. Pointing out oversights in a peer's work was difficult due to the inherently corrective nature of online communication. Although necessary, this is a challenging aspect of impersonal online communication:

> *What I grappled with was how to handle the situation in writing.*
>
> *The theme also provided for some very clever word plays, which ordinarily could have been misconstrued as being rude.*

Even with the added vocabulary of the soccer tournament, it was difficult to avoid harsh judgments. They used keyboard smilies, strengthened by animated emoticons (figure 1) to demonstrate goodwill:

> *Working in a team online, there are still those who just don't get the meaning of the word team. www.smileycentral.com these little emoticons were of great help, they often portrayed a word with a picture that seemed to lighten the blow.*

7.2.7 Metaphors to Voice Personal Issues

Personal issues and circumstances beyond their control hampered students as real life continued outside the online *soccer pitch*. The metaphors selectively divulged more personal details. Occasionally students used the metaphor to inform the others of their temporary absence:

> *Sorry, but the goal posts have shifted for me this last week.*
>
> *The IAO- world cup soccer match is in injury time!*

7.2.8 Metaphors to Deal with the Facilitator

After dealing with the facilitator as the guide on the side (Mazzolini & Maddison, 2003) and not always visible, the students appreciated the role the facilitator played either as *coach, referee* or *team doctor*:

> *Good to have you as our ref! From past experience I know you play fair and know how to apply the rules.*
>
> *Facilitators must be on the ball!*
>
> *Be nice to the coach - the papers still need to be marked.*
>
> *Just so that we don't forget that learning should be fun I found this little pic of the ref for you all to enjoy* [animation of a whistle-blowing referee to the amusement of the rest of the team].

Students dealt with peers' non-compliance with rules by requesting the *referee* to *blow the whistle* or when they believed the *coach* was not reacting quickly enough or entirely missed the *foul*:

> *Presumably this topic could be allowed in Open? Would need a referee to prevent side-tracking!*
>
> *Hopefully the IAO Coaches and judges will give us time to be prepared for the final round* [when the server was down].

When the students were *offside* by not following convention in posting their assignments, and when peers wasted *playing time* to search for the assignments for peer-evaluation, the following rhyme warned the *offending players* and the *coach*:

> *11 players are on the field*
> *1 ball - oval shaped*
> *No coach, no ref*
> *Oops - are we playing rugby or soccer???*

Students encountered challenges not only from their personal computers, the Internet, university servers and peers, but also from their *coach*, who was not always right on the *ball*. She, *inter alia*, omitted names from a list:

> Student: *A problem if I keep on taking my siestas and say "Benvennido a Espanja!"? I see nobody else is responsible for the team of Spain. Si?*
> Coach: *Sorry for the finger trouble in the middle of the night. Have a complimentary plane ticket back to Spain!*
> Student: *Gee, thanx coach, I am on my way! Oleeeeeeee!*

The soccer tournament metaphor as the virtual country's vernacular turned the interaction from a potential skirmish to a delightful banter where nobody lost face. This metaphor contributed entertainment value, vividness, compactness, and courteously disguised the administrative error. Metaphors' entertainment value should not be overlooked in online courses with high volume postings where both students and facilitators are expected to read them all. Humour counteracted boredom and encouraged interaction.

7.2.9 New Metaphors

Metaphors supply a skilful application of language. Appropriate metaphors can enhance the understanding of new or abstract concepts (Purdue University, n.d.), and provide useful tools for instructional designers and facilitators (Cameron, 2002; May & Short, 2003). The majority of the students spontaneously used the soccer tournament metaphor in their

interaction with peers and the facilitator. They also extended the metaphor to describe aspects of learning not originally defined by the metaphor. For example, they extended, amongst others, the use of *fitness* and *injuries*. Metaphor described their frustration with technical issues, uncooperative co-students and even with the facilitator. Animated emoticons as graphical presentations of some of the entailments conveyed the messages, and added to motivation.

The students extracted concepts from the source *soccer* and mapped them to different components in their online learning by creating metaphors that exhibited the three main characteristics of conceptual metaphors. For example, a student who started the course with low technical skills likened the experience to a nightmare and another to military training:

> *This dream was often not the pleasant experience I had hoped for and mostly felt more like a dreadful nightmare… But of course, the "Dreamweaver" could help me weave and reach the dream!*
>
> *The three-month basic training done by new military recruits … This is 'Basic Training' of military intensity for Online Educators.*

While creating their metaphors, students abstracted the essence of what they wanted to convey and packaged it in a form they believed would transfer the message. The full implications and real meaning of some of the metaphorical use only came to light after we read the students' end-of-course narratives and the personal blogs. Re-encountering the metaphors and comprehending their intensions from another angle crystallized the findings from the online discussions.

We base our interpretation of the students' use of metaphor as the model of using the metaphor "*ONLINE LEARNING IS SOCCER TOURNAMENT"* (figure 2). The metaphoric source domain "soccer" yielded a wealth of familiar entailments like teams, opponents match, fair play, referee, coach, fitness, injuries etcetera. Students used these terms as extended metaphors to describe the new topics of the online learning environment. They used the vividness and compactness of metaphor to describe aspects of the coursework, the facilitator, technical aspects and programme knowledge. When read in context, these posts produced metaphorical expressions that also pointed to personal inadequacies. They likewise used the inexpressibility characteristics of metaphor to suggest things hard to express with literal language, like exposing poor work.

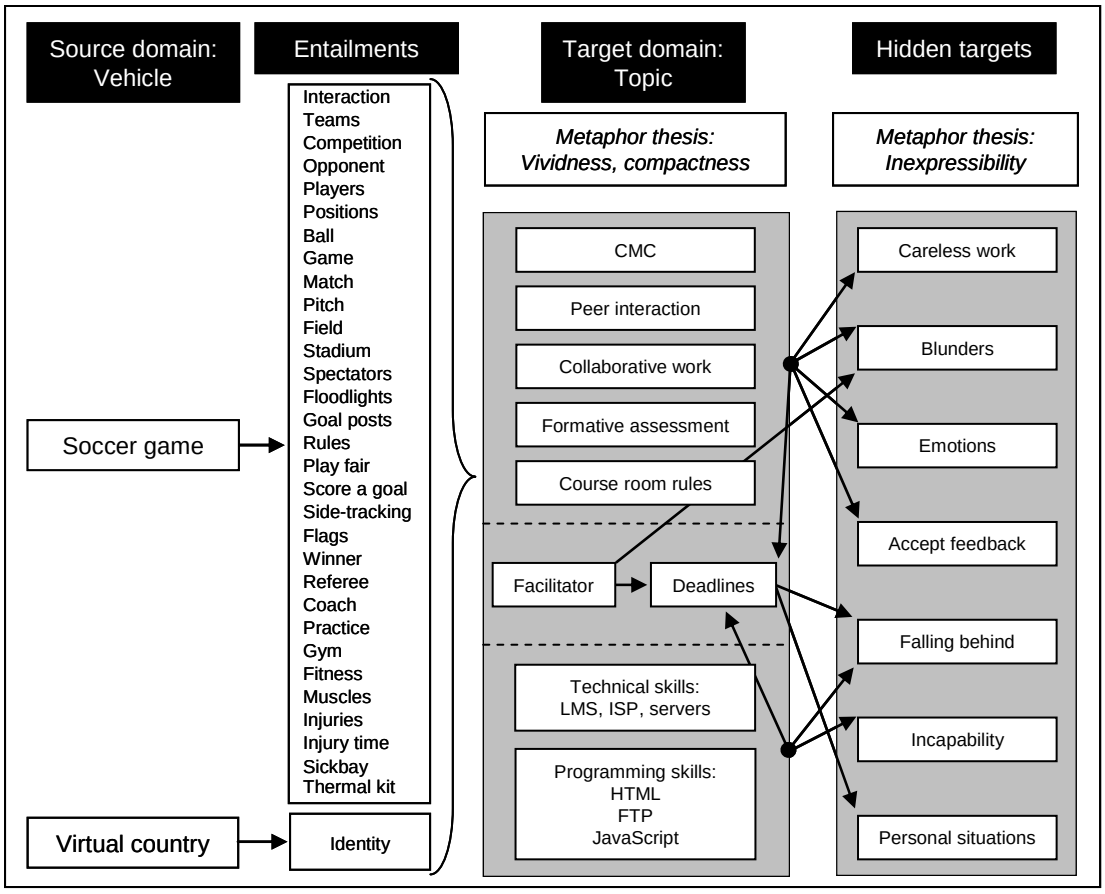

Figure 2: **Model of using the metaphor** "*ONLINE LEARNING IS SOCCER TOURNAMENT*"

8. CONCLUSION

The soccer tournament metaphor helped students become familiar with a new online learning environment and guided them to interact with the course material, their peers, and the online facilitator. This metaphor was successful because it helped students understand the context of the topic and promoted engagement with the online resources and interaction with peers. The high degree of interaction contributed greatly to the development of an effective online learning community. The students also appropriated the metaphor and created a motivating and amiable atmosphere where they successfully met the course challenges.

Metaphors elucidated concepts difficult to express in literal language. Many of the entailments of the original metaphor became extended metaphors. The prevalence of

metaphors in a situation indicated their importance (Deignan, 2003). Dense metaphors also conveyed emotionals (Fainsilber & Ortony, 1987). The topics the students chose to describe through the soccer metaphor rather than literal language showed importance and they were emotionally involved (Fainsilber & Ortony, 1987). We distinguished four prominent themes of topics clad in metaphor: peer learning and collaboration, hidden and sensitive agendas, online facilitation and student-centred learning.

8.1 Peer Learning and Collaboration

Peer learning and collaboration provided the most prominent themes among the metaphors in postings. The metaphors addressed their peers, talked about them in general, or recounted problems working with them. These metaphors provided vividness and compactness. The metaphor allowed students to express otherwise sensitive issues, reprimand each other and the online facilitator while still fostering online learning community. Metaphor provided students a vehicle to address challenges through its inexpressibility and euphemistic properties. The online community nurtured by the soccer tournament metaphor, enabled the constructivist learning approach of the course. The metaphor provided scaffolding that contributed to collaborative learning characterised by interaction and respect for individual contributions (Panitz, 1996).

Informal interaction supports the importance of communication and collaboration among peers in online learning (Baker, 2004; Burgos et al., 2005; Frankola, 2001; Kollock & Smith, 1999). This highlights the prominence of social communication with peers in the otherwise impersonal world of online learning.

8.2 Hidden and Sensitive Agendas

Using metaphors for students' successes, failures, challenges, frustrations with technical issues, and time-constraints provided prominent theme in the student posts. These are sensitive issues for many adult students, as nobody wants to be portrayed poorly. Students used metaphors to soften the blows of failure. They communicated emotions in their narratives, as it was hard for them to take the first step in soliciting help. This aspect resonates with the very heart of constructivist online learning; knowledge actively and collaboratively constructed (Johnson, 2001; Panitz, 1996; Wegerif, 1998).

8.3 Online Facilitation

Students often described facilitation using metaphors. These included vividness, inexpressibility, compactness, humour; in short, practically the whole spectrum of what metaphor offers. This illustrated the importance of the facilitator in online learning, even when barely visible. Like the scaffolding, students relied on guidance and support when needed. Many also gained insight into the role of the facilitator through the modelling, and, as educationalists, allowed them to identify with this heretofore unknown role. Students portrayed the facilitator consistently as the *guide on the side* (Baker, 2004; Mazzolini & Maddison, 2003).

8.4 Student-Centred Learning

A fourth theme emerged from the postings: the metaphors for *rules,* online structure, deadlines, submission formats and orderly communication. Although these extended metaphors often involved humour, they contributed to the good order, conduct and discipline in online discussions and to the development of the online learning community. The students purposefully kept to their code of conduct. They treated each other with respect and tolerance, were vigilant of the *rules* and applied those to solve problems with peers. They also used the inexpressibility of metaphors to complement the theme of the *coach*. In a student-centred pedagogy, students share authority and the responsibility for their own and their peers' learning (Panitz, 1996). Successful online learning depends on a course's organization and design.

In summary, the extended metaphor in this online course yielded a number of themes consistent with the literature on constructivist online learning. Students consistently used metaphors in online interaction. Our content analysis highlighted the dynamic interaction among students and facilitators to reflect the challenge of replicating normal communication and bonding among students over the Internet. This study emphasised the importance of selecting metaphors that serve the intricate communication needs of diverse online students. Metaphors proved indispensable in the interaction between students for both social and content-related communication. In this study we challenged the premise

that metaphors only delivered content. Metaphors allowed online students to enrich their environments, enabling them to reduce the impersonal distance and foster learning.

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Methical Jane: Perspectives of an Undisclosed Virtual Student

1. ABSTRACT

We examined the *ethical* implications of a *mythical* online student with a carefully concealed real identity who took part in an online post-graduate course. Distributed students need scaffolding for complicated tasks in online learning, lest they abandon the course. Students should take charge of their own learning and form collaborative learning communities. In a successful constructivist online course the instructor should not dominate discussions. The mythical online student took part in all student activities and provided co-students with cognitive and technical support as covert second facilitator. Consequently, students found scaffolding unobtrusive. Students integrated the unknown virtual student into the learning community. We explored the ethical implication of undisclosed identity and analyzed students' reaction to the exposure after the course. The study confirmed our success in creating a convincing virtual student, but this success precipitated students' shock, disbelief and dismay. No student had a problem with the presence of a virtual student, but some felt betrayed because her *real identity* was hidden. A variety of teaching situations may benefit from such a virtual tool: experts supplying technical expertise, multiple faculty enriching the support and teaching assistants and tutors participating with smaller groups in large online classes.

2. INTRODUCTION

We intended to improve students' online learning success by inventing Jane, a mythical online student. The online facilitator piggybacked her as a second facilitator to provide covert student support. Aware that this might present an ethical problem because the class thought she was a real student, we nevertheless thought the experiment worthy.

Ineffective course facilitation and lack of faculty communication reduce student performance. Students often feel inadequate, lonely and unmotivated. As excessive

instructor control can also weaken online communication, the instructor should not manipulate the course. Success increases when students amalgamate into virtual student communities (Davies & Graff, 2005).

Designing an online higher education course in South Africa presents challenges. Instructors often dominate traditional teaching because students expect it. Accordingly, we anticipated that our students would assume a passive role (Schank, 2001), and that would place the online instructor in the familiar teaching role.

King (2002) increased student participation in online classes by using a virtual student as additional facilitator. We investigated the success of adding a virtual student to stimulate online participation and interaction and of providing scaffolding for less competent students. Our premise was that the students would rather request assistance from a co-student than from an instructor (King, 2002).

Jane was our virtual student; she was not a real student enrolled for the course, but a name and a login on the class list, as a participating student. We modeled Jane on King's Virtual Joe to augment online communication. Jane's role was to become the students' friend, confidante and helper. Extending the presence of the facilitator, she also instigated online communication. In contrast to virtual Joe, we carefully concealed the identity of our virtual student for the duration of the course, planning to keep it hidden, unless the students uncovered her. As assistant researcher, she could observe behavior not readily visible to the facilitator, a role with (hitherto) unexplored ethical implications. We carefully considered ethical objections to this false identity and only revealed her origin after the course to observe the students' reactions.

The research questions of this study are:

1. How does a virtual student enhance online learning?
2. How do students feel about the ethical issues of instructors' hiding and then disclosing the identity of a virtual student?

3. LITERATURE STUDY

Online learning places complex, even conflicting demands on the facilitator. On one hand, online students and administrators request maximum affective and cognitive support from a highly visible facilitator. On the other hand, Facilitators should fade, compelling students to amalgamate into an independent learning community.

3.1 Online Support

First-time online students are often challenged and frustrated with technology and feel anxious, isolated (King, 2002) and insecure (Wood, Bruner, & Ross, 1976). The throughput rate in online distance courses is therefore disappointingly low (Chyung, 2001; Morris, Wu, & Finnegan, 2005). Not surprisingly, they often feel inadequate, lonely and unmotivated when faculty facilitate ineffectively (King, 2002). Students require support and guidance in the unfamiliar environment of computer-mediated communication (CMC).

Wood et al (1976) refer to *scaffolding* as the interactions where more competent individuals offer guidance and help to less informed or accomplished individuals. Scaffolding originally illustrated child development; currently it indicates child-adult and novice-expert interaction that improve learning regardless of students' knowledge or skills levels. Scaffolding is the provision of extrinsic contextual support, especially when students encounter new challenges and timely removal when redundant (Boyle, 1997). Without the appropriate scaffolding, faltering online students often become disinterested, bored or frustrated with their learning environment (Rieber, 1996). Scaffolding promotes interaction among online distance-learning students and the formation of virtual learning communities (Johnson, 2001). The facilitator should be part of the scaffolding.

3.2 The Role of the Instructor

Some students prefer a highly visible, traditional instructor, as they are used to strict corrective feedback and control. This allows them to adopt a passive role poorly suited to online learning (Moore, 1989; Schank, 2001). A facilitator who maintains appropriate

social and teaching presence, also promotes critical thinking (Garrison, Anderson, & Archer, 2001).

King (2002) maintains that a supportive instructor should post frequently to the discussion and maintain a high online visibility, simultaneously monitoring the quality of student online participation. The facilitator has to monitor pitfalls like students who are absent, interact insufficiently or superficially, agree without supporting their stand, post short and superficial messages (creating annoyance), or post lengthy messages (causing problems with processing times) - as none promotes communities of practice (Collison, Elbaum, Haavind, & Tinker, 2000; Johnson, 2001).

On the other side, while facilitators steer away from the pitfalls, they should not be dominating and authoritative, but provide support when necessary and then fade when discussion progresses well. Mazzolini and Maddison caution:

> The more instructors posted to discussion forums, the shorter were the discussion threads on average. Instructors who were active in initiating discussion threads did not appear to stimulate more discussion, and may actually have limited the amount of discussion (with the more advanced students) and the length of discussion threads (with all students). … students may possibly react more positively to questions posed by fellow students ('cries for help') rather than questions posed by instructors (which may be perceived to be probes to expose gaps in understanding) (2003, p. 252).

Sometimes a facilitator has to sustain conversation before an audible silence descends on the discussion. A virtual student can intervene in such circumstances without the facilitator visibly taking control.

Researchers use different metaphors to describe the elusive role of a successful online instructor (table 1). The most popular account suggests that the online instructor should guide from the side in a CMC virtual classroom (Collison et al., 2000; Ip, Linser, & Jasinski, 2002; Moore, 1989). The facilitator as guide promotes learning by guiding students to focus and deepen the dialogue without getting in the way (Collison et al., 2000; Mason, 1991). The ideal online facilitator intervenes selectively and encourages participants to work debates out for themselves, allowing students to fill the (metaphorical) empty spaces (Ip et al., 2002).

Table 1: Roles Online Instructors Play in Moderating CMC

Online facilitator roles	Activities, characteristics	Described by
Behaviourist teacher	Offers Ccorrection, rewards and punishes, steers behavior	(Gagné & Glaser, 1987)
Guardian angel	Looks over the players' shoulder , helps	(Ip et al., 2002)
Guide on the side	Fosters the creation of community	(Blignaut & Trollip, 2003; Collison et al., 2000; Mason, 1991; Mazzolini & Maddison, 2003)
Ghost in the wings	Absent, unavailable	(Mazzolini & Maddison, 2003)
Improvising story teller	Presents new content	(Ip et al., 2002)
Intellectual	Informs, corrects, directs;, Socratic questioning	(Blignaut & Trollip, 2003, 2005; Coppola, Hiltz, & Rotter, 2002; Mason, 1991)
Jammed up courseroom	Exhibits personal interest in students; offers light-hearted bantering; welcoming messages, praises students	(Palloff & Pratt, 2003)
Lead player in a jazz ensemble	Introduces new themes for discussion	(Mason, 1991)
Manipulative devil	Creates problems for players to solve	(Ip et al., 2002)
Mentor in the Middle	Offers reciprocal teaching, distributed expertise	(Brown & Campione, 1990)
Organizer	Provides administrative assistance	(Bleed, 2006; Blignaut & Trollip, 2003; Mason, 1991)
Plumber, Gardener, Alchemist	Supports CMC	(Bleed, 2006)
Resident Teaching / Learning Resource	Moderates	(Ip et al., 2002)
Sage on the stage	Presents new content	(Mazzolini & Maddison, 2003)
Shaman Troubadour	Presents inspiring new content	(Thornburg, 2001)
Social role	Presents friendly approachable demeanor, affective	(Baker, 2004; Blignaut & Trollip, 2003; Mason, 1991)
Virtual Professor	Sifts information, posts questions and facilitates discussion	(Kettner-Polley, 2005; Pelz, 2004)
Virtual student	Guides, participates	(King, 2002)

Social rather than technical factors determine the success or failure of an online course (King, 2002; Schank, 2001). Mason (1991) identifies the social role for online facilitators as they should create a friendly social environment for learning and encourage participation using a congenial, personal tone. These nurturing skills develop as well as support community. Pro-social communication patterns in online instruction also help: "the more instructors incorporate relationally supportive language in the online classroom, the more that students will enjoy and benefit from the online learning experience" (Baker, 2004, p. 12).

3.3 The Role of Co-students

Actively participating online students are more likely to complete courses successfully (Davies & Graff, 2005). There is a strong association between interaction with fellow students and successful completion of internet-delivered courses (Mason, 1991; Swan, 2001; Wegerif, 1998). The establishment of a virtual community of learners should be cultivated through supportive facilitation. "When you successfully encourage a culture of co-learners, participants will readily comment on one another's postings, relieving you of sole responsibility" (Collison et al., 2000, p. 64). In well-functioning online communities, participants post regularly and express honest opinions about technology, content and even the facilitator. Participants collaborate, teach each other and moderate the discussion. Students support and care for their community as it meets their needs (Collison et al., 2000).

Adequate scaffolding is a challenge in a student-centered approach where the facilitator maintains a low profile. A virtual student functioning as helper in the class, but who is "one of them," consolidates these (divergent) ideals. Deceiving students needs careful ethical consideration.

4. CONTEXT OF STUDY

The University of Pretoria has been researching techniques for supporting online post-graduate courses for almost a decade (Cronjé, Adendorff, Meyer, & Van Ryneveld, 2006). In this article we report on the use of an undisclosed virtual (mythical) student in an online course for Masters in Computer Integrated Education students. Initially twenty-three students enrolled for the course on web-based learning. The group contained eighteen female and five male students. Nine students were Black and thirteen White; fourteen were employed at schools either as teachers in ICT or information science; five worked in the e-learning industry and four in the higher education sector. Their ages ranged between thirty and fifty. Three students discontinued the course for personal reasons.

4.1 Course Design

We designed the course for the WebCT™ Campus Edition 4.0-platform as, at the time, it was the University of Pretoria's Learning Management System (LMS). The course followed a constructivist pedagogy structured based on a participatory metaphor. Each week we explored a different online learning topic that students had to research and post as a properly referenced 200-300 word assignment to the Discussion in WebCT™. Students also evaluated and critiqued papers of two peers. We also interspersed numerous other online activities and less structured discussions. Students created practical online artifacts applying their theoretical understanding; some hosted on their LMS student homepages and others on the University experimental internet server. Students used an open discussion topic for non-graded, non-academic or social posts, eliciting support and airing discontent.

Students maintained blogs hosted on external sites for continuous self-reflection, incorporating their reminiscences in a reflective essay submitted at the end. Immediately after the course, students congregated socially and a week later, we conducted semi-structured interviews. A couple of weeks after the course, we informed students of Jane's identity and simultaneously asked them open-ended questions about the deception (figure 1).

Hello class
Jane here. My apologies for deserting you near the end of the module. But it seemed that my job was done and you did not need me any more. See, I am no ordinary Jane. I am Virtual Jane (King, 2002). I was created by the facilitator to see if I could help you in ways the others could not. According to the literature (Mazzolini & Maddison, 2003), "the ways in which instructors post to forums can influence students' forum discussions and perceptions, but not always in expected ways".
If you are not too mad at me, [facilitator] and the Professors would like to know your opinion on my presence in the class. Will you please answer the following questions by return e-mail:

1. Was Jane credible? Did you believe she was real?
2. Did she make any real contribution to your participation and / or learning? Did she contribute towards any success?
3. How do you feel about her real identity having been hidden from you?
4. Do you have a problem with Jane not being a real student?

Any other opinion/ criticism is welcome! Fire away!
Have a wonderful holiday (writing your dissertations!) and a blessed Christmas.
Jane ☺ and [facilitator] ☺

Figure 1: Post-course Disclosure and Questions

4.2 Virtual Jane's Role

Jane's presence provided the class with two facilitators; each supported collaborative learning and social construction of learning (King, 2002). Jane represented a typical student in this course with a profile similar to the others. We supplied her with a vague enough background so her identity could not be easily uncovered. In a country influenced by cultural perceptions and prejudices, she conformed to no stereotype. She differed from the rest of the class in one important aspect: she entered class as a total stranger whom nobody had met before. She also disclosed only her most essential background. Jane regularly contributed to the theoretical and technical assignments, and she freely offered advice and help to any student. Table 2 summarizes Jane's profile.

Table 2: Virtual Jane's Profile

Characteristic	Virtual Jane
Profile	Undisclosed student Female Similar to class average profile Involved with fellow students as equal Plausible
Brief	Second facilitator Models activities and discussion: research-based conversation Posts hints in her own right Stirs up opinions and controversy Points out mistakes/errors Disagrees when necessary Provides the human touch as friend
Conversation style	Uses appropriate styles, models communication Answers questions based on experience
Participant	Targets comments directly to students
Promote learner control	Withdraws from conversation as indicated Does not dominate Keeps instructor contributions to 15% of message volume Diminishes the perceived amount of one-way, instructor-dominated communication
Observer	Observes covertly

4.3 Facilitation

Online facilitation followed the model of *guide on the side* (Collison et al., 2000; Mazzolini & Maddison, 2003) allowing free -flowing discussion (Ip et al., 2002; Mason, 1991). Following all discussions, the facilitator judged the merit of each posting but deliberately did not respond immediately, practicing online wait time (Collison et al., 2000), giving co-students first opportunity to respond. The facilitator replied to immediate

problems and those that remained unresolved after twenty-four hours. Jane participated actively and assisted students with content and technical problems, like a facilitator would. She modeled collaborative behavior so students could follow her example and help each other. This approach fostered development of an online learning community where students shared course facilitation (Johnson, 2001; Pelz, 2004). If the students had known that Jane were the instructor, it would have defeated the object of the study. Generally speaking, South African students observe the institutional hierarchy and retain a respectful distance from instructors, not questioning teaching practice (Khalil, 2006).

5. METHODOLOGY

Ethical considerations are at the core of this investigation. We obtained clearance from the ethics committee before embarking on the research (addendum 1). We used a developmental research design to answer the two research questions (Reeves, Herrington, & Oliver, 2005) using a mixed methodology (Sharp & Fretchling, 1997). Examining the effect of the virtual student on the visibility and dominance of the facilitator required a positivist approach (Burrell & Morgan, 1979). We approached the reaction of students to the ethical aspects of a mythical student from an interpretivist stance, as we needed to know how they felt. In the words of Boeree (1998), qualitative methods "at least attempt to capture life as it is lived," and we conducted an ethnographical analysis on the diverse documents associated with the course (LeCompte, 2000)(addendum 17).

The search function associated with the WebCT™ discussion tool enabled us to differentiate among posts of students, facilitator and Jane. We calculated the *facilitator index* by expressing the number of instructor's posts as a percentage of the total discussions posts for each course week (King, 2002). This indicated the students' perception of the facilitator's online participation. Jane's posts, added to the facilitator's, represent the collective online availability and contribution of the facilitator. Expressed as a percentage of the total posts, this metric, named the *supporting index,* represents the combined facilitator contribution (addendum 21).

We compiled the discussion posts in WebCT™ according to sender and saved them for analysis. We also analyzed the facilitator's diary documenting all course design decisions

and the daily progress of the course. After concluding the coursework, we conducted focus group interviews, asking students about their cooperative learning experience. Students initiated a social gathering to meet each other after the course. We captured all these conversations on videotape and transcribed the relevant sections for inclusion in the content analysis.

Unlike experimental interventions, it was not possible to recreate any scenarios or repeat any questions once the opportunity had passed; therefore, we conducted a cursory analysis of the course artifacts and focus group interviews (Merriam, 1998). Scrutinizing the discussion posts, blogs, essays and interviews suggested that students did not suspect Jane's real identity. Merriam urges researchers to "plan data collection sessions according to what you find in previous observations" (1998, p. 163). As the initial results yielded little concerning Jane, we revised the initial decision not to disclose Jane's identity. While students were still accessible after the course, we sent an e-mail unveiling Jane's identity coupled with some open-ended questions about their experience with her and her contribution to the course (see fig 1). We compiled these replies and included them in the content analysis.

The documents used for analysis (addendum 17) consisted of 1615 discussion postings, as well as seventeen student blogs, end-of-course reflective essays, and ten post-course feedback reports. We captured the documents in ATLAS.ti™ for qualitative analysis (Bush, 2005; Dick, 2005; LeCompte, 2000), identified 257 codes concerning Jane and through inductive ethnography developed the thematic categories. In this article we discuss only those that reflected the students' feelings about Jane's identity. We crystallized the quantitative findings against the content of the blogs, essays and discussion postings to confirm the validity of findings.

6. FINDINGS

Especially in the beginning, many students posed the same questions. A facilitator would repeat replies if using e-mail. The convenience of CMC discussion in an LMS allowed the facilitator to save effort and time by only having to answer a question once, and sometimes not at all, as students intervened and filled the informative role.

A facilitator is only "visible" when posting to the CMC (Trollip & Blignaut, 2005). Educational decision-makers prefer a high instructor online presence whereas King (2002) sets the ideal facilitator participation or visibility at *less* than fifteen per cent of postings, so as not to dominate the discussion. Table 3 shows the number of communication posts by the facilitator and Jane and the quantitative participation indexes per week.

Table 3: Perceived Facilitator Presence and the Combined Facilitator Contribution

Week	Total posts	Social posts	Facilitator posts	Jane's posts	Facilitator index %	Supportive index %
1	349	51	32	11	9	12
2	168	62	23	8	14	18
3	126	34	9	5	7	11
4	184	52	24	8	13	17
5	302	48	38	9	13	16
6	211	44	57	9	27	31
7	169	81	45	3	27	28
8	53	23	12	0	23	23
Total	1562	395	240	53		
Average					16.4	19.6

Students submitted social posts to the open discussion area not dedicated to a course discussion topic. The weekly social participation of the class, as shown in table 3 remained relatively constant and averaged around fifty posts, except for week seven that saw a flurry of technical communication. In week eight, students worked more or less independently finalizing their essays. The facilitator deliberately maintained a low profile during the first three weeks, demonstrating online wait time, to sustain reflection about postings and foster "opportunities for rich thinking and response" (Collison et al., 2000, p. xvi). This helped students to settle in and seek answers independently.

The facilitator index barely remained below the benchmark of fifteen per cent (King, 2002) in the initial five weeks (figure 2), in spite of the facilitator only replying on cue. Around week six, considerable one-on-one coaching contributed to the high facilitator presence. From week six, the focus shifted from theoretical discussions (causing a decrease in total discussion posts) to applications that were more practical. The urgency and stress levels in the course increased towards the deadlines, and the students directly channeled more unsolved urgent problems to the facilitator. This profile reflected the constructivist nature of the course, rather than excessive dominance by the facilitator.

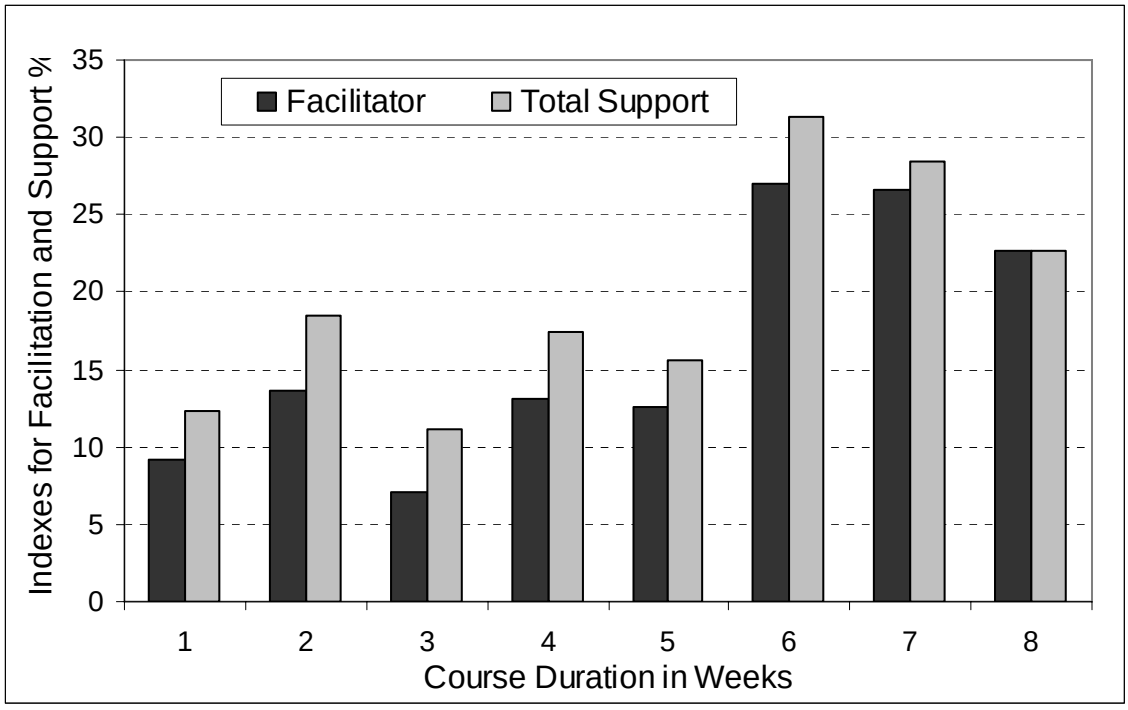

Figure 2: Comparison of the facilitator and support indexes

figure 2 also illustrates Jane's role in the facilitation and support contributing to the combined facilitator effort and scaffolding. As the facilitator maintained a low profile as shown by the facilitator index, students thought they relied upon each other for help. In reality, the facilitator helped them much more than they realized, shown by the total support index. Towards the end of the course, students discussed fewer general issues where Jane could explain or support. Like scaffolding, she faded. After mastering the initial technical challenges, students directed specific questions to the facilitator.

7. DISCUSSION

7.1 The Ethical Issues

7.1.1 Experimental Studies

Boeree (1998) strongly criticizes unethical manipulation in "scientific" experimental studies. Human beings may object to exploitation as it "may undermine their self-respect,

their psychological integrity, their sense of self-determination, or even their physical health" (Boeree, 1998). Piaget and his followers engaged in *experimental phenomenology*, which he called *la méthode clinique.* They studied an infrequent phenomenon by setting up a situation in which that phenomenon is likely to occur. One can make a valuable, yet non-experimental, contribution by watching how students solve specific problems. Ethnomethodologist Harold Garfinkel extended Piaget's method and made use of *experimental participant observation.* He simply broke the rules, doing what does *not* come naturally in order to see what happens, evolving the *garfinkling* technique (Boeree, 1998). Considering the ethical aspect of the unorthodox methods we used, we defend this study as non-experimental as we did not manipulate students, but carefully observed them, albeit in a contrived setting. Therefore, we do not believe it unethical.

7.1.2 Concealment

Concealing oneself or deceiving subjects is an ethical concern in fieldwork. Boeree (1998) discourages taking part in illegal, immoral, or unethical activities, and cautions, "you should not present yourself to the people you are studying as something other than yourself." He poses the following question: "Would you like to be spied on or lied to?" We solved the injunction against spying by strictly regulating the channels of communication, only allowing students to communicate online using the LMS tools. We disabled the LMS e-mail tool, and required a written promise not to contact each other privately. We allowed no exchange of addresses or phone numbers in the discussions. Therefore, students had no opportunities to communicate confidential or sensitive information to Jane (or anyone else) without the knowledge of the others. In answer to the ethical question, *What access do my subjects have to this information?* (Boeree, 1998), the subjects of the study benefit most from this research. We explored how they felt about the deception, so designers of online distance education will be able to apply these findings in a similar context.

7.1.3 Role-play

Observant participation or *hermeneutic role-playing* techniques can assist in understanding people's underlying social realities. The ethical problem can be overcome by clarifying to the group that you are an outsider wishing to become an insider (Boeree, 1998). Jane had outsider status, as she was a new student in the course, wishing to become

one of them. In this respect, Jane did not violate any ethical standards, as she was a *declared outsider*, well positioned to observe and interact. Jane as *observant participant* (Boeree, 1998) allowed us to analyze unfolding data and incorporate the results into the ongoing course design.

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7.2 Student Reactions to Virtual Jane

7.2.1 Jane's Credibility

After eight weeks of intense online interaction, the students wrapped up the course by arranging a social gathering. This initiative illustrates the final stage in role play simulations and the value of purposeful disengagement with the virtual and subsequent re-engagement in the real world (Ip et al., 2002). The class was curious to meet Jane after completion of the course and was disappointed when she did not arrive. They expected her to be equally interested in meeting them.

> "Pity the ones living far away, like Jane, cannot attend".
>
> [student 1]: "I could not place some of the people. Like Jane. Where does she come from?" [student 2]: "Gauteng". [student 1]: "So she is here close by?" [student 2]: "She did say she could not make it". Someone: "but if she's that close…" [student 1]: "I could not quite place her".
>
> When talking about the course, [student 3] remarked: "I did not see any assessment from Jane". (Many people talking simultaneously).
> Again [student 3]: "I was fortunate to do the assessment for Jane". (Big chuckle) "Now I can see why she didn't come!"

These conversations captured by videotape at the social function illustrate that Jane was a credible student, and everybody thought she was real. Someone assumed her address, even though she never disclosed it. When someone asked about her background, the explanation was plausible though unrevealing. Even afterward the comments in e-mails continued:

> "I was quite disappointed that not everyone arrived for the social function after the course, particularly those that were not part of the class for previous modules, e.g. [mentions 4 names, including Jane]".

Jane maintained credibility at all times, and no student doubted her identity.

By this time, students had had ample time to gossip about Jane, and air their views. In order to comply with the ethical stricture not to deceive subjects (Boeree, 1998), the time had arrived to unveil Jane's identity and to gauge the class's reaction .

7.2.2 Unveiling the Real Jane

We revealed Jane's real identity by e-mail (Appendix) after the course was completed. This mail also posed a few open-ended questions probing their reaction. Ten students replied. No one suspected that Jane was not who they thought she was, as all thought she was real and most strongly voiced their surprise, confirming what we deducted from course documents and discussions. Students expressed shock, surprise and disbelief as Jane's total credibility was shattered, and they expressed their dismay at her *virtual* or *non-real* identity:

> What other sneaky tricks do you still have to admit responsibility for?
>
> What a surprise! No, really! I feel cheated!
>
> I was so shocked I could not answer your questions properly.
>
> I am finished – that is so sneaky …"

Replying to *How do you feel about her real identity having been hidden from you?* only one student, whose participation was erratic and who did not finish the course, expressed shock at her identity being hidden:

> Shocked to say the least. I don't really like talking to machines (or software!). It feels odd. But then thinking about it, what's the difference between a parametric test that responds to your answers and a "person" responding to your activity in a distance learning environment?

In the same breath, this student concedes that it was "one of the most exciting e-mails," somehow blunting his discontent.

One student questioned the necessity of exposing Jane; another felt betrayed. Both had been highly interactive students in the course:

> At first had to think about this "ghost-student" and to be honest I felt somehow betrayed, since I was wondering how many more eyes were actually watching us, battle things through.
>
> I trusted all in the course module and not for one moment thought that someone was not for real. I think if she was never exposed for what she really is, it wouldn't have bothered me. The question is - is it necessary to expose her in the end? Not exposing her wouldn't have done any harm. Her real identity being hidden from me makes me feel betrayed.

Students reacted in one of three ways. Some did not bother to reply; some respondents were indifferent, "minding my own business;" whereas others even expressed enthusiasm "I quite like the idea of a mysterious Jane!!"

We assume that students who did not respond or reply to our questions did not harbor strong feelings. Their participation profiles in the LMS confirm that they were less involved in course activities and did not attend the social function. Amongst the students who replied, some interacted more with her and formed a virtual relationship with her. The initial shock was intense because the prior deception was so convincing. The problem of deception is not limited to illegal or immoral activities(Boeree, 1998). The problem deepens because online students in a well-functioning online community "show concern and support for the community" (Collison et al., 2000, p. 77) and form affective relationships as a result of collaboration (Panitz, 1996). Students who integrate into this community become very vulnerable (Barab, Thomas, & Merrill, 2001).

After initial disbelief, students reconsidered the situation. Some shared their thoughts on using a virtual identity in online learning:

> How virtual can you become in class before it becomes unethical?
>
> Complete anonymity bothers me though. I want to know who's the machine! I must just say that I struggle with seeing the machine as a fellow student and could deal with it as a tutor more easily.
>
> I can relate – when I worked at [*Name of Company]* I often used to send emails from my bosses email address and go into discussions on his behalf (he agreed), to encourage students and get them to participate in the e-learning initiatives… and it worked.

No student was unhappy about having a mythical student in the group, but some wanted to identify the virtual student as such.

7.2.3 Jane's Contribution to Learning

Half the participants indicated that they could not remember if Jane assisted them or if she contributed to their learning, even though all had been working with her (in a team), and everyone had exchanged peer-reviews with her. Therefore, the course provided scaffolding both transparent and unobtrusive:

> It doesn't really bother me. I'm quite surprised though.
>
> Jane was not very High Profile though and I can't say that she stood out above other students.
>
> I can't remember who was in the class except perhaps some of those who critted my postings and those I've personally met. …. But I can't remember someone named Jane. Perhaps that's proof that I didn't even notice a cybergirl in the group.

> To be honest - Jane didn't influence me at all. … I've noticed there are new names and other people in the "game", but the pace and inputs required were hectic and I focused my energy "to stay in the race" and maintain as high as possible quality...
>
> I think e-learning is a very lonely study and you focus mainly on yourself

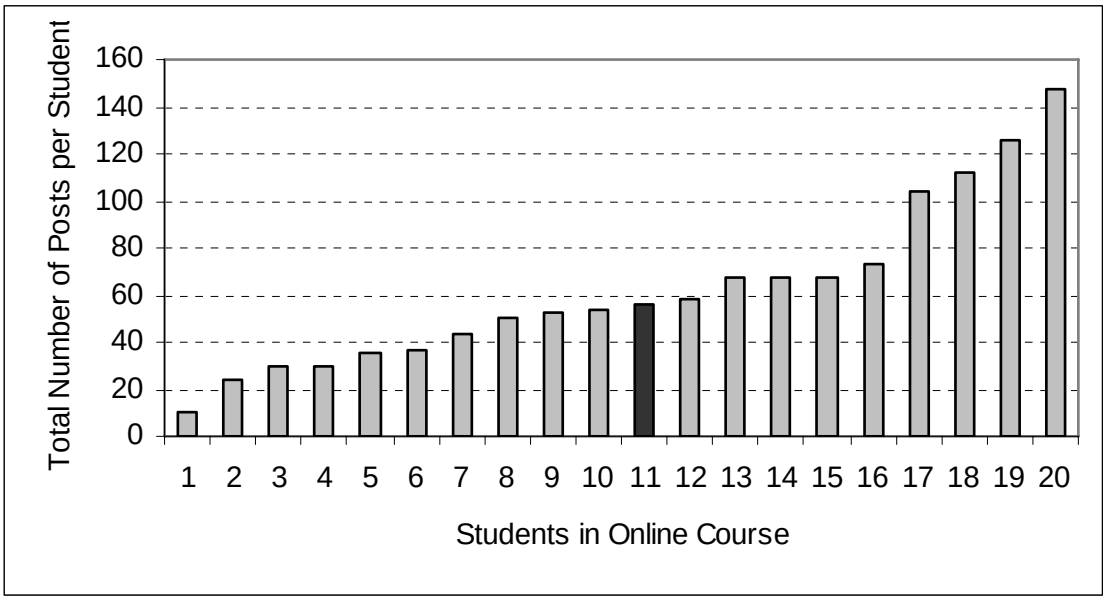

Figure 3: Students ranked according to number of discussions posts, with Jane as Student 11

Figure 3 shows that Jane (student no 11) contributed an average number of postings in the course. She contributed value in the content of her posts rather than in the quantity.

In her unobtrusive way, Jane contributed to the cognitive aspects of online learning, both in her direct class participation and by being a virtual student. Students commented that everybody who contributed to the community was important.

> … then I went back to the postings and looked at Jane's comments and input and I saw the subtle way in which she gave her input and advice, if needed. I think it was a great idea to have a "helper in disguise". This was a super and interesting way of facilitating the team to their end-goal.

Jane also made an affective contribution to the class. A few students mentioned Jane's strong personality in the online discussions and the contribution she made to the learning community wherein "participants express honest opinions" (Collison et al., 2000, p. 77):

> I experienced her as being, "strong", straightforward, and as someone who won't hesitate to tell what she thinks.

> I think she was necessary, since all were so polite all the time, and she offered a bit of "excitement" with her "personality".

After students grappled with their surprise, reconciled their feelings and rationalized their reactions, they realized that Jane's presence had done no harm and saw the potential didactic benefits of using a mythical student in teaching.

> I agree that such a person is needed to "direct" a course a little.
>
> Thank you for the deception Jane, it could revolutionize my didactic methodology or at least influence it.
>
> I think that it is ingenious and clever, and it has got me thinking about the plausibility of inventing a "ghost" learner for my normal live classes.

In medical school, faculty frequently use a *standardized patient* (Greenberg, Loyd, & Wesley, 2002) who is not a real patient, but a perfectly healthy person acting as a benchmark patient. In this educational context, one could consider Jane a *standard* student.

7.2.4 Research Role

We described Jane's research role as an *observant participant* taking part in role-playing (Boeree, 1998). The virtual peer intrigued many students who also saw the possibilities for research. As these students learned of the ongoing research of this community, their expertise in online research allowed them to perceive the benefits of using a virtual helper in an online course (Boeree, 1998).

> To me this sounds very interesting and I am going to read more about this.
>
> It must have been really interesting to observe our reactions towards Jane. Myself in your position I would have also found it interesting.

Observing how students related to Jane also indicated how they related to the learning community. With Jane as observant participant we gained new insight into the strength of the bonds in the virtual community. Jane was a barometer of students' integration into this community.

7.2.5 Goodwill in the Virtual Community

After the initial astonishment, some students enthusiastically endorsed the concept. The amiable informal conversation resumed. The students did not hesitate to express their opinions online, demonstrating that the facilitator was not authoritative and did not intimidate the virtual community of learners (Pelz, 2004). They regarded the facilitator-cum-student as part of the learning experience (King, 2002):

> Hi Jane or [facilitator] or whatever your name is.
>
> Hope you are now going to have a good holiday Jane… oops [facilitator].
>
> … I just feel sorry for the online facilitator who actually seemed to have had a split personality after all!
>
> How do you feel about me thanking Jane for all your hard work?
>
> All in all - I have GREAT appreciation for the way in which you handle the facilitation of the online course!!

The facilitator modeled pro-social behavior throughout the course (Baker, 2004). The above comments illustrate the amicable relationship between facilitator and students in the virtual learning community. Nobody complained that the instructor spent too much effort on the stragglers or neglected them, as Jane performed that function. The friendly parting tone of these representative messages conveys neither anger nor irritation.

The initial shock was intense because the deception was so convincing. We assume that the students who did not react to the exposure, did not harbor strong feelings. Amongst the students who replied, some interacted more with Jane and formed a virtual relationship with her. Betrayal in a learning situation is ethically inadmissible. Hiding the identity of a virtual student who interacts with empathy and develops a relationship with the students is problematic. A known virtual student like Joe (King, 2002) was exempt from this dilemma.

7.3 The Facilitator's Perspective of Jane

Because the planning of the course was a team effort, different faculty contributed ideas and suggestions for technical challenges. It made sense for one person to control the instructions and to keep pace with the students. Jane completed outlines of technical assignments to verify that the goals were indeed achievable within set periods. Jane also presented her assignments under similar conditions; she experienced the same challenges of off-campus low bandwidth and slow dial-up modems. These provided insight into the students' workload and course experiences. In LMS a facilitator did not have the option of a student preview of the course, and in this regard, Jane deterred potential problems. We could address problems with server downtimes, JavaScript issues, incompatible browsers and the constraints of firewalls. Using Jane to detect and report a problem proved a practicable way to make students attentive to unclear instructions, to provide timely announcements on assignment deadlines, and to alert them to expectations on specific learning outcomes. Anticipating such problems through Jane contributed to the scaffolding.

According to Mason (1991), exceptional online moderation consists of understanding and modeling all aspects of the subject matter. The facilitator's diary records Jane's triumphs and limitations.

> During the course of the afternoon Jane manages to add free translation (tools) for text to speech and a translator, a hit counter, links to German tourist sites, a map. She downloaded the Trellian to her computer, but did not quite figure out how to get it working on the website.

7.3.1 Facilitator Effort

Administrators often have exaggerated expectations of online facilitators, requiring prompt and extensive participation (Blignaut & Trollip, 2005). King (2002) comments on the tedious aspects of using a virtual fictitious student, as it demands even more time and resources. Likewise, it was demanding to maintain double online roles. At times it was necessary to keep Jane's profile low due to limited time and resources. The following excerpts from the facilitator's diary verify our dilemma:

> Jane has been nominated (by the group) to create the tagboard for wuwu's rubric. I do not know when she is going to have time to do it.

> I am drowning in correcting extra stuff, and doing Jane's work.
>
> There is not a chance that I will have a new unit prepared for uploading tomorrow, that I will have the criteria for next weeks evaluation sorted out, or that Jane will even be halfway through her page.

Students afterwards commented on this workload and its sustainability:

> "I am now wondering how much work and time you put into this module, it seemed you worked 24/7".

In addition to demands on the time of the facilitator, we encountered other challenges. We had to be vigilant of ethical aspects like "illegal" private communication that threatened Jane's position in the inclusive online community. A breach could jeopardize her continued existence. As by design the LMS reveals the identity of the person posting, we contrived to protect Jane's secret virtual identity. It was challenging for the facilitator to remember whom she represented when posting to the students. We therefore created a separate login for Jane. The facilitator's diary records:

> As it is confusing to speak as two people, I must remind myself of who I am by sticking a different coloured sticky note with my name on the screen when I work, and logging out completely when one is finished.
>
> I have to be extra careful from now on as we are posting attachments, and they have to be created and posted from Jane's computer, to show the right properties.

Jane's presence in the course mandated that the facilitator read all posts at least twice, each time wearing a different hat in order to reply with the appropriate voice. Wearing different hats helped the facilitator prioritize responses. One-on-one online coaching was Jane's responsibility, and other students could ignore those lengthy online sessions. The facilitator's contributions were therefore more concise and topical, concentrating on issues that mattered to the whole class.

Other colleagues also posted as Jane to assist the facilitator in peak times. From the students' perspective, this limited confusion, as they did not feel exposed to an audience, and support came from one voice.

Maintaining the deception was challenging. However, the demand on time and resources of researching and posting as a student proved worth the effort as "that is what being member of a learning community is all about" (King, 2002, p. 164). The facilitator had to keep abreast of the discussions and remained challenged and engaged.

8. CONCLUSIONS

8.1 How do Students Feel About The Ethical Issues of Hiding and Then Disclosing the Identity of a Virtual Student?

The ethical concerns of using a mythical student in an online class are genuine. We were constantly aware that we would have to abort the project if students' relationship with Jane compromised their trust or privacy or if her identity became known. The success of creating a very credible Jane had its downside. This very credibility caused students to feel deceived when they learnt the truth. Past the first shock, no students indicated that they had a problem with Jane not being a real student.

The students identified with Jane, recognized her strengths and weaknesses and related to her as their friend. Her credible identity allowed the community to accept her. This illustrates an efficiently functioning online community's ability to integrate a stranger or *outsider* into the learning environment, even those who did not specifically notice her. Jane also acted as a barometer of the existence of a caring virtual learning community. Jane's deception gave us insight into their citizenship of this community.

8.2 How does a Virtual Student Enhance Online Learning?

Although a virtual student did not save time or effort and added considerably to the instructor workload, our mythical student-facilitator made unique contributions to the online class. Virtual Jane addressed many of the challenges that an online facilitator faces (Blignaut & Nagel, 2007). As part of the scaffolding, Jane coached and redirected students in an unobtrusive way, helping them cope with the demands of online learning. Jane's encouragement allowed them to finish the course; the end thereby justifying the means.

Jane monitored the student workload and emerging problems and contributed timely alternatives. Her activities blended with the online scaffolding of student support. Furthermore, Jane curtailed the dominance and clutter of online facilitator posts without sacrificing student support.

We could not maintain the facilitator's visibility in the online class below the benchmark of 15%, even with help from virtual Jane (fig 1). Jane made an enormous qualitative contribution to the course, despite being an average student in quantitative terms (fig 2). The quality and timeliness of student support seems to be more important than the number of posts in ensuring successful online learning. Jane also contributed to the development of a virtual community of learners (Nagel, Blignaut, & Cronjé, 2007).

In this particular case, the extra effort also provided us with research data. This was a unique opportunity for "garfinkling," or setting up circumstances to study for the sought-after phenomenon of living with online students, and provided information that could not be gathered in a regular online class (Boeree, 1998).

9. RECOMMENDATIONS

We have separate recommendations relating to disclosure or non-disclosure of the virtual identity. Like King (2002), faculty can disclose the identity of the virtual student from the start, if analysis shows that authority does not inhibit student participation. This will ease ethical and technical constraints. Research will benefit from observing how students react to such an interactive web-based tool.

In order to manage the ethical aspects when planning to mimic this study, faculty should

- obtain relevant permission and ethical clearance before inventing a virtual student
- allow external supervision and monitoring of the activities of an undisclosed virtual student
- not use a virtual student to spy on students or violate their trust and privacy
- not manipulate students deliberately.

Concealing the facilitator behind the identity of a peer can encourage reluctant students to contribute to online discussions. Due to diverse cultural backgrounds and historical disadvantages, many Black South African students are less spontaneous class participants in unfamiliar settings (Khalil, 2006) such as online classes.

A virtual student can promote online dialogue, encourage student participation, provide additional support, model student online behavior, and promote a mutually supportive climate. A virtual student can adjust to a variety of roles demanded by different and evolving teaching scenarios.

Due to the increased workload, we do not recommend that a single facilitator be responsible for an online class of twenty or more students as well as playact the role of student and facilitator without external assistance. The virtual student can act as spokesperson for multiple course tutors, facilitators or moderators. For example, a technical support specialist can anonymously assist students, and another can help with a specific contextual aspect without contributing unfamiliar voices to the course.

Teaching assistants and tutors can become part of the course and participate within smaller learning groups in large online classes, thus easing the facilitation burden on faculty. Consistent with constructivism, the facilitator can maintain a lower profile, thereby encouraging students to support each other. This helps establish a high functioning virtual learning community. Effective online communities support students in challenging learning environments and contribute to their success. Methical Jane could evolve into an ethical, versatile, and personal (though mythical) muse.

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Facilitating an Online Distributed Course: Virtual Jane, not an Ordinary Student

1. ABSTRACT

This study responds to the article: "A Virtual Student, Not an Ordinary Joe" (King, 2002). The virtual student acted as an additional facilitator and improved student online interaction and collaboration. Online courses can fail due to inadequate instructional design, facilitation, communication, and technical requirements. A virtual student can change the focus of online communication and improve student involvement and success. We answer the following questions from King's article: "How did the students really perceive this fictitious student? Did Joe really enhance the students' online educational experience? Are there things that I could do with Joe to further improve my web based courses?" (2002, p. 164). We modelled a virtual student named Jane on King's Virtual Joe, without telling students she was not a real student and investigated her role in the online course. Virtual Jane's main contribution to the course was intellectual, as she gave individual feedback to students, correcting their posts. She solved technical problems, contributed affective posts, and encouraged, motivated and praised students. Jane participated collaboratively as a student taking over facilitator functions, as in a healthy online community. Through virtual Jane's eyes, we discovered that the students became caring citizens of their online community of learning.

2. INTRODUCTION AND PURPOSE OF STUDY

This study is an answer to King's (2002) article, A virtual student, Not an ordinary Joe. Improving the quality of online learning requires custom-made tools, such as Kings' virtual student who acted as an additional facilitator and increased student online interaction and collaboration. A virtual student can improve the limited success of online distance learning, particularly from a student perspective. Poor online success results from factors as diverse as inadequate instructional design, ineffective faculty facilitation, poor communication and technical restrictions. Students often feel inadequate, lonely and unmotivated. The quality of facilitation is crucial to the success of online courses

(Blignaut & Trollip, 2005; Mazzolini & Maddison, 2003). Introducing a virtual student can change the focus of online communication and further improve student involvement in online discussions. We modelled a virtual student named Jane on King's Virtual Joe and examined her role in an online course.

We aim to answer questions King (2002, p. 164) solicited for further directions on using a virtual student in online classes:

1. How could a virtual student contribute to the formation of a community of students?
2. How did the students perceive this fictitious student?
3. How did Jane enhance the students' educational online experience?
4. What could we do with Jane to improve the web-based course?

3. LITERATURE STUDY

The literature abounds with the limitations of online distance course delivery. Distance students, in the absence of contact interaction, can be excluded from the scholarly community and consequently feel isolated and lonely (King, 2002), and inadequate and insecure (Wood, Bruner, & Ross, 1976). With ineffective facilitators, first-time online students often experience anxiety and lack of motivation, partly due to lack of effective feedback. Frustration with technology, confusion and failure in online learning are often due to ineffective instructional design, ambiguous instructions and inflexible course management (King, 2002).

Students rate online learning highly (Coppola, Hiltz, & Rotter, 2002). The online learning environment also creates opportunities that transcend the boundaries of the physical classroom, enabling anytime, anywhere learning. Well managed virtual classrooms not only limit many of the alleged confines of online learning, but they also afford sustained interaction with learning material and meaningful interaction with peers and the facilitator (Swan, 2003). Social and human factors contribute to the success or failure of an online course more often than technical factors (King, 2002; Schank, 2001).

The formation of a virtual learning community of students contributes to the success of online courses. From the literature, we investigated the contribution of the online facilitator in such a community and sought to elucidate the value of a virtual student. The answer to this question became the theoretical framework for analyzing virtual Joe (King, 2002) and Jane's contribution to their online courses. We discuss three dimensions of student interaction in an online classroom (Swan, 2003): the course, the facilitator and the co-students.

3.1 Course and Content Interaction

A mouse click delivers information online, in contrast to traditional classrooms where teachers provide the only information (Schank, 2001). Online instructors should not focus on providing content to learners, (Ip, Linser, & Jasinski, 2002; Moore, 1989), but rather on adding value to the computer-mediated communication (CMC). Students should be familiar with the online delivery mode to spend their time optimally engaging with and mastering the course objectives (Miller, Rainer, & Corley, 2003). Asynchronous CMC provides students time to produce more thoughtful, better organized and more reflective contributions (Collison, Elbaum, Haavind, & Tinker, 2000). Actively participating online students are more likely to complete courses successfully (Davies & Graff, 2005). In online courses, learning depends not only on interaction with the facilitator but also with other students.

3.2 Facilitator Roles and Interaction

3.2.1 The Ideal Facilitator Role

Online students require support and guidance in unfamiliar CMC environments. The "guide on the side" (Collison et al., 2000, p. 7) is the most appropriate style of leading an online class and contributes to online success as students become part of a collaborative learning community (King, 2002). While an online facilitator makes suggestions and explains how to do things (Cronjé, 2001), the ideal facilitator does not get in the way and knows when to intervene and when to let participants solve their own issues (Collison et al., 2000; Mason, 1991). "The role of teachers will have to change so that they become mentors rather than providers of information or experience" (Schank, 2001, p. 9). The

facilitator contributes to the quality of interaction in a virtual community and to cognitive learning outcomes and student satisfaction (Baker, 2004; Blignaut & Trollip, 2003).

> The collaborative learning model stresses the importance of the instructor being a ‘‘guide on the side’’ or a ‘‘mentor in the center.’’ In this capacity, the instructor not only guides the other learners, but is also a full, cooperative, and collaborative learner within the established community of learners (King, 2002, p. 160).

The online facilitator has to adapt to changed cognitive, affective and managerial roles (Coppola et al., 2002).

3.2.2 Intellectual Role

The didactic or intellectual role of an online facilitator lies at the heart of online learning, entwined with the CMC, ensuring mental processes conducive to learning, as thinking and information storage becomes more complex online (Coppola et al., 2002). The facilitator should focus discussions on crucial points, ask questions and probe responses to encourage students to deepen the dialogue and expand their comments. Weaving together disparate concepts is a highly valued skill of CMC (Mason, 1991), like providing summaries of synchronous communication events (King, 2002). A facilitator posting challenging discussion topics with specific learning goals in mind (Bhagyavati, Kurkovsky, & Whitehead, 2005), contributes to reflection and cognition. The cognitive presence in a learning community is evident when a learning community can construct meaning through communication (Garrison, Anderson, & Archer, 1999). In the taxonomy of facilitator postings, Blignaut and Trollip (2003) distinguish three types of posting that reply to student posts and display academic content. *Corrective posts* correct or improve the academic reasoning of a learner’s postings. *Informative posts* provide individual feedback and comment on the content of a learner’s posting. *Socratic questioning* posts consist of reflective questions to guide the student to discover a better answer or insight. King (2002) promotes reflective thinking by posting deliberately incorrect interpretations for students to examine critically and to improve upon. The collective intellectual contribution of the online facilitator encourages students to deepen their learning through critical reflection.

3.2.3 *Organisational, Managerial and Administrative Role*

One should separate content from process-related queries, as the latter need prompt attention to avoid frustration (Collison et al., 2000). Confusion is a major problem in an

online classroom but can be alleviated by better instructional design and clearly written instructions (King, 2002). A managerial role also requires discipline, gate-keeping and boundary-spanning (Coppola et al., 2002). An online facilitator sets the agenda and objectives of the discussion, as well as the timetable, procedural rules and decision-making norms (Ip et al., 2002; Mason, 1991). The online teaching presence remains the primary responsibility of a facilitator and includes the selection, organization, and presentation of the content, activities, and assessment (Garrison et al., 1999). Having more time to clarify responses than in synchronous or contact communication, the facilitator can pre-organize the discussion (Collison et al., 2000). Blignaut and Trollip (2003) classify the posting of new discussion topics for students as *Other* posts without academic content, as they are generated by the system and do not reflect effort from the course facilitator. This scenario may differ among institutions. General administrative posts without academic content relating to dates, profiles, formats, software functionality, present the administrative category of facilitator postings in an online course (Blignaut & Trollip, 2003). Like other posts that originate with the facilitator and are directive (Cronjé, 2001), they contribute to the organization of the class. Tutors may also eliminate confusion by communicating with students either electronically or by phone, helping to solve the problem of reticent online faculty (King, 2002).

3.2.4 Affective and Social Role

Traditional learning institutions can have a personal involvement with the student through social interactions in the learning environment (Galusha, 1997). Mason (1991) first described the social role of online facilitators as creating a friendly environment for learning and encouraging participation using a congenial, personal tone. Welcoming messages and providing ample feedback on students' inputs in a friendly, personal tone, encouraged participation (Baker, 2004; Salmon, 2003). According to Baker (2004), instructors' verbal immediacy and social behaviour contribute to learning. Although affective expression in the absence of verbal communication is often difficult for online faculty, they can develop a more intimate relationship online with students (Coppola et al., 2002). Blignaut and Trollip (2003) classify postings that acknowledge learner participation and provide affective support but do not address any academic content as *Affective Posts*. Facilitator feedback has two components. A friendly encouraging tone

has an affective, social dimension, and it can also have intellectual value addressing the content of a student's postings.

The pace of response is important, as the facilitator should make sure no one is left out of a conversation, as a "participant can feel quite vulnerable if multiple posts go unanswered or aren't cited by you (or the rest of the community)" (Collison et al., 2000, p. 64). Nurturing skills are the essence of the feeling of community. While at first impression *Other* posts (Blignaut & Trollip, 2003) with no academic, intellectual or administrative function seem superfluous, they are ubiquitous in online classrooms, contributing a friendly tone. "Social presence is defined as the ability of participants in the Community of Inquiry to project their personal characteristics into the community, thereby presenting themselves to the other participants as 'real people'" (Garrison et al., 1999, p. 89).

At the beginning of an online course, it is the facilitator's responsibility to entice students to take part in the CMC. When developed properly, a transformation into a virtual community of learners occurs, and students start to take over some of the facilitator's tasks in nurturing the community. "Facilitation, is a responsibility that may be shared among the teacher and some or all of the other participants or students" (Garrison et al., 1999, p. 90). This transformation is the culmination of successful online interaction among the students.

3.3 Interaction with Peer Students

Interaction with fellow students is key to successful completion of online courses (Mason, 1991; Swan, 2001; Wegerif, 1998). Participants in CMC should reflect before putting their thoughts in print, resulting in higher quality contributions. The online environment is suitable for collaborative learning when students work together and take responsibility for their own learning as well as for their peers':

> Collaborative learning is a personal philosophy, not just a classroom technique … It suggests a way of dealing with people which respects and highlights individual group members' abilities and contributions. There is a sharing of authority and acceptance of responsibility among group members for the group's actions. The underlying premise of collaborative learning is based upon consensus building through cooperation by group members (Panitz, 1996, p. 1)

A supportive facilitator cultivates a virtual community of learners. Johnson (2001) defines a *virtual learning community* as a group separated by space and time (i.e., geographic

location and time zone), using networked technologies for collaborating and communicating. Collison et al (2000) lists the characteristics of a healthy online community:

- Participants post regularly to the online discussion.
- The online community meets its members' needs, and participants express honest opinions.
- Participant-to-participants collaboration and teaching are evident, and spontaneous moderating occurs among the participants.
- Reasonable venting about technology, content, and even the facilitator is acceptable and evident.
- Participants show concern and support for the community (p. 77).

We use this framework to characterize a well-functioning virtual community of learners in order to pinpoint the contribution of the virtual student.

4. BACKGROUND OF STUDY

The University of Pretoria has been researching techniques for supporting online post-graduate courses for almost a decade. In this article we report on using a virtual student as facilitating helper in an online distance course for Masters in Education students. Initially twenty-three students enrolled for the course on web-based learning. Three did not complete the course for personal reasons. The group consisted of eighteen female and five male students; fourteen were employed at schools either as teachers in ICT or information science; five in the e-learning industry; and four in the higher education sector. Their ages ranged between thirty and fifty. The mature profile of the cohort called for using andragogical learning principles (Knowles, 1984).

We designed the course for delivery on the WebCT™ version 4.0 Campus Edition, as it was the learning management system (LMS) platform in use at the University of Pretoria at the time. We used the discussion tool for CMC among students and the facilitator, submitting scheduled theoretical content assignments and peer reviewing those assignments. We also created an open discussion topic for voluntary social posts, eliciting help and support, and sharing difficulties and discontent. A substantial portion of the course consisted of applying the learnt theory and designing online artefacts, presenting a steep technical challenge to most students. Despite the high proportion of technical

content in the course, we decided to adhere to constructivist pedagogical principles (Clark & Feldon, 2005; King, 2002).

The online facilitation primarily followed the model of *guide on the side* (Mason, 1991; Mazzolini & Maddison, 2003), to promote constructivist learning. On occasion the facilitator was a *mentor in the middle* to coach reliant students (Brown & Campione, 1990; Collison et al., 2000; King, 2002). The facilitator, who followed all posts, replied within a reasonable time, except when problems needed immediate remedy. On occasion, mostly due to time limitations, other faculty members posted comments and feedback to students under Jane's name. As student, Jane participated fully in discussions, technical assignments and cooperative teamwork.

5. METHODOLOGY

We followed a qualitative approach (LeCompte, 2000) to interpret the contribution Jane made to the class and to analyze how the co-students experienced her presence. The unit of analysis (addendum 17) consisted of more than 1600 discussion postings, seventeen end-of-course student reflective essays, the facilitator's documentation of the daily progress of the course as a diary, and the students' reflective diaries as blogs. We formatted all the files for analysis with ATLAS.ti™ qualitative analysis software. Thereafter we analyzed, coded, and categorized the data according to an ethnographical approach (Bush, 2005; Dick, 2005; LeCompte, 2000).

The data from various sources aided in the validation of the findings. We analyzed 257 quotes relating to Jane and isolated the themes representing her contribution to the course. We used the voices of the online facilitator as described by Collison *et al*. (2000) to compare Jane's facilitation voices to Joe's (King, 2002). We also created a theoretical framework for evaluating the online community using

- the classification of instructor postings of Blignaut and Trollip (2003); and
- the structure of a healthy virtual community (Collison et al., 2000).

From this framework, we deductively explored Jane's role in the community, answering the first research question.

6. FINDINGS AND DISCUSSION

6.1 How does a Virtual Community of Learners Grow?

Before we answered the first research question, we explored the characteristics of a virtual community of learners. Initially, students in an online class needed encouragement to start contributing to the CMC (Salmon, 2003). An online community relies on facilitator support. Later, when a virtual learning community has been established, students migrate from the periphery to the centre (Johnson, 2001) and eventually take charge of their learning (Allan, Barker, Fairbairn, Freeman, & Sutherland, 2002). "When you successfully encourage a culture of co-learners, participants will readily comment on one another's postings, relieving you of sole responsibility" (Collison et al., 2000, p. 64). The question is, What prompts a class to become more independent of the online facilitator and develop into an effective virtual community? Towards this end, we tried to identify the functions online students take over from the facilitator in becoming such a community. We compared the types of online facilitator posts (Blignaut & Trollip, 2003), with the characteristics of a healthy online community, representing student-student interaction (Collison et al., 2000).

Table 1: Comparison of the Types of Posts by a Facilitator and Students in an Online Community

		Virtual community profile [a]							
	Facilitator posts [b]	Post regularly	Meet needs	Express opinions	Collaboration	Moderating	Venting	Concern, support	Technical
Without content	Administrative/ organizational	X							X
	Affective / social		X					X	
	Other / off topic						X		
With content, Cognitive	Corrective/ moderate					X			
	Informative/feedback			X					
	Socratic questions								

[a](Collison et al., 2000, p. 77)
[b](Blignaut & Trollip, 2003)

We posit that the facilitator's categories of posts, as shown in table 1 on the left, represent their roles in distance online courses as well as in their interaction with students. The

profile of a healthy virtual community on the top on table 1 shows what we should look for to identify such a community. The activities marked by an X indicate features of the online community that correspond with functions customary of online facilitators, showing when students step into the facilitator's shoes. Virtual Joe's efforts towards community building (King, 2002), and his profile also matches this ideal community profile. Table 1 shows that most characteristics of a well-functioning online community have their counterpart in the facilitator roles. Collaboration is the notable exception, as it is a student-student learning activity, (Hafner & Ellis, 2004; Panitz, 1996) wherein students take responsibility for learning and are relatively independent of a facilitator. Socratic questioning represents an exception from the facilitator's functions as it does not become a student activity. It is a sophisticated teaching technique often not mastered by faculty (Blignaut & Trollip, 2003); therefore, its absence in the student repertoire is no surprise.

Students do not generally start posting to a discussion board without inducement. Proper organization supports and scaffolds students (Mason, 1991) as disorganization causes confusion and lack of participation (King, 2002). Collison (2000) did not mention students performing administrative functions in healthy virtual communities, though regular posting depends on administrative and organisational structure. Students in an admittedly dysfunctional online community (personal communication, J Cronjé, 2005) ask questions, pose problems and dispense information (Cronjé, 2001), paralleling administrative activities. Taking part in the online discussion was only the fourth numerous activity among Cronjé's disgruntled online students. Their profile of postings probably does not indicate a high functioning online community.

We isolated the leading indicators of online community. Affective posts displaying concern, offering support, and meeting the needs of the community are essential to a successful online community. So are techniques like "correcting the participant/professor" (King, 2002, p. 162) contributing intellectually and fostering deeper learning. Spontaneous moderating and high quality informative posts reflecting opinions also indicate the transition from facilitator-driven to community-based learning.

Like Joe, we modelled Virtual Jane on the activities indicated in table 1 in order to advance the online community. She had to be the students' collaborative partner; their affective,

sympathetic, sharing friend; as well as their intellectual, correcting, moderating and facilitating critic. In the next section, we investigate what really happened.

6.2 How did Virtual Jane Resemble Virtual Joe?

Joe Bags O'Doughnuts (King, 2002) had a pre-defined role. He was a dynamic student; he initiated discussions and took part in all collaborative activities. Joe represented a typical member of the class, involved with the students. From the beginning, they shared their difficulties, treated each other sympathetically and expressed concern over others' problems. As facilitator, he contributed to the social construction of learning by taking part in critical dialogue and correcting both participants and the professor. We compare the two profiles in order to pinpoint Jane's contribution.

Table 2: Comparison of the Functionality of Virtual Joe [a] and Virtual Jane

Characteristic	Joe	Jane
Profile	Identity known as facilitator Male College age student Credibility irrelevant	Identity implied as student Female Similar to average class age Plausible
Task	Ice-breaker at start of discussion First posting to technical problems area Posts hints from professor Gives objectives and major points	Not necessary Not necessary Posts hints in own right No
Conversation style	Uses informal conversation style	Models communication style suitable for topic
Elicits reaction	Makes deliberate mistakes/errors Disagrees with instructor by using literature to corroborate	Points out mistakes/errors Disagrees with instructor and students, gives personal opinions, stirs up controversy
Observer		Covert observer

[a] (King, 2002)

Table 2 summarizes the differences in their profiles, tasks and styles. Joe, the Professor's right-hand, posted objectives, major points, and other information coming from the Professor. Jane, on the other hand, never posted content as the facilitator's delegate. Our facilitator modelled the role of guide on the side. As Jane was not the facilitator's confidante, all information and suggestions she passed on to the class had to be credible coming from her. She had the same information as everyone and she readily shared her insights and experience.

Joe and Jane shared a number of characteristics. They were both virtual students and fully participating members of the class, sharing the general profile of the class and the instructor's gender. Joe and Jane provided their classes with two facilitators, supporting collaborative learning modelling online activities and discussion (King, 2002). Both targeted comments at students and answered questions based on experience. Jane and Joe both disagreed with the facilitator on occasion,. Both were critical of fellow students and the facilitator, corrected them, and ensured that postings conformed to all the course criteria and conformed to a high academic standard. Both supported learner control by withdrawing from the online conversation when not needed, not dominating the discussion. Both provided a human touch. Attentiveness and sympathetic treatment motivates students (Baker, 2004; Johnson, 2001).

6.3 Describing Virtual Jane

In all aspects, Jane was an ordinary student; capable, but not high profile; knowledgeable, but not prominent; friendly, but not uncritical; helpful, but not condescending.

6.3.1 Designer Identity

Before the course started, we designed the virtual student's identity with clear goals in mind. She had to blend in with the student group and take part in online discussions without attracting attention. In an institutional culture influenced by perceptions and prejudices (Khalil, 2006), she conformed to no stereotype. At the same time, her vague background did not invite anyone to uncover her identity. To enable the female online facilitator to act her role convincingly and to prevent detection, we chose a female student with an educational practitioner background. This aspect matched the general profile of the class. Her wide teaching experience enabled her to communicate authoritatively on diverse topics. We quote from the facilitator's diary:

> It was decided that Jane could not be clever, affluent and white, as then she would make no difference… She had to be made approachable …. Jane had to have an education background, without her CV being traceable. She also had to be jack-of-all-trades and master of none … Therefore she was a relief teacher who had taught (or supervised in her own words) all over the show and all imaginable subjects. Nobody would expect her to know too much. Hopefully they would also not be intimidated by her. … She would also have a limited internet budget. It was decided that she was to target the bottom end of the class and be their friend and confidante in order to try and inspire them.

Jane was bilingual with an English name and Afrikaans surname, female, thirty-something, and her location and background indistinct. We thought most students would identify with her. In one group assignment, the students decided to publish photographs of all the participants,; therefore, we provided one that would compound her vague background:

> Jane finally has a face; dark skinned, strong-nosed, long straight dark hair, reminds one of Cape Malay or Indian descent.

6.3.2 Jane as a Student

She acted like a typical student. She forgot to link attachments, liked to research new topics, and contributed reading matter to her group. She exhibited neither compulsive order nor organization. She frequently apologized for forgetting things, being late, not being able to do things immediately. She identified with the students who made similar mistakes:

> Sorry, I forgot to add the last bit, was so glad to get rid of this!
>
> Sorry, I only now saw that my attachment did not go. Here it is again

In unscheduled communication, she used informal language, made the usual student mistakes, and regularly committed typing errors. She often contributed typical off-topic or "other" content-less messages found in all courses (Blignaut & Trollip, 2003).

6.3.3 Jane's Restrictions

Jane was no superwoman. She experienced the same challenges and restrictions as other students: limited time, a social life that interfered with her online studies, technical issues, internet unavailability, and even a computer crash. She was a typical student.

> The times you spend online is the time I am wearing my housewife hat.
>
> PS: Sorry I couldn't make the chat session last night - technical failure! :-(
>
> Sorry I could not do anything about the tagboard, as requested.
>
> Sorry for the lateness of the posting. I notice that opponents have been allocated already. Maybe someone else is still coming? Jane

As a typical student, Jane also took chances. Instead of using the LMS online html editor, she edited offline, demonstrated a viable shortcut to her peers, and pointed out the risks involved:

> I must confess, I downloaded the file, edited it in [program name] and uploaded it again. And nobody knew any better. Before anyone attempts to do that, one must just first make a backup of the original. The snag is: when two people are working on it simultaneously....

Jane stopped contributing to the course when the collaborative tasks and peer-reviewing was over, for the same reasons virtual Joe withdrew from conversations when not needed (King, 2002). Like scaffolding, she faded. Students thought she simply ran out of steam.

6.3.4 Jane as Friend

Jane's personality dictated that she was a friend, confidante, and helper to the students. She encouraged, explained and took additional trouble to assist students when possible. For example, she repeatedly encouraged a student who did not cope and withdrew from the course by encouraging her from her "actual" experience:

> Please do not give up because things are hard. My friend, who did this module two years ago, has never in her life experienced a steeper learning curve in any six weeks. And that whole class survived, they said, and said it was worth it. Hope this helps a little. Jane.
>
> I truly found that I learnt immensely from the others by observing how they did things, and further by dabbling. I think one has to come out of your comfort zone where you just ride the wave of previous learning, to really learn something new.

When her *protégée's* finally mastered new web-based skills, such as formatting images, she complimented them:

> Your page is wonderful, pics and all!
>
> You really did your homework on references, well done.
>
> You two have been fantastic and really worked so hard at this. My congratulations and thanks.

Social presence and immediacy (closeness behaviours) influence student satisfaction, motivation and learning (Baker, 2004; Richardson & Swan, 2003). In general, Jane displayed affective behaviour. She empathized, she sympathized, and she responded to personal information. Support and concern for members of the community is characteristic of a healthy online community (Collison et al., 2000):

> I am quite jealous of you going to the conference! And in the Cape (where my heart is).
>
> Good luck to everybody sticking their necks out …
>
> Enjoy the weekend …
>
> Have a marvellous time!
>
> Everybody did such a great job, this [group work] was really painless ...

The role of friend was evident in frequent affective postings acknowledging student participation and providing support. Consistent with the Blignaut and Trollip (2003) classification, these posts are typically devoid of learning content. This role is also reminiscent of Collison's (2000) *Personal Muse*. Social or ludic interaction among

students helps form a virtual learning community (Erickson & Kellogg, 2001). Jane supported suggestions to make the impersonal LMS environment more human and to facilitate communication:

> Why don't we just use first names (or nicknames) to identify ourselves?

The facilitator reciprocated by changing the display format for identifying discussion posts in the LMS to include first names. This post clearly furthered social aims as having first names gave students more online identity and personality and humanized the impersonal environment (Blignaut & Trollip, 2003). Jane wove her affective role into administrative, technical and intellectual posts.

6.3.5 Jane as Collaborative Student

Jane participated collaboratively by taking part in all activities and interacting with all students (Panitz, 1996). True to the characteristics of collaboration, Jane took responsibility not only for her own learning, but for her peers as well. The group-work structure necessitated that students function independently of the facilitator and appoint their own leaders. Jane took the lead when necessary. Students also monitored their peers' activities and took joint responsibility for the product, even if it required correction and redirection. In the groups, Jane used a reflective voice (Collison et al., 2000) in corrective posts (Blignaut & Trollip, 2003).

> Seems you and I look from different perspectives. I see this rubric as assessing what an online course has to offer in the line of support to the student enrolled for it. From what I read in your rubric, it is assessing the behaviour of a student in a course, supporting his co-students. (another group works on this)

> Argument: I do not understand how you minimize sealing off … Do not agree that you want to set the individual apart, as they have very LOW Individualism scores.

6.4 Jane's Facilitation Functions

6.4.1 Jane as Organizer

A pertinent function of online discussion moderator is that of organiser (Mason, 1991). The course facilitator dealt with administrative issues in a weekly webpage containing detailed instructions on all aspects of course work and discussion topics. She also posted summaries and comments on the past week's discussions and other technical work. In contrast to Virtual Joe, Jane's administrative contribution mainly reminded students of

information already available. Sometimes she was to the point and sometimes accommodating, depending on who of us acted as Jane at that stage, as we used Jane's voice for the opinions and contributions of multiple faculty. This helped to ease the burden on the facilitator when students required more support than time allowed.

> May I request that short postings be included in the messages themselves and not as attachments, as they are so cumbersome to open and take forever to read? Some intended attachments also get lost on the way and we waste time searching for them. Jane.
>
> I just found the nicest way to keep track of threaded messages. If you click on the little looking glass next to the first message in the thread you can see all the submessages in one place. No need to look at all the messages one by one! Isn't that cute?

These discussion posts also represent messages with multiple classifications in a single post. The messages are classified as administrative, without academic content (Blignaut & Trollip, 2003), but the tone of the second message is also social, as Jane was playing the role of friend. From the first week, it was clear that Jane's online function would differ from Virtual Joe's, as the diary reveals.

> Already I can see quite a difference between the use for Joe and Jane…Joe's class needed prompting to get going and frequently did not know how to do things. Jane's class was running so fast, and figured out things by themselves, that she can hardly keep up.

6.4.2 Jane's Intellectual Role

Jane's main task was to ensure academic rigor in the discussion postings, both in terms of content and format. She did not even spare the instructor, as she was a bit of a nit-picker. Her trademark was to be critical: "I am glad for the emphasis on language issues. One thing worries me a bit. How do we consolidate British / SA English with APA style?" This post also illustrates the reflective voice (Collison et al., 2000).

She freely made suggestions to students, as students generally resent criticism from a facilitator. She lobbied for objectivity and, like Joe (King, 2002), suggested from experience by capitalizing on her "teaching background." Jane took the trouble to correct students' referencing style, spelling and grammar in posts, especially of the weaker English second language students.

> I think an important aspect to look at … is using correct grammar and spelling.
>
> After many years of teaching and assessing kids' work, I see formative assessment as ...
>
> From the perspective as a foreign language teacher, it is most interesting to observe ...
>
> There are several ways of making this more representative (or quite complicated), by putting some weight on these parameters, for instance, to have Argument counting more. I think that any of the above two methods can distinguish between a good and an inadequate posting and an added few sentences of comments can improve the usefulness of the feedback.

The above posts, although posted by a virtual student, conform to the category of instructor-generated informative posts containing academic content (Blignaut & Trollip, 2003). She used the voice of generative guide (Collison et al., 2000). The facilitator should direct learning by focusing discussions on crucial aspects, asking questions and probing responses to encourage students expand and build arguments (Collison et al., 2000; Mason, 1991).

We required the students to peer-review designated discussion postings. Like her classmates, Jane also generated posts of a corrective nature that referred to the course content:

> Which site are you using in connection with the APA style? (I love the OWL site). Do they say you have to give URLs in the text itself? I find that quite odd. Also, you give no dates with Ten sigma and Andrade in the text.
>
> About peer-referenced journals: I am unfamiliar with the term. Should it not be "peer-refereed"?

Jane, unlike Joe, sometimes used the voice of conceptual facilitator (Collison et al., 2000) in Socratic questioning exchanges: "Content: good development of argument, though there is nothing to verify it against. Why should we believe this?"

6.4.3 Affective Facilitator

The social behavior of the facilitator is crucial to successful distance learning course outcomes (Baker, 2004; Mason, 1991; Richardson & Swan, 2003; Spitzer, 1998). Jane encouraged her classmates. These posts are classified as affective (Blignaut & Trollip, 2003), displaying teacher immediacy (Baker, 2004) and social presence (Richardson & Swan, 2003). Jane's affective posts resemble Collison et al's (2000) personal muse.

> This is great, Gitte! Full marks for a header that captures the essence of the post. Technically all aspects are neatly tied up, including word-count, grammar, reference style. The argument is properly developed and well supported by the literature. We can market you in South America. The personal perspective is readable and convincing. I love your positive attitude.
>
> Hello Karen I was really impressed by the way you managed to put in the comments.

The social component of messages resembles a third dimension over the grid of facilitator functions appropriated by students in the virtual community. It is present in all affective but also in administrative and content-bearing intellectual posts and even in some content-less other posts.

6.4.4 Technical Facilitator

As a significant portion of the learning outcomes in this course was technical, we classified many technology-related topics as containing learning content (Blignaut & Trollip, 2003). Jane contributed corrective academic postings on computer-related topics. Mistakes or incorrect URLs did not escape Jane's vigilant eye.

> The text was a little hard to read against the busy background, the text being multi-coloured … instructions are a bit thin ... It does not play intuitively. The solution button does not work.
>
> I see you still have your [student name].html file in Group Google. You must delete this file and then you must add all your information to the Index.html file as [student 1] directed you to do.

After doing the assignments herself, she made informative suggestions on how to build the web-artefacts, subtly tailored to co-students' proficiency. Her suggestions were always imperfect, as she was an ordinary student, but they tended to nudge students onward and contain students' feelings of inadequacy (Wood et al., 1976).

> I used the site http://www.votations.com to create my free poll. I then used my hagar page as URL for the poll, as I did not know what the URL of the WebCT page was, and just linked the poll to hagar. Lucky that it worked!
>
> If you do not know html, there are easier ways to do it ... but those are the issues I struggled with most in the beginning. I love the html-learning program in [program] as it shows you the code and the effect of the code at the same time.
>
> Another trick is to just begin the page in Word, save as html …

Ambiguous instructions often cause problems in online classes (King, 2002). Jane clarified expectations by highlighting critical instructions. When the facilitator provided incorrect instructions, Jane suggested alternative ways of going about the assignment. We hoped that students would be as comfortable with the facilitator. Institutional culture with unapproachable academic staff often prevent students from admitting problems and asking for assistance (Lemone, 2005). Such inflexibility often contributes to students' insecurity in online classes (Wood et al., 1976).

Jane sometimes instigated debate between the "facilitator" and the "student" where their roles merged. She simultaneously acted as a critic and an administrator. This differed from Joe's intellectual debates (King, 2002).

> Jane to facilitator: Why do you tell us to "upload" our concept maps to the clubhouse pages, if there is no such facility available? I tried to copy the code of the map into one of the textblocks, but that does not work, as the map has Java. You should rather have told us to upload it to [Server] and just provide a link. I find this all very confusing. :-(Jane.

> Facilitator to Jane: Sorry Jane and all the others who are confused. I must confess I also got confused with what can and cannot be done and where.

6.4.5 Critical Facilitator

Jane also displayed a cognitive function by correcting the prescribed theoretical course content posts and suggesting better alternatives. This function linked with her peer review task as student. Like Joe, she functioned as a critic who made intellectual contributions. Her self-appointed function as quality watchdog often necessitated stern corrective feedback. Jane openly aired her opinions, so others could follow and express theirs. Exchanging views is a characteristic of a healthy virtual learning community (Collison et al., 2000). She stimulated critical dialogue when interaction waned, preventing stagnation in the discussion (Blignaut & Trollip, 2003). Jane used her virtual identity to create a unique point of view in the following assignment:

> I believe the (Hofstede) indices given for South Africa reflects mainly the White, English speaking white-collar workers who were working for IBM at the time of the original research. The power distance in traditional Afrikaans-speaking communities are still very high, as I see among my relatives in the Cape "platteland" (rural areas). Children respect parents, elders and teachers. Discipline is not a problem. What I see up in Gauteng is a different story! Masculinity is very high with well-defined gender roles. We avoid uncertainty and cling to traditions, including speaking our Mother tongue and teaching it to our children. It is unthinkable to send small children to be schooled in any other language.

The two students responsible for peer review of this assignment noticed the potential for debate in her stance, as the government abandoned mother tongue schooling. Presenting students with interesting or controversial topics elicited lively and successful asynchronous discussion (Bhagyavati et al., 2005). In their reviews, both peers responded to the contentious issues, responding with more questions. The facilitator did not intervene, leaving the debate for the students to conclude, as generally advocated (Ip et al., 2002) :

> It is true that the children in the "platteland" are different. Would that be because of location, parental upbringing other factors or a combination of these? (Would be an interesting Thesis topic ...) How would we adapt software or e-learning to accommodate such a diverse population?

> I agree on your SA analysis, and the input from a teaching angle. Out of curiosity, what happens on the platteland "farm" schools? Is there still teaching in one language although the ethic and colour make-up of the kids are now different? (or are they?).

Whenever the online facilitator erred, Jane, just like Joe, exposed it, eliciting corrections and apology. We used Jane's personality to probe some grey areas in the online environment. In the beginning of the course, we posted all review and feedback, including corrections as threaded discussion posts, so everybody could learn from it. Some educators, however, advocate that formative feedback be given only in private (Shannon,

Roberts, & Woodbury, 2001). In a premeditated incident, the facilitator posted particularly harsh comments to a student who persistently produced careless work and resisted correction. Jane defended the student and reprimanded the facilitator for being so insensitive in "public." We expected the class to consolidate ranks and side with Jane and the other student, so we anxiously awaited the class' reaction. Was the facilitator friend or foe? Silence fell. Nobody responded, as if the incident never happened. The ethical issue of where to draw the line in public corrective feedback remained unresolved. Only afterwards, we found references to the incident in the student blogs, reflective essays and post-course feedback. Students were wary of Jane's attack, but refused to take sides:

> Perhaps the message she sent in which she was critical of the facilitators harsh criticism of some of the weaker students efforts was a bit over the top in that it may have helped contribute to the acute politeness. Hardly any participant criticised another harshly when harsh criticism had perhaps been earned. Everyone tended to only say nice things, and after that intervention by Jane, it was perhaps reinforced that only nice things were to be said.

The students showed real concern and support for their community and refrained from perpetuating a discussion that could hurt it. Their maturity gave them insight into the instructor's problem. Because of this incident, the facilitator coached and corrected unsatisfactory work in a private discussion topic with students who did not read or understand previous instructions. Jane joined the lagging students for the "extra practice" to help them catch-up on their work. One irate student misunderstood the arrangement, as the facilitator diarized:

> Seems she does not understand the extra work principle at all. Jane tried to explain to her how it works.
>
> Hello [student], As I understand it, we only have to fix the mistakes we made in the last round of postings … it should be easy to fix … It seems that we are just forced to do some corrections before going on. I am also glad we are not picked out before everybody else. Jane.

Jane was often a "pacifier" (King, 2002), mediating (Collison et al., 2000), and intervening on behalf of either the student or the facilitator in affective posts (Blignaut & Trollip, 2003). This softened the critique. As facilitator, Jane fulfilled social, teaching and organizational CMC moderator functions (Mason, 1991). Like Joe, Jane pioneered the emerging activity of students performing some of the facilitator functions and responsibilities as the virtual community of learners formed (Collison et al., 2000).

6.5 Students' Opinions of Jane

After conclusion of the course, we exposed Jane's identity and informed the class that Jane was not a real student.(Nagel, Blignaut, & Cronjé, under consideration) Some students afterwards indicated that they could not remember that Jane helped them or that she contributed to their learning, even though all had been working with her in a team and engaged in peer review with her at some stage. She successfully kept a low profile.

> To be honest - Jane didn't influence me at all … I've noticed there are new names and other people in the "game", but the pace and inputs required were hectic and I focused my energy 'to stay in the race' and maintain as high as possible quality.

Online students depended upon each other and learned from their peers. Many students gave her some credit for contributing to learning. They noted her motivation and her help to students who grind alone in the background:

> ... I thought this was somebody I should take note of in future as she seemed to read the instructions very carefully … So in that respect she did contribute to my learning as I tended to read through the instructions more carefully …
>
> She contributed a lot of useful info, and in a very subtle way tried to communicate help to others.
>
> All persons that contributed to the course in any way either encouraged or motivated me to participate as fully as I could. Jane was one of the persons that contributed and assisted in a believably authentic way and as such I learnt from her just as I did from the other students that participated meaningfully.

A few students mentioned the tone of Jane's discussions. In a virtual community, students express honest opinions and allow reasonable venting of emotions (Collison et al., 2000). A core element in a community is the projection of personality, showing online students are *real people* (Garrison et al., 1999):

> I experienced her as being, "strong", straightforward, and as someone who won't hesitate to tell what she thinks.
>
> … since all were so polite all the time, and she offered a bit of "excitement" with her "personality".

Distance students interacting through technology prefer the interaction with their peer students rather than the presence of the facilitator (Cronjé & Blignaut, 2000). Learning with and from Jane aligned with their preferences. Jane inconspicuously contributed to the learning and affective dimensions in the online classroom. She was part of the team, aided students on cue, and assisted the facilitator. She made a unique contribution.

7. CONCLUSIONS AND RECOMMENDATIONS

7.1 How can a Virtual Student Contribute to the Formation of a Virtual Community of Students?

An online facilitator has to organise clearly, coach cognitively, and contribute affectively to discussions in order for students to experience satisfactory learning (Blignaut & Trollip, 2003). This is time-consuming. A virtual learning community where students take responsibility for their learning improves the quality of learning and eases the facilitator's burden. Fostering such a virtual community requires judicious and skillful facilitator participation incorporating appropriate restraint (Moore, 1989). King (2002) introduced a virtual student named Joe to improve his online courses; we created virtual Jane. This virtual student in an emerging community of practice, contributed expertise, collaboration, leadership and concern (Johnson, 2001). She also facilitated all aspects of learning, moderated the discussion, gave intellectual feedback, and supported course organization (Collison et al., 2000). Our virtual student also supported and encouraged others. She was not alone. In all these activities, the other students participated in equal measure, creating a vibrant and active virtual community.

7.2 How did the Students Perceive this Fictitious Student?

Jane blended in, and the class never noticed that she was not one of them. Neither was she a copy pasted from Virtual Joe's template (King, 2002). She grew into her eventual personality, tailored to the requirements of the particular course. We recommend that designers adapt the profile of a virtual student to blend into their student community. Furthermore, they can emphasize some of the virtual student's characteristics to help address specific requirements in the course, and to integrate groups of students, and to stimulate participation, as some students more readily relate to peers than to the facilitator.

7.3 Did Jane Enhance the Students' Online Educational Experience?

Jane contributed to the course as student and as facilitator. As virtual student, Jane acted like a member of a virtual learning community and promoted similar behaviour in the rest

of the class. She contributed to the intellectual discussions, modelled free expression, and invited students to exchange views. She was emotionally involved and displayed personal style. Designers can model a virtual student to display specific affective behaviour meeting the needs and showing concern and support for the online community.

7.4 Are There More Things That we Could do With Jane to Improve the Web-Based Course?

The potential of mastering different online voices (Collison et al., 2000) can contribute to the quality of online courses, as it also keeps the instructor challenged and engaged (King, 2002). There is enormous potential in using different faculty to "speak" through a virtual student, as one can contribute expertise to collaborative groups within communities of practice (Johnson, 2001) where students readily learn from peers. There is also much to uncover about transforming into an online community of learners. We also investigated the ethical aspects of hiding the identity of a virtual student from the class and probed the student reactions to the eventual disclosure of Jane's identity (Nagel, Blignaut, & Cronjé). In future, we hope to investigate if students will embrace a virtual student into their midst as successfully if they know beforehand this is a web tool and not an authentic student.

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Read-Only Participants:
a Case for Student Communication in Online Classes

1. ABSTRACT

The establishment of an online community is widely held as the most important prerequisite for successful course completion and depends on interaction between peers and the facilitator. Beaudoin (2002) reasons that online students sometimes engage and learn even when not taking part in online discussions. The context of this study was an online course on web-based education for Masters in Computer-integrated Education students at the University of Pretoria. We used a mixed methodology approach to investigate how logins and discussion postings relate to learning and course completion. We also investigated how student collaborative behaviour and integration into the community related to success. Although the quantitative measured indices showed highly significant differences between the stratifications of student performance, there were notable exceptions unexplained by the trends. The class harboured a well-functioning online learning community. We also uncovered the discontent students in the learning community felt for invisible students who were absent without reason from group assignments or who made shallow and insufficient contributions. Student online visibility and participation can take many forms, like read-only participants who skim over, or deliberately harvest others' discussions. Other students can be highly visible without contributing. Students who anticipate limited access due to poor connectivity, high costs or other reasons, can still manage their login time effectively and gain maximum benefit. Absent and seldom-contributing students risked forsaking the benefits of the virtual learning community. We suggest how to avoid read-only-participation: communicate the required number of online classroom postings; encourage submission of high quality, thoughtful postings; grade discussions and give formative feedback; award individual grades for group projects, rotate members of groups; and augment facilitator communication with internet-independent media to convey important information. Read-only-participants disrupt the formation of a virtual community of learners and compromise learning.

2. BACKGROUND

As more formal education courses are available online, quality and non-completion remain problems

> While online course enrolments continue to climb, retention and success rates in such courses and programs are frequently reported as typically lower than those delivered in a traditional classroom format; those of us in roles that support online students have a role in reversing that trend! (Schreck, 2006 online).

Researchers often measure the success of online learning in students' perception of learning and course throughput rates. Drop-out rates for online courses range from 20-50%, often 10-20% higher than for equivalent contact courses (Bernard, Brauer, Abrami, & Surkes, 2004). Searching for a model to predict student success in online learning, Bernard and co-workers (2004) found that students' *frame of mind* can predict readiness for learning and affect course outcomes, while "prior achievement is still the best predictor of future achievement" (Bernard et al., 2004, p. 44).

Research shows that online participation is necessary to ensure successful course completion (Klemm, 1998; Rovai & Barnum, 2003; Swan, Shea, Fredericksen, Pickett, & Pelz, 2000). Clark and Feldon (2005) concluded that a facilitator who participates and interacts with students prevents them from abandoning their course. Better cognitive outcomes occur when students engage and form a virtual community of learners. The development of community depends on online interaction with peers and the facilitator. Learner satisfaction, perseverance, and cognitive outcomes characterise the formation of a virtual learning community. Some contest participation as prerequisite to learning; they claim students learn sufficiently by observation (Beaudoin, 2002; Sutton, 2001) and lobby for lenience towards lurking or read-only participation. This article responds to Beaudoin's (2002) article: Learning or lurking? Tracking the "invisible" online student. He reasons that students sometimes engage and learn even when not taking part in online discussion with faculty and other students and shows that low-profile students …

> spend a significant amount of time in learning-related tasks, including logging on, even when not visibly participating, and they feel they are still learning and benefiting from this low-profile approach to their online studies (p. 147).

We investigated the importance of student online "visibility" apparent in the quantity and quality of participation. We explored as a case study the successful completion of a post-graduate online course by asking the following research questions:

1. How did online participation relate to learning and successful course completion?
2. How did participation influence the learning community?

3. LITERATURE

3.1 The Debate in Favour of Online Participation

3.1.1 Taking part in Discussions

An LMS tracks progress and performance and reveals students who do not login to their online classroom or who login without participating. Klemm (1998) blames classroom-based teaching where students expect entertainment for conditioning them to passive learning. Therefore, they seldom realize the benefits of participating actively in online discussions, naturally lurking. Well-facilitated online discussions can be more inclusive than classroom discussions by including introverted students and enabling better quality interaction (Cox, Carr, & Hall, 2004; Prammanee, 2003). Rovai and Barnum (2003) claim that passive online learning through "listening" without participation produces no measurable increase in knowledge, as they could predict perceived learning through the number of messages posted. Others also report that distributed students who participate in dynamic discussions had better course completion and that failing students interacted less frequently (Davies & Graff, 2005; Swan et al., 2000). Active online participation also benefits learning.

3.1.2 Improved Learning

Deep cognitive learning (Prammanee, 2003) and high levels of interactivity are possible in online discussions, as students can prepare well-considered contributions (Kettner-Polley, 2005). According to Carr (2004), students who focused on building knowledge and collaborative interaction had a superior average performance, as challenging online interaction promotes understanding. Interactive learning provides an instructor with

insight into student misconceptions, difficulties, conceptual problems and verbal pitfalls. Asking leading questions elicit insight into what students understand, more than simply telling them the answer. Immediate feedback from peers and instructors and social interaction built into the online discussions contribute to learning (Collins, Brown, & Holum, 1991). Collaborative learning activities contribute to deep learning, critical thinking skills, a shared understanding and long term retention (Garrison, Anderson, & Archer, 2001).

> Consistency in course design, interaction with course instructors, and active discussion – have been consistently shown to significantly influence the success of online courses. It is posited that the reason for these findings relates to the importance of building community in online courses (Swan et al., 2000, p. 513).

3.1.3 Community of Learners

Interaction is conducive to the emergence of a community of practice (Collins et al., 1991) and a virtual community of learners (Collison, Elbaum, Haavind, & Tinker, 2000). Learning from peers in a structured way can ameliorate the social isolation online students often experience (Boud, Cohen, & Sampson, 1999). Collaborative learning groups solve problems while sharing and clarifying ideas (Cox et al., 2004). In a collaborative learning environment, students develop critical thinking skills and a shared understanding and deep learning, while retaining learning over the long term (Garrison et al., 2001). In a community of practice, novices learn from the experts by observing authentic tasks and executing progressively more advanced tasks themselves under an expert eye (C. S. Johnson, 2001). Complex tasks can be learnt in a community of practice wherein "participants actively communicate about and engage in the skills involved in expertise" (Collins et al., 1991, p. 16). Frequent, meaningful, valued and dynamic discussions in an online course lead to the formation of a virtual learning community where students interact and support each other. According to Collison (2000), members of a healthy online community of learners post regularly, collaborate with other participants, as well as teach and moderate the online discussions spontaneously. Group cohesion, trust, respect and belonging further characterize a community of learning (Kreijns, Kirschner, & Jochems, 2003). However, some students do not participate fully.

3.2 The Case for Read-only Participation

3.2.1 *Legitimate Non-participation*

Non-participation may initially be legitimate, as peripheral online learners make limited entrances into the community remaining on the outskirts, observing the activities of more advanced participants and learning from it (Collins et al., 1991). Sutton (2001, p. 223) also reasons that "direct interaction is not necessary for all students and that those who observe and actively process interactions between others will benefit through the process of vicarious interaction." As students increase their expertise, they move from the periphery to the centre (Carr et al., 2004), with increasing visibility. Beaudoin (2002) found that invisible students sometimes "spend a significant amount of time in learning-related tasks, including logging on, even when not visibly participating, and they feel they are still learning and benefiting from this low-profile approach to their online studies" (p. 147). Williams (2004) advocates using the term *read-only participants* (ROP) rather than the derogatory *lurker* for non-participatory students and vicarious inter-actors. He cautions that while the ROP-ing students may be satisfied that their learning needs are met, they do not contribute to the larger community.

3.2.2 *Inadvertent Non-participation*

Students do not actively participate in online discussions because they procrastinate, they feel isolated, or they're unfamiliar with technology. They may also miss the course structure or control of discussions and therefore remain unconvinced of the course's benefits (Miller, Rainer, & Corley, 2003). Patterns of online participation and interaction can vary across cultural groups. In many developing countries the digital divide is increasing due to insufficient infrastructure and few internet subscriptions (Roycroft & Anantho, 2003). The exclusive use of English in non-English-speaking cultures, economic development and available bandwidth also affect student success.

3.3 Facilitator Participation

Student interaction is not the only factor influencing collaboration, learning and successful course completion. Students become more involved in an online conference when the

facilitator participates as guide, providing extensive critique, feedback, and encouragement (Collison et al., 2000). An effective learning community requires an instructor with integrated social, cognitive and teaching presence (Cox et al., 2004). Facilitators should teach critical thinking, effective communication, and problem solving skills (Shavelson & Huang, 2003). The current vogue to embrace constructivist pedagogy where the instructor withdraws from the online learning environment, allegedly to promote discovery and experimental learning activities, is unsubstantiated (Kirschner, Sweller, & Clark, 2006). Automated e-learning or a lurking instructor presents an even greater impediment to learning than do lurking students.

4. CONTEXT OF THIS STUDY

We presented an eight-week course on web-based distance learning to Masters students in Computer-integrated Education at the University of Pretoria. This was an elective course in a programme usually presented in blended contact and online mode. We delivered this course entirely online using the WebCT ™ Campus Edition as LMS (learning management system). The delivery mode enabled a diverse cohort of 22 geographically distributed students whose ages ranged from nearly thirty to nearly fifty to enrol. The course followed a constructivist approach and consisted equally of theoretical and practical applications structured around eight salient online learning topics. Each week the students had to research online scholarly literature on the topic and post their contribution to the LMS discussions area where they also posted peer-reviews. Concurrently, students had to create web-based artefacts applying the theory.

In the latter half of the course, students created group assignments in teams of five to seven (addendum 14). One of these was a rubric to score online collaborative behaviour, taking into account participating in discussions, contributing to group assignments, replying to pleas for help and offering tips and advice. We used this rubric to allocate a collaboration score for each student. Students aggregated a year mark (addendum 19) derived from discussion postings, web artefacts, group work, peer review and collaborative assessment. The final course grade also included their reflective examination essays. Unlike Davies and Graff (2005), we did not use this final course grade as indication of success. Instead, we used the year mark, representing course activities.

We used multiple windows on students' experience with online learning. These consisted of their private blogs (only shared with the facilitator, addendum 8) for reflection and self-assessment, open paragraph questions included in an online quiz (addendum 16), a reflective essay (addendum 13), and feedback questions e-mailed to the students about a month after completion of the course (addendum 9). The facilitator also documented observations in a diary (addendum 15).

5. METHODOLOGY AND FINDINGS

The course presenters simultaneously conducted research, using mixed methodology (Sharp & Fretchling, 1997). Qualitative methodology allowed us to probe the context of the non-participating students and the class's perceptions and reactions. We conducted content analysis using ATLAS.ti™ software on the following primary documents: students' blog postings, discussion posts, an online quiz, and examination essays (addendum 17).

We validated the findings against the facilitator's field notes (addendum 15) and used multiple documents and perspectives. The researcher also facilitated the online course, and as participant observers, ensured the reliability of the findings.

The student-tracking tool in the LMS provided a quantitative view of student activity in the course including the numbers of original postings and replies (addendum 18). We calculated students' reply ratio by dividing the number of replies to others by their own original posts (addendum 20). Table 1 ranks students according to their year mark (addendum 19) and shows the students' numbers of logins and discussion messages posted, their reply ratio, collaboration score, and whether they returned the voluntary post-course feedback. Unlike the other criteria, the collaboration score is a qualitative measurement obtained by using a rubric to assess each student's collaborative behaviour.

Table 1: Summary of Individual Student Grades and Participation Profiles

Subject no	Year mark	Logins	Messages Posted	Reply ratio	Collaboration score	Feedback submitted
1	#[a]	424	24	0.8	0	
2	#	244	14	1.8	0	y
3	#	1161	30	0.4	2	
4	#	1706	50	0.9	6	
5	38.8	871	50	1.4	3	
6	48	223	10	0.1	0	
7	53	1406	68	1.5	3	
8	60.2	966	54	1.3	7	
9	60.9	776	30	1.0	8	
10	61.6	844	36	1.3	5	y
11	63.1	1503	73	1.1	8	y
12	64	1758	58	1.5	3	
13	66	1093	37	1.5	9	
14	66.3	1487	104	2.7	9	y
15	70.2	1675	53	2.3	8	y
16	80	1810	126	3.2	10	y
17	80.3	963	43	1.0	8	
18	80.9	1165	68	1.8	9	y
19	83.8	1226	68	2.0	9	y
20	85.4	1853	148	2.7	10	y
21	88.5	2980	112	1.7	9	y

[a] These students did not complete the course.

We represent student online activities using the assumptions of Davies and Graf (2005), who categorised students according to final course grades. Our grade categories reflected the assessment stratification used in South African Higher Education. We did not include the student who abandoned the course without doing any work. We stratified the rest of the class into three grade group categories: the *Fail* group for students who did not complete the entire course or achieved less than 50%; the *Pass* group of students who aggregated between 50% and 74%. Those with 75% or more we called *Distinction* candidates. One student (subject 6) changed categories after the final essay and passed the course. We used this stratification for all statistics.

Table 2: Average Number of Logins, Posts and Follow-up Posts per Student in Grade Groups

Grade group	n	Logins	Posts	Reply ratio	Collaboration	Feedback %
Fail	6	771.5	30	1.06	2.2	17
Pass	9	1278.7	57	1.43	6	44
Distinction	6	1666.2	94	2.06	9.2	83
H-value / Chi-square		H=26.3	H=34,5	H=24,7	H=52.8	Chi ^{2}=47
Significance	p	>0,001	>0,001	>0,001	>0,001	>0.01

Like Davies & Graff (2005), we used the Kruskal-Wallis non-parametric test to investigate the significance of differences in online activities among these grade groups (addendum 20). We also calculated the significance of the difference in return rates of voluntary questions using *chi-square* with two degrees of freedom, as shown in table 2 (addendum 20). figure 1 shows a graphical representation of the values given in table 2. We show the average value for each criterion for each of the grade groups.

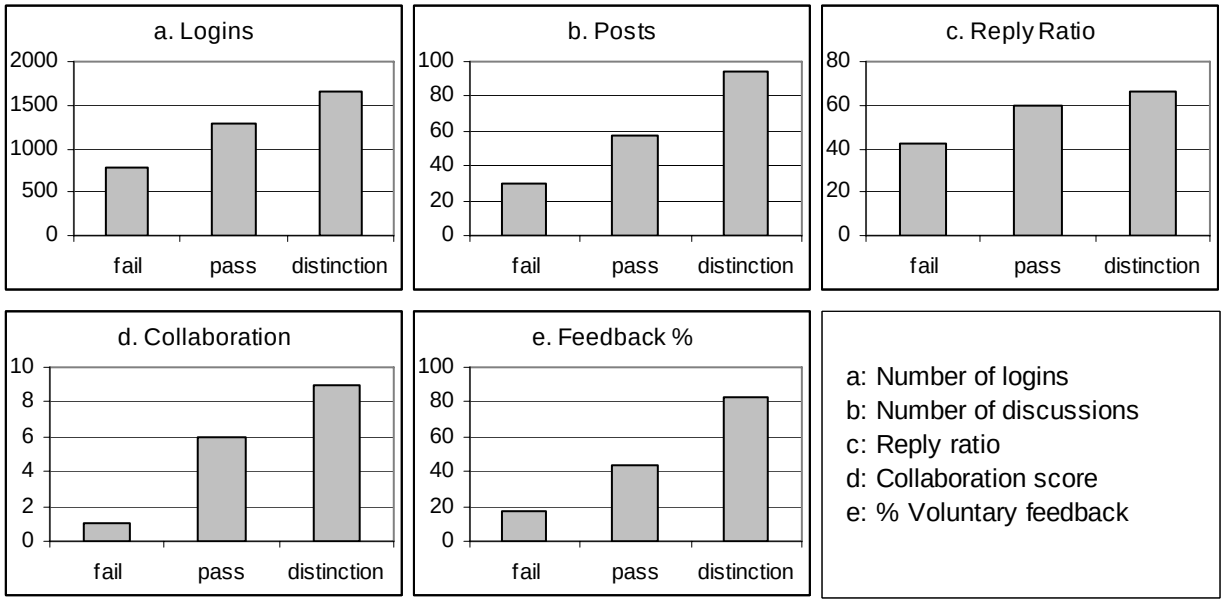

Figure 1: Average Dimensions for Each Grade Group

6. DISCUSSION

6.1 Student Online Visibility and Learning Success

Like Beaudoin (2002), we did some tracking of our "invisible" students, trying to pinpoint reasons for their invisibility as well its effects. We compared their online participation profiles and indicators of their integration into the virtual community with their success in completing the course. Interested in improving course completion rates, we first identified the unsuccessful students, to see if their participation differed from the others.

6.1.1 Student Logins

One can approximate students' participation in the online classroom quantitatively by the number of times they login, as shown in figure 1a. It shows that the student group that aggregated a failing grade or did not complete the course, logged in significantly fewer times than the successful students. Students who achieved distinctions logged in even more than did the average students.

Learning success depends on interaction with reliable technology (Swan, 2003). The digital divide running through infrastructure, economic and cultural dimensions (Roycroft & Anantho, 2003), influenced connectivity and participation. Students whose infrequent logins rendered them invisible compromised their success. The blogs revealed that the students employed in the e-learning industry had practically unlimited bandwidth with state of the art computers and software. Others made do with much less and singled it out in the quiz as their biggest challenge:

> Costly and demanding financially, time consuming, stressful … Not for the poor people, under privileged students can be dropouts (Q).

Students experienced other technical problems that compounded their infrequent internet connectivity:

> Sometimes my (dial-up) connection was not reliable (Q).
>
> There are moments during this module where in my area I experienced a number of electricity cuts and this kept me anxious and waiting to get started with work (E).

Some students showed resilience in coping with poor infrastructure, regular electricity cuts, and poor connectivity; they managed successfully without compromising their studies. For others, technological problems were overwhelming.

> … first three weeks of the course I couldn't work productively because of constant trouble with my PC (Wrong Internet Explorer program, needed Java program to read and send information and finally got the Blaster virus.) This made me very aware of the high-dependency on technology in the e-learning world. No Computer – No learning – No-success (E).

It is not always clear why some students persist against enormous odds while others give up. Motivation possibly played a role in the last two students, as the student with the electricity problems required the credits to graduate. Students perceived connectivity as

the reason for erratic peer contributions, as they did not "see" the lurkers, but noticed that some withheld contribution.

> When some of the peers are struggling for access, their level of contribution is hampered.
>
> We are a nice bunch enrolled for this course. Some learners easily share and are spontaneous, while others hold back.

Even logging in often (table 1) does not always indicate participation. Rovai and Barnum (2003) caution that attending courses without participation produces no measurable increase in knowledge, and students who wish to pass just through attendance do not succeed. Learning requires interaction not only with the learning content but also with co-learners (Swan, 2003).

6.1.2 The Number of Discussion Posts

Discussion posts revealed quantities of student participation, as shown in figure 1b. Like logins, there was a significant difference between the numbers of postings from the students in different grade groups. Students who failed or abandoned the course posted on average significantly fewer discussions than their successful counterparts, confirming Davies' (2005) results. We also observed a significant difference between average and excellent students, a trend Davies and Graff could not indicate.

On average, the high-performing students were also most active in the discussions. There were also average performing students (subjects 7, 14) who posted proliferate messages, constituting "noise" in the discussions (Williams, 2004), and an excellent performer (subject 17) who posted few (table 1), reminiscent of vicarious or read-only-participation. The number of posts, therefore, does not reflect student involvement.

6.1.3 Ratio of Reply to Original Posts

This metric indicated a student's style of participation, whether peer or self-focused, and is independent of participation quantities. From figure 1c, it is evident that the more successful students more readily interacted with peers. Successful students replied two or three times more often to other posts than they initiated original posts. The less successful students' replied less often than they originally posted. The difference between all groups is highly significant (table 2). These observations confirm that, after a minimum

interaction establishing the necessary support, the quality and dynamics of interaction further influenced online learning (Davies & Graff, 2005). This metric still does not indicate the real quality of contributions. To encourage rational discourse, Klemm (1998) urges facilitators to grade on the quality of the postings and not to settle for mere opinions. Absent students and those who contribute little of value or virtually "nod" their approval in threaded discussions do not deceive their peers (Collison et al., 2000).

6.2 Quality Participation

6.2.1 Peer Assessed Collaboration

Klemm (1998) proposes using peers to grade the value of each person's contribution. Therefore, we designed one team assignment to develop a rubric for scoring online collaborative behaviour. The collaboration score (figure 1d) is an average of assessment by two peers and the facilitator, using this rubric. While rudimentary, it indicates how students rated others' participation. Similar to all previously discussed quantitative measurements of student activity in the online classroom, the collaboration score showed highly significant differences among the three stratifications of students, as unsuccessful students had low collaboration scores and the highly successful ones scored highest. Interpretation of the score is problematic, as again, there are notable exceptions. Subjects 6 and 12 (table 1) logged in often, but they did not score high on collaboration and present themselves as classic read-only-participants.

We also used peer-review extensively as a mechanism to improve interaction and learn collaboratively (Boud et al., 1999). The transparent learning gave students insight into each other's work. Most students were positive about the peer-assessment process and realised the advantages:

> With traditional learning, nobody really has access to your assignments, except if you want them to. To me e learning proofed to be a very transparent way of learning. For the first time in my life I had freely access to everybody else's assignments. I were able to position myself, to compare my own writing and most important learn from others. I was intrigued by the differing viewpoints from which the assignments were approached

> Peer assessment sharpens a student's responses - the student knows he cannot "get away" with lazy work.

While the non-contributing students may be satisfied that their learning needs are met (Beaudoin, 2002), they do not contribute to the benefit of the community. We contend that the quality of a student's contributions to the course reflects integration into the community.

6.2.2 Group Participation

Cooperative group assignments encourage students to participate online. As previous teamwork in this programme resulted in much unresolved conflict, we scheduled group assignments in the latter half of the course and allocated a smaller portion of the grades to these activities. Despite online support in the form of a dedicated discussion groups and synchronous chat rooms to ease the management of their assignments, some students participated insufficiently and created discontent. Prodded in the quiz, numerous students indicated teamwork as the biggest challenge in the course:

> Collaborative work via the Internet [was] very difficult.
>
> Team work - the response from people, ways of communicating within the group and I "think" the ability for people to "ignore" the postings in the hope that other people in the group would do it.

The challenge of online teamwork also emerged as a prominent theme in students' reflective essays at the end of the course.

> The chat rooms were functioning well and the teams worked together beautifully. Unluckily not all team members could participate here.
>
> I really HATE working in a group. My attitude is not to depend on others, and to make sure that I don't need to rely on others. I trust myself and my own work most of all. This all in all makes me a VERY bad team player!
>
> As I expected, only three team members were actively involved during the group work assignment. We were supposed to be seven in the team.
>
> It was once again not a very satisfactory experience, because only a few group members participated.
>
> Team work, this proved to be a challenge. As the nominated team captain, I learnt a few lessons; these being people are demanding, they wanted to know I was online and on track. There were those people who tried to participate but when the chips were down and timelines tight they were nowhere to be found. Then there were those people whom I knew I could rely on, it seemed a bit of performance punishment, but they just got more work to do, because I knew they would cope.
>
> Working in a team online, there are still those who just don't get the meaning of the word team.

Group membership rotated. In constructivist fashion, students self-organized their groups and appointed their own leaders. Organization and leadership in online teams exhibit distinct dynamics. "In contrast to face-to-face teams, the leadership role of virtual teams is shared among team members" (S. D. Johnson, Suriya, Yoon, Berrett, & La Fleur, 2002, p. 379). When team members did not share responsibility, problems arose. Some contributions to group assignments were often late and unusable, reflecting low quality planning discussions, consisting of little more than affective messages. These students were very enthusiastic spectators, cheering from the sidelines and afterwards congratulating the team on good work, even if they did not expend much effort. Scott Johnson and his group (2002) suggested "Problems in the virtual teams came from a lack of willingness to participate, lack of planning, conflicting schedules, or individual disagreements. Most of these are social interaction issues" (p. 391). Not all our students were adverse to online group work

> When the peers are encouraged to work together, they better realise their collective potential.
>
> Creating a rubric as a team was quite fascinating. I created my rubric and I felt good to see my work joined with the work of others (E).
>
> We worked so hard with my teammates ... I call this team the A team because of the outstanding work we did (E).

Significantly, some of the accolades came from the very students that others complained about and in their reflective essays accused of withholding contribution. Many low-performing students had poor metacognition of their contribution.

Non-English speaking students can find it challenging to participate in fast-paced synchronous chats (Carr et al., 2004). Some students participated erratically in synchronous chats and some never mastered tool, in spite of clear online instructions. Some managed to log in but did not respond when other participants repeatedly encouraged them to contribute. This adversely affected other students, as they suspected those students might be spying.

The learning needs of some of the read-only participants were met, even if they contributed minimally. Some thought that affective participation was sufficient. Diverse students understand their responsibility to the online community differently.

6.3 Virtual Community

6.3.1 Voluntary Participation

After exploring many factors that influence successful course outcomes, we investigated the role of the virtual community on learning and the effect of non-participation on the community. According to Collison (2000), students in a healthy online community support their community. Their concern became evident when they contributed without expecting rewards. After concluding the course, we e-mailed a request for feedback to clarify some outstanding issues. We assumed that voluntary responses would indicate prolonged involvement in their community. In figure 1e, we display the results of the replies. As expected, the students who did not successfully complete the course nearly unanimously ignored the request. The difference between the average students and the distinction candidates was both interesting and highly significant.

Figure 1 shows that the successful students were not only most active online but were also the most involved in the virtual community, contributing more posts, replying to a larger percentage of fellow-student posts, displaying collaborative behaviour and readily providing voluntary feedback.

6.3.2 An Integrated Community

A core of students represented a high functioning, healthy online community (Collison et al., 2000). The ethnography showed the concern and support that existed in this community, with students informing peers of imminent absence from discussions. Reasons for absence were often work-related,– teachers attending conferences or school tours, for example. Students were also willing to be vulnerable (Barab, Thomas, & Merrill, 2001) and shared personal circumstances like serious illness, road accidents, and death among close associates. By extending support, close affective bonds and camaraderie developed. This resembled Barab's (2001, p. 105) community where "students readily shared their feelings, critically examined course issues, extended their support in helping peers". Our community was not inclusive. At its core students participated often and at the periphery individuals participated less.

6.3.3 Facilitator Support

Some of the less-connected students communicated with the facilitator by e-mail, telephone and short text messages. The distributed rural student with the intermittent electricity supply reported these by short text message or telephone and thus negotiated deadlines. A few communicated to the facilitator personal circumstances that precluded class participation. We accommodated them by allowing them to work separately. Their interaction with the facilitator possibly contributed to their success (King, 2002).

Other low-participation students used ordinary e-mail for communicating with the facilitator or for submitting assignments, thereby indicating that their lack of communication and participation was not caused by poor connectivity, but by poor LMS attendance. E-mails consisted mostly of excuses for missing deadlines, but we were often unable to respond due to overflowing mailboxes. The reasons for this poor participation remain obscure, as they did not return telephone calls or e-mails, nor did they reply to discussion postings. These poorly connected students seldom made valuable contributions, as they frequently missed important instructions. Online support went unheeded. They did not improve their work and did not integrate into the online community of learners. Many of these *invisible* students had poor completion rates and grades.

No amount of online coaching will improve the learning experience for unconnected students. They illustrate Bernard's (2004) finding that frame of mind and previous performance are the best indicators of online learning success.

7. CONCLUSIONS

We present evidence that in a predominantly participative class, the number of times students access the course, the number of contributions to the discussion, the ratio of replies to others' posts, and integration into the learning community, all significantly relate to successful course completion. These metrics, however, have poor individual predictive value because of the great diversity of students in the cohort.

Low online visibility and participation can take many forms, with students assuming different roles:

- read-only participants, merely skimming, or deliberately harvesting much of value from others' discussions
- highly visible without contributing much of value
- poorly visible due to poor connectivity or high costs, although some manage their login time effectively and gain maximum benefit
- absent due to other reasons, but interacting with the facilitator and staying on track
- absent and non-reading, non-participating for undisclosed reasons, not sharing the benefits of the virtual learning community.

Only students who contributed to the class or interacted with the facilitator completed the course successfully. Our calculations confirm that students who are at risk of not completing a course contribute less and of poorer quality, reflecting less interaction with fellow students and the facilitator. Because of low frequency logins, these students miss out on crucial support needed for success (Davies & Graff, 2005).

Also in professional list servers, people lurk, using content or ideas from a discussion contributing nothing in return (Klemm, 1998). While read-only-participants learn from others without visibly participating or adding value to the discussion (Beaudoin, 2002), the dynamics in an online community of learners depend strongly on diverse contributions from all its members. It is necessary that students post often and care for the community (Collison et al., 2000). In an online community, students spontaneously moderate the discussions and give cognitive feedback, allowing novice members to grow into full participation. Non-participating students relinquish coaching, feedback and support from the facilitator and peers, as the affective dynamics in the community precludes non-participating members. We caution against Beaudoin's permissiveness towards lurkers. It is not in the interest of the community if a large number of the class are read-only participants. This also deters the isolated student.

To avoid read-only-participation, we endorse Klemm's (1998) suggestions, and further suggest a facilitator should

- communicate the required login frequency clearly

- encourage the submission of high quality thoughtful postings, and grade them accordingly
- grade all discussions initially and give formative feedback, in private if necessary
- grade individual contributions to group projects, and do not give the same grade for all
- rotate members of groups, so students are not stuck with non-participating members
- convey important information also with internet-independent media like mobile technology.

The problem of poorly performing and course-abandoning online students is complex. Students who did not contribute did not become part of the community and did not benefit from facilitation, tutoring or peer feedback. The other students reacted to this behaviour. We foresee that a large number of lurking students in an online class can prevent the formation of a virtual community of learners and compromise everyone's education.

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Synopsis, Conclusions and Recommendations

1. INTRODUCTION

Although the reader could examine each of the articles separately, I presented them in the order of completion, as this represents the development of the main research question. This thread begins with the questions sprouting from the historical context and then weaves through each design intervention, each addressing new questions relating to the academic puzzle. The last article, Read-only Participants: a Case for Student Communication in Online Classes, completes the loop by investigating the juxtaposed position, namely what is the implication of students *not* participating in an online class.

Throughout the thesis, the participation of the facilitator and the students were in a dynamic balance. The debates about facilitator presence and student participation tie up with this equilibrium. Theoretically, the facilitator role changes from initially providing momentum to providing scaffolding and cognitive support, with eventual judicious fading. Excessive dominance, inflexibility and non-participation in the complex facilitator role cause disintegration of learning communities. As Khalil (2006) reported that black African students are reluctant to request help, it was decided that in the local context, the facilitator had to contribute support in an unobtrusive transparent way.

Initially course design and facilitators should encourage student participation. Therefore, the design contained various compulsory interactive components to provide participation momentum. The facilitator deliberately followed a non-prominent and non-interfering role to encourage student initiative. The facilitator guarded the sidelines, and watched all online activities closely, ready to intervene at any time.

Student roles change from initially being uninvolved, to becoming more appreciative of peer contributions. When students take ownership of their collective learning by spontaneous moderating and affective support, they grow into a well-functioning online community, resulting in successful course completion. Therefore, the tools and strategies

in this course aimed at maximising student participation and fostering the online community.

Table 1 summarises the characteristics that indicate high quality participation and lead to the formation of a virtual community of learners. As the instructional design aspects of this course are beyond the scope of this thesis, the course characteristics that promote and indicate a community are not comprehensive. I fostered these characteristics as strategies to promote the formation of the community, otherwise, their spontaneous occurrence in the community indicated the existence of the community. The predetermined course structure and the facilitator role aligned with the strategy to improve participation. The intention of the soccer tournament metaphor was to elucidate the course structure and the unfamiliar facilitator role (Ortony, 1975) and stimulate participation (Boud et al., 1999). Jane, the virtual student, modelled her participation on the defined facilitator role (Coppola et al., 2002) and the student activities of a virtual community (Collison et al., 2000). Research would reveal how well these tactics succeeded and how it influenced the student community. The research question then investigated the emergence of this community as the result of the combined strategies.

Table 1: Characteristics of High Participating Communities

Dimension	Characteristics promoted by the Strategies
Course	peer critique and assessment
	collaborative decisions on course organization
	student contribution to assessment criteria
	group work
Facilitator	organization
	teaching presence
	affective presence
	scaffolding and judiciously stepping back
Student participation and community	frequent postings
	quality postings
	cognitive presence
	affective presence
	supporting and helping each other
	taking ownership

I investigated the effect of the combined tools and tactics, as they all contributed to the learning experience, focusing mainly on the student participation aspect. In the next section, I present a synopsis of the articles' outcomes. Then I discuss how the collective findings address the primary research question.

2. SUMMARY AND DISCUSSION OF THE MAIN FINDINGS FROM THE ARTICLES

2.1 Reviewing Metaphors for Online Learning

The contribution of the literature review was to find a working definition and description for metaphor applicable to designing online learning interventions. To uncover the central issues required a comprehensive and systematic literature search. Suitable metaphors represent concepts and transfer meaning from well-known or concrete vehicles to new or abstract topics. A gold-standard test for a good metaphor is whether it adheres to one of the three basic hypotheses of inexpressibility, compactness and vividness (Ortony 1975).

The metaphors used in online learning are not always successful, due to limited application of the functions and affordances of metaphor in the online environment. Some of the metaphors could ease students' transition to the online environment and support dynamic interactive learning.

Next, I show how using a soccer tournament metaphor fitted the suggested prerequisites.

2.2 Using a Soccer Tournament Metaphor in a Distributed Course on Online Learning

In this study, I challenged the premise that metaphors are only used for content delivery. The intended use of metaphor was to assist students in engaging with online tools and activities, as interaction was a high priority. The soccer tournament metaphor helped students become familiar with the online learning environment and guided them to interact with the course material, their peers, and the online facilitator. One student described the course as follows:

> *A virtual learning community should have:*
> 1. *The precise quantity and quality players … aha ... students!*
> 2. *A ball … nicely shaped curriculum!*
> 3. *Definitely a coach … please let us learn while you facilitate!*
> 4. *The ref … the watchdog … hope this one's not missing in this game … on the other hand the more the merrier!*
> 5. *Rules … there should be no confusion!*

This metaphor elucidated the context and promoted engagement with online resources and peers. The students also appropriated the metaphor and created a motivating and amiable atmosphere where they successfully met the course challenges.

Students chose to describe important or emotional topics through the extended soccer metaphor rather than literal language (Fainsilber & Ortony, 1987). I distinguished four themes of topics clad in metaphor: peer learning and collaboration, hidden and sensitive agendas, online facilitation and student-centred learning. The themes are in agreement with the literature on constructivist online learning.

2.2.1 Peer Learning and Collaboration

The topics students frequently used metaphors for were peer learning and collaboration. They used the metaphor to address or describe peers as *teammates, a the speedy right wing,* or *opponents*, or recount problems working with them in a vivid and compact way. The metaphor also allowed students to express sensitive issues, reprimand each other and the online facilitator without harming the online learning community. Metaphor provided students a vehicle to address challenges. *These smileys are the only thing that has kept me sane for the last 6 weeks.* Through the soccer tournament metaphor, an active online collaborative community of students emerged, respecting individual contributions (Panitz, 1996). Students also used the metaphor in informal social communication that supported community building (Baker, 2004; Burgos et al., 2005; Frankola, 2001; Kollock & Smith, 1999).

2.2.2 Hidden and Sensitive Agendas

Students used metaphors for successes, failures, challenges, frustrations with technical issues, time-constraints and soliciting help. These are often sensitive issues for adult students, and they used metaphors like *seriously injured player* and *on the bench* to soften the blows of failure and to communicate emotions. Hoxsey (Hoxsey, 2004) showed that human presence and personality transform empty spaces. Metaphor served to humanise the impersonal online environment by allowing richer, more expressive communication.

2.2.3 Online Facilitation

The metaphors used to describe facilitation represented practically the whole spectrum of metaphor functions and illustrated the importance of the facilitator in online learning. Students relied on scaffolding and guidance, and consistently portrayed the facilitator as *coach, trainer* or *referee*, consistent with the recommended role as the *guide on the side* (Baker, 2004; Mazzolini & Maddison, 2003).

2.2.4 Student-centred Learning

The students often used metaphors of *rules, blowing whistles* and *yellow cards* to portray online structure, deadlines, submission formats and orderly communication. Although these extended metaphors often involved humour, they contributed to the good order, conduct and discipline in online discussions. The students guarded the *rules* and applied them to address challenging peers. In a student-centred pedagogy, students assume ownership by sharing authority and the responsibility for their own and their peers' learning (Panitz, 1996).

This study emphasised the importance of selecting metaphors that serve the intricate communication needs of a diverse cohort of online students. Metaphors proved indispensable in the interaction between students for both social and content-related learning-enhancing communication.

2.3 Methical Jane: Perspectives of an Undisclosed Virtual Student

I described how the students experienced Jane, the virtual student we created as a tool to improve participation. The course facilitator played the role of Jane, posing as a student. The subsequent article describes her origins, functions and secondary facilitator role. We carefully concealed Jane's real identity from the class until well after the course. After exposing the guise, I asked students how they felt about her fictitious identity. Although students initially felt deceived, Jane's positive contributions to the course compensated for the trickery. The students identified with Jane. Her credible facade allowed the community to accept her. The study confirmed our success in creating a convincing virtual student, but this success increased the ensuing shock, disbelief and dismay. No student

objected about a virtual student *per se*, but some felt betrayed because we masked her *real identity*.

Although a virtual student did not save time or effort, and added considerably to the instructor workload, our mythical student-facilitator made unique contributions to the online class. As part of the scaffolding, Jane coached and redirected students in an unobtrusive way, helping them cope with the demands of online learning. She monitored the student workload and emerging problems and contributed timely alternatives. Jane curtailed the dominance of the online facilitator without sacrificing student support.

The ethical issues concerning the deception were important, as the literature discourages any form of deception in research (Merriam, 1998). This was a unique opportunity for "garfinkling" or setting up circumstances to observe and gather data on the phenomenon of virtually living with online students. Such data is not available in regular online classrooms (Boeree, 1998). I also showed that, even in the absence of contact lessons, an outsider could integrate successfully with a learning community. Jane was an indicator of the caring virtual learning community and provided insight into the citizenship of this community.

2.4 Facilitating an Online Distributed Course: Virtual Jane, not an Ordinary Student

Jane's main function was to act as second facilitator. As online facilitator she had to organise, coach, and contribute affectively to discussions (Blignaut & Trollip, 2003). As student she contributed expertise, collaboration, leadership and concern (C. S. Johnson, 2001). She also facilitated learning, moderated the discussion, gave intellectual feedback and supported organization, helped and encouraged peers (Collison et al., 2000). Jane fitted inconspicuously into this class and evolved as the course demanded from her.

Jane assumed some of the facilitator's cognitive and affective responsibilities by looking after and supporting co-students. She assisted students technically and, owing to her contribution, some students who almost abandoned the course, persisted to the end. Jane modelled exemplary online student behaviour, promoted online dialogue, encouraged participation, provided additional support, and promoted a mutually supportive climate.

Online students construct their on-line personae through postings (Ruhleder, 2002). Jane built her own credible online identity through high quality postings, as "reputation is enhanced by posting intelligent and interesting comments" (Donath, 1999, p. 3). Jane also contributed to the formation of a virtual learning community by helping and coaching others, as they moved from the periphery to the centre (Collins et al., 1991). Some students credited Jane for contributing to their learning:

> All persons that contributed to the course in any way either encouraged or motivated me to participate as fully as I could. Jane was one of the persons that contributed and assisted in a believably authentic way and as such I learnt from her just as I did from the other students that participated meaningfully.

We investigated King's suggestions in a broader context than discussed in this thesis. Prof. Seugnet Blignaut, who must take credit for conceptualising virtual Jane, also compared the facilitating roles and voices of the real facilitator with Jane as it was necessary to round off the study. Being the facilitator myself, someone else had to investigate that perspective. Prof. Blignaut will present her findings as *Cousins Virtual Jane and Virtual Joe, Exceptional Students*, (Blignaut & Nagel, 2007) asking the question: What was virtual Jane's contribution to the facilitation of an asynchronous online course? She recommends:

> This type of research should be repeated when a team of real tutors and facilitators are available to support the main facilitator. Also, as Reeves (2005) and King (2002) have pointed out, real students react positively to virtual support in spite of the fact that they know that the support is a web-based tool and not a real person (Blignaut & Nagel, 2007).

2.5 Read-only Participants: a Case for Student Communication in Online Classes

While the previous articles explored strategies encouraging students to participate online, this article juxtaposes what the effect is when students do *not* participate. Like Beaudoin (2002), I tracked our "invisible" students to pinpoint reasons and the effects of their invisibility. Evidence indicated that in a predominantly participative class, the number of logins, discussion posts, the ratio of replies to others' posts, all significantly ($p>0.001$) relate to successful course completion. These metrics, however, have poor individual predictive value due to the student diversity.

Low online visibility and participation took many forms, with students as

- read-only participants, merely skimming, or deliberately harvesting much of value from others' discussions
- highly visible without contributing much of value

- poorly visible due to poor connectivity or high costs, but managing their login time effectively, and gaining maximum benefit
- absent due to other reasons, but interacting with the facilitator and staying on track
- absent and non-reading, non-participating for undisclosed reasons, not sharing the benefits of the virtual learning community.

Students who contributed to the class or interacted with the facilitator completed the course successfully. Descriptive statistics confirm that students at risk of course non-completion contributed less and of lower quality and interacted less with fellow students and the facilitator. Students noticed this and remarked: "Some learners easily share and are spontaneous, while others hold back."

The problem of poorly performing and course-abandoning online students is complex. Some do not log in often enough. Others log in regularly, but are read-only-participants, do not contribute much of value for the rest of the group, and do not become part of the community. Some students log in inconsistently, participate without conviction and contribute sub-standard work, and due to poor attendance, do not benefit from facilitation, tutoring or peer feedback. Due to poor interaction, they do not join the virtual community, further compromising their learning. The other students experienced this behaviour negatively. I therefore caution against Beaudoin's permissiveness towards lurkers, as it is not in the interest of the community if a large portion of the class are read-only participants. Many read-only participating students in online classes hinder the formation of a virtual community of learners and compromise learning.

In the next section, the findings from the separate articles converge to answer the prime research question.

3. ADDRESSING THE PRIME RESEARCH QUESTION

The above pieces of the academic puzzle also fit together serving as evidence to address the prime question. They substantiate the underlying thesis that online participation contributes to the emergence of a virtual learning community and to learning success.

The framework for this puzzle consisted of literature and theory, drawing together the diverse findings. Theories from opposite ends often seemed to contradict each other, as debates about facilitator and student participation were inconclusive. Filling the gaps in the picture with understandings gleaned from the investigation, added perspective to the prime research question:

how do the dynamics of participation in online classes influence learning?

Conclusions on the findings in the separate articles elucidate the main question, as they contribute to the dynamics.

3.1 Course Structure, Content and Technology

A clear and consistent course structure is one of three factors contributing significantly to the success of online courses (Swan et al., 2000), representing one of the dynamics in the study. As the content of the course was current, it presented students with fresh challenges and they had to exert themselves to meet the course outcomes. This approach kept students interested and engaged. As the course was highly contextualised, the learning content merged with the technology enabling online learning and integrated with their daily learning experience.

The technological component of the course was likewise challenging, further aggravated by the mode of delivery. Scaffolding and online tutorials supported students. The chosen metaphor had to ease students' understanding and interaction with the technology, and the metaphor contributed to the online scaffolding. The online facilitator and particularly the virtual student provided further online coaching to students who requested assistance on technical challenges.

The metaphor aimed to inspire the black students, levelling the playing field, but did not address other challenging issues such as inadequate computer literacy, insufficient access to infrastructure, and limited ESL skills (not discussed in the thesis) that all seemed to influence their participation. However, regardless of these challenges, some students developed coping strategies and successfully completed the course. The digital divide represented inadequate connectivity and attitude towards online technology. Although the

divide curtailed student participation, it did not account for all failures, as factors like motivation or cultural issues might have influenced participation too. Even a culturally appropriate metaphor was not a magic wand to remove all underlying cultural restrictions to learning.

3.2 Facilitation

The dynamics of interaction between facilitator and students significantly influence course outcomes (Swan et al., 2000). There is no consensus on whether more facilitation is better. "The current model of e-learning sets student needs and instructor workload in opposition - online students need interaction with their instructors far more than their face-to-face counterparts" (Smith & Taveras, 2005). This dilemma is universal, as the expectations of online course administrators meet reasonable faculty participation (Blignaut & Trollip, 2005). This debate is far from over, as the introduction of technology to learning still increases faculty workload. Reporting progress on the use of digital agents is beyond the scope of this discussion. Using a virtual student played by the facilitator provided new facets of student support and contributed to the dynamics of student-student and facilitator-student interaction.

3.2.1 Virtual Jane as Facilitator

Many findings confirmed previous research, sometimes from unexpected quarters. Students illustrated and confirmed the importance of facilitator contributions to the course in their use of metaphor and in their interactions with Virtual Jane. The virtual student quantitatively diminished the facilitator's visible dominance in the course, arguably to lessen students' reliance on the facilitator. Limiting the facilitator visibility, as literature suggests, had questionable benefit, as disguising the facilitator as a virtual student increased the instructor workload. The real value of the virtual student was not in lessening the facilitator's dominance or increasing the quantity of student contributions, but in the nature and quality of dynamic support.

Because the facilitator communicated when requested and only when other students did not intervene first, the nature of the task dictated the timing and quantity of facilitator contributions. The requirement and subsequent provision of facilitation varied according

to the difficulty of activities. The quality and timeliness of facilitation contributed to student success, confirming that preconceived quotas of facilitator visibility, if deficient, can be detrimental to learning.

Concealing the facilitator behind the identity of a peer encouraged many reluctant students to contribute to online discussions and to support each other. Jane as second facilitator purposefully coached individual students until they mastered requisite skills. Students on the verge of abandoning the course persevered to the end due to online coaching by Jane and other helpful students. This contributed to a much improved success rate compared to previous courses, confirming that a virtual student contributed to successful online learning.

Authoritarian leadership in classrooms is not conducive to online learning. According to McClure (1998), groups should interact freely without instructor involvement. To counter instructor dominance, Virtual Jane provided leadership and facilitation from the non-authoritarian position as a co-student. She had a profile similar to the students and did not side with the class elite. Jane contributed to the democratic student-centered learning environment, where students self-organised, revered the rules and cared for their community. Jane's presence was a barometer of the strength of this community, as students' involvement with the community was evident from their behaviour towards Jane.

The dynamics between facilitator and student depend on the quality of facilitation as well as students' responsiveness to the facilitator.

3.2.2 Metaphor and Facilitation

Previous online courses were very stressful. Literature suggested that more attention to structure and organization could avoid the excessive stress in the previous online courses. Students used the extended soccer metaphor for issues that were emotional, hard or inappropriate to address with literal language, and so indicated stressful situations. Students' use of metaphor also pointed to the importance of order and organization in the online classroom, consistent with a facilitator's organizational role (Blignaut & Trollip, 2003). In order to counteract anticipated stress, I provided ample structure, overt and

covert facilitation and support. In spite of all those provisions, students still complained that they experienced stress and spent too much time completing assignments.

Constructivism was the one aspect inherited from previous courses that I did not challenge. Kirschner (2006) claims that constructivism and unguided instruction do not work, and students learn best from worked examples. I did not provide this scaffold. It is therefore possible that the constructivist nature of the course contributed to the stress. Concerning the unsuccessful students, I believe that more scaffolding equivalent to worked examples would have made no difference to the pass rate, as the instruction and scaffolding that I provided missed its purpose while these students were offline. If constructivism is indeed the source of excessive stress, more research should shed some light.

In conclusion, more facilitation is not necessarily better, or even plausible, but not enough is seriously detrimental. Particularly in a constructivist leaning environment, the timeliness and quality of facilitation is a key dynamic.

3.3 Student Participation

3.3.1 Tools to Stimulate Participation

Historically students are passive, conditioned by classroom teaching (Klemm, 1998). King (2002) used Joe Bags to start discussions and Salmon (2003) enticed students with social chitchat to begin posting online. Due to diverse cultural backgrounds and historical disadvantages, many local students are less spontaneous class participants in unfamiliar settings (Khalil, 2006) such as online classes. To counter this disadvantage, the soccer tournament metaphor specifically addressed the black students' culture and aimed to familiarise them with the interactive nature of the course. It was therefore heartening how readily this cohort adapted to the online environment.

The other tool poised to stimulate participation was Jane, the virtual students designed to represent the general student profile. Virtual Jane was ready to initiate conversation. Surprisingly, the students did not wait for Jane, but picked up the challenge and ran with the ball. The explanation lies in the course structure and the way the soccer metaphor implicitly suggested, encouraged and supported participation and collaboration.

Quantitative measures like logins and numbers of discussion posts differed significantly ($p>0.001$) between failing and successful students, with the most frequent interactions seen among the best performers. The dynamic of participation between students includes quantitative dimensions.

3.3.2 Quality Participation

Although according to Collison (2000), students in a virtual community post often, the quantity of student participation is not the only factor in building community. Quality counts. Jane modelled and promoted collaboration and quality participation, and contributed to high quality participation as member of the virtual community.

I challenged the educational use of metaphor to either explain cognitively or to enliven and entertain, and showed that metaphor could enable and enhance all aspects of online communication. Metaphor contributed directly to quality online communication and consequently to learning success. It was surprising to unravel the hidden meaning of student posts clad in metaphor. Uncovering the depth and quality of student communication was a gratifying exploration. I discovered that underneath the outwardly light-hearted banter were real concerns and emotions clad in metaphor. It is of prime importance to provide students with a suitable metaphor that enables rich quality online expression, as this dynamic has an often-neglected qualitative dimension that contributes to learning.

3.3.3 Formation of a Virtual Community

Many findings in the study were consistent with the leading literature, and confirmed extant theories. It was nevertheless gratifying to uncover and observe the characteristics of a healthy online community (Collison et al., 2000) in this online class.

The importance of peer interaction was evident in the use of the extended soccer tournament metaphor. Students used the metaphor more often for peers than for other topics (Nagel et al., 2007e). Their abundant use of metaphor for the rules of the classroom shows that they took ownership of their course and used rules as a strategy to cope publicly with problematic peers. Content analysis of the non-public documents also highlighted the

underlying conflict with read-only participants (Nagel et al., 2007c). Students complained about group work and insufficient participation. Bangert (2004) indicated similar discontent with non-contributing members of groups. This seems like an unresolved problem in online classes.

The online community showed how vulnerable real online students were when sharing their feelings (Barab et al., 2001) This was evident in their use of metaphors for sensitive issues in online discussions (Nagel et al., 2007e). Online banter, as postulated above, was often a metaphor to disguise underlying stress and discontent. Personal circumstances were often in opposition to the responsibility they assumed for the community. The community was also open and willing to share their private lives when it affected their participation in the community (Nagel et al., 2007c). Stating the reasons for imminent online absence was analogous to obtaining permission from the community. Sometimes metaphor eased disclosure.

An interesting observation was the virtual absence of irrelevant private anecdotes, even though rules of the Open Discussion topic allowed it (addendum 22). The community had its foundations in a common purpose and respect for individual expertise and contributions, echoing a collaborative learning community (Panitz, 1996). The findings do not support the necessity of initial trivial social exchange before the emergence of a virtual learning community (Salmon, 2003).

Students communicating with peers about the learning content represent interaction with the learning content and with others. The learning community benefits students in two ways. The more students in a learning community communicate with others, be they peers or facilitator, the better they understand and master the course content. The contrary position is also true. Sustained cognitive interaction with others on the learning topic builds the trusting foundation for a community. Findings gleaned about Jane and read-only participants show that quality cognitive contributions, responsibility, respect and care for the community promote and indicate membership of the virtual community. Non-participators do not become members.

The dynamic of the online learning community is predominantly qualitative, and confirms its importance among interactions that promote learning.

3.4 Learning Success

Previous online courses had high non-completion rates. Altruism motivated online students in the Cybersurfiver course to provide affective support to others and helping them to complete the challenging course (Cronjé et al., 2006); but it still suffered high attrition.

For the majority of our class, their participation strategies had the desired effect, as the success rate was much better than in previous, similar courses. A typical comment in the essays was: "The course is by far the greatest learn-how to learn-challenge I have ever experienced". It was surprising that, in spite of all the strategies to increase participation, there were students who participated insufficiently.

I challenged Beaudoin's (2002) premise that read-only-participating students learn satisfactorily. Davies and Graff (2005) showed quantitatively that failing students were less interactive online than successful students. They could not indicate a difference in the activity of average and excellent students. We observed a highly significant difference in all indicators of online activity, quantitative and qualitative, between those groups. The high performers were also students who showed evidence of integration in the virtual learning community. I illustrate that the improved performance of the top-students relates to their integration in the learning community. Unsuccessful course completion strongly related to insufficient and poor quality online participation and non-integration into the virtual community. There is a real danger that formation of a virtual community can fail when there are significant numbers of non-participating students. These students therefore do not only compromise their own learning, but the learning of others. As they have a negative impact on the community, such behaviour should not be encouraged.

Davies and Graff (2005) found that students who achieved low grades interacted less than successful students, but they report no significant differences in activity between average and high-performing students. They did not observe or report the existence of a virtual community. I indicated significant differences in all dimensions of interaction among the three stratifications of student grades and illustrated the existence of community.

When students become a virtual community of learners, they interact freely with peers and they learn more than they did on their own. The more they voluntarily interact, the stronger the community becomes, improving learning still further, spiralling upwards. The unanswered question is: how does this learning community come into existence? From all the observations, I posit that free content-related interaction with co-learners, whether they be peer students or facilitator, starts this movement. When the students maintain sufficient momentum, the facilitator can fade, without harming the community. This upwardly mobile learning spiral continues as long as the learning challenge requires. Ultimately, the necessity for peer support becomes superfluous and students work independently.

Trying to facilitate or coach non-participating students was frustrating, as they did not respond to suggestions or corrections from the facilitator or from peer students. They also disrupt group work when they do not contribute their fair share. Students commented "Working together in the larger IAO 880 group contained all the important elements of cooperative learning, while I can't say the same about the smaller group projects" Dealing equitably with similar threats is one of the online facilitator's unmentioned challenges. One of the students afterwards suggested in a private e-mail that this course separated the corn from the chaff, as group work did not provide a free pass, as had happened before. A possible answer lies with Bernard's (2004) premise that motivation plays a role, but that previous study grades have the highest predictive value for success in online studies. No amount of facilitation or innovative tools can increase success for students who are unsuitable candidates. Online learning is a dimension that strongly depends on the interaction between the surrounding dimensions. Students suggested prior selection, as "this will also help to timely eliminate 'less competent' students." I suggest that suitability and motivation should inform the selection criteria for online studies.

The dynamics that influence learning always have qualitative dimensions, some also with quantitative extent. The debates in the literature mostly address the dynamics quantitatively and can portray an incomplete picture.

3.5 A Theory of Dynamics of Participation in an Online Community

A student's online activity grows and ebbs representing three phases, depending on the state of learning and expertise achieved. Encountering new content dominates the first

phase. According to the legitimate peripheral participation model, novices initially participate little, as they rather observe experts. Unsure students do not participate online when they think they do not have something valuable to contribute (Collison et al., 2000). Low participation levels often indicate low levels of expertise. When students do not progress towards full participation in the community, it indicates incomplete learning. The study of read-only participants showed that poor participation indicated insufficient learning.

The middle phase is characterised by abundant and high quality interaction, integration and dependence on the virtual community of learners, as shown in the use of metaphors and interaction with Jane. This stage seemingly accompanies learning activities in the middle order of Bloom's taxonomy. In the application phase of learning, students gain much from peer review and comparing their work with that of others. Improving upon their efforts cultivate expertise and confidence.

In the mature third phase of learning, online activity ebbs. Participation tapered off and students contributed fewer social posts towards the end of the course. At this stage students progressed towards higher-order learning activities as they engaged in evaluation and synthesis, indicating that cognition at this level is mainly a solitary activity.

The ease of tracking student activities on an LMS invites academic analysts to make inferences about student learning. Attempts to formulate "early warning systems" only based on logins, are a case in point (Campbell, 2006). One should interpret quantity of student online activity carefully, as it does not portray the quality of interaction, the cognitive learning levels, or personal circumstances. Student online participation is a dynamic process shaped by learning requirements and the community.

4. THE LIMITATIONS OF THE STUDY

This study had limitations; most of them anticipated, but some uncovered during the investigation. The following methodological delimitations were evident:

- Being a participant observer limited my objectivity as researcher, but does not negate the validity of the research (Atkinson & Coffey, 2003).

- One of the limitations of the study is that, both the article format of the thesis and the limited period for the research, prevented me from reporting all possible factors that shape participation or analysing the dataset comprehensively, as academics suggest (Strauss & Corbin, 1998). I did not report on how integrated online assessment influenced participation; therefore, this is a recommendation for further research.
- Literature studies in theses following the article format are less comprehensive (Louw & Fouché, 2002). I do not distinguish between author positions and empirically validated research in the literature survey, though I treated their contribution to the research accordingly.
- I did not perform member checks of the interpreted data, as advocated by Merriam (1998) and Hatch (2002). Others dispute the stipulation on epistemological grounds "when the philosophical idea of multiple realities has not been addressed" (Tobin & Begley, 2004, p. 392).
- As the population under investigation originated from culturally diverse backgrounds, I could not gather all the opinions and interactions that took place in the virtual environment.
- Physical communication and collaboration that took place *in situ* among students using the University's computer laboratories were sometimes evident in student postings and artefacts. Students generally did not declare such communication and some contributions bordered on plagiarism.
- I present the research as a study of one course, and any conclusions are only applicably to courses presented under similar circumstances, therefore broad transfer is not possible.

An interpretivist researcher does not manipulate the phenomenon, therefore hindsight shows where other possible observations are possible. It is not possible to capture every detail fully, therefore the researcher can only present the widest possible perspective, using a crystallised approach. Future researchers may take heed of the preactical limitations.

The context of the study contributed a number of limitations:

- The effect of the digital divide was evident in this class (Roycroft & Anantho, 2003). Not all students had sufficient access to computers and the internet.

- Not all participants responded to the post-course questions.
- We expected greater enthusiasm from the black students in using the soccer tournament metaphor.
- My whiteness is a limitation. Clark (2001) places economic benefits at the core of white privilege. Most students knew me well; therefore, I did not have an invisible online identity.
- This was my first experience of being an online course facilitator on this scale; therefore, I do not claim the expertise of more established practitioners.
- Like its predecessors, the course design is open for critical scrutiny and research.

The limitations uncovered during the investigation indicate possible areas for further inquiry, either by myself or other researchers.

5. RECOMMENDATIONS

5.1. Metaphors

The use of metaphors in online instruction is highly commended, as they support cognitive outcomes. In choosing metaphors, I also suggest that designers of online instruction should:

- have clear purposes for using a metaphor, taking into account the learning outcomes
- choose a metaphor that simplifies understanding and does not complicate learning (Lakoff & Johnson, 1980)
- know the target audience well enough to ensure that the metaphors are culturally suited, well understood, and popular.

5.2 A Virtual Student

There are separate recommendations relating to disclosure or non-disclosure of the virtual identity. Like King (2002), faculty can disclose the identity of the virtual student from the start, if analysis shows that authority does not inhibit student participation. This will ease ethical and technical constraints. Research will benefit from observing how students react

to such an interactive web-based tool. In order to manage the ethical aspects when planning to mimic this study, faculty should:

- obtain relevant permission and ethical clearance before inventing a virtual student
- allow external supervision and monitoring of the activities of an undisclosed virtual student
- not use a virtual student to spy on students or violate their trust and privacy
- not manipulate students deliberately.

Concealing the facilitator behind the identity of a peer can encourage reluctant students to contribute to online discussions. A virtual student can promote online dialogue, encourage student participation, provide additional support, model student online behaviour, and promote a mutually supportive climate.

Due to the increased workload, a single facilitator should not attempt to facilitate an online class of twenty or more students as well as playact the role of student. The virtual student can act as spokesperson for multiple anonymous course tutors, facilitators or moderators without contributing unfamiliar voices to the course. Teaching assistants and tutors can become part of the course and participate within smaller learning groups in large online classes, thus easing the facilitation. Consistent with constructivism, the facilitator can maintain a low profile, thereby encouraging students to support each other and establishing a virtual learning community.

I recommended that designers adapt the profile of a virtual student to blend in with their student community. Furthermore, they can emphasize some of the virtual student's characteristics to help address specific requirements in the course, integrate groups of students, stimulate participation, as some students more readily relate to peers than to the facilitator. Designers can also model a virtual student to display specific affective behaviour meeting the needs and showing concern and support for the online community.

5.3 Read-only Participation

To avoid read-only participation, I endorse Klemm's (1998) suggestions, and further suggest that a facilitator should

- Communicate the required login frequency
- Encourage the submission of high quality thoughtful postings, and grade them accordingly
- Grade all discussions initially and give formative feedback, in private if necessary
- Grade individual contributions to group projects, and do not give the same grade for all
- Rotate members of groups, so students are not stuck with non-participating members
- Convey important information also with internet-independent media like mobile technology.

5.4 Other Recommendations for Future Research

The five articles each contributed recommendations for implementation into learning situations, and for future research. The articles alone did not encompass all the conclusions gleaned from the study. Some conclusions contribute to the main research question, though even they do not address all facets of the main question. A couple of issues will require further research.

- Why is online learning so stressful? Does constructivist learning increase stress?
- How do online assessment strategies affect online participation and learning?
- How should faculty resolve the challenge of non-participating online students?

6. THE VALUE OF THE STUDY

In a quest to improve student persistence in a highly challenging online course, I identified student support as an important scaffold. Literature suggested two tools as mechanisms to support online participation: an explanatory metaphor and a virtual student acting as second facilitator.

Education abounds with metaphors to ease learning. There is a paucity of literature on how metaphors influence students' online participation. My literature review indicated the

characteristics and functions of metaphor that can make a useful contribution to online learning, particularly to guide online activities.

The literature indicated that metaphors should be culturally appropriate for students to understand them. The metaphor chosen for the course had to unite and inspire the diversified cohort. I did not anticipate that black students would be so unappreciative of a metaphor that deliberately reflected their cultural preferences. This finding raises more questions. We do not know how seriously language skills and other cultural phenomena influence ownership of a metaphor.

Although literature describes how designers use metaphor for online teaching, it is unknown how students would use metaphor for learning. Inductive analysis showed students most often used metaphor for co-students and problems with others. Thereafter they used it to address intricacies of technical assignments and managing their time. Metaphor also referred to the facilitator. Interpretation through the framework of metaphor functions indicated the importance and emotional underpinning of those issues in online learning, confirming from a different perspective the importance of participation with peers and the facilitator in online learning. Students also expanded the metaphors to inspire them. They disguised hardship by rendering the difficult aspects of online learning tolerable. Online students using metaphor for expressing emotional and sensitive issues is a new perspective that adds to our understanding of metaphor in online learning. This study indicates that online students use metaphor to address sensitive and unmentionable topics, and transform impersonal online communication to become more expressive and meaningful.

Online discussions are the heart of online learning, but require effort to initiate. King (2002) invented virtual Joe, a student cum facilitator, primarily to start and enliven online conversations. For Virtual Jane, our own virtual student, this was unnecessary, as the metaphor and design curtailed initial sluggishness in discussions. The quality rather than quantity of Jane's postings were exemplary. She found her niche in the course as one-on-one tutor. The arrangement reserved the facilitator's voice for a wider audience, preserving its salience. Jane illustrates a virtual student's adaptability to play unique online roles not possible for the facilitator. She expanded the repertoire of virtual student roles.

While Joe (King, 2002) was a *known* virtual student, the literature describes no other *undisclosed* virtual students. Initially the feasibility of masking the identity of such a student for the duration of a course was questionable. I report that Jane's masquerade was a resounding success. Students believed who she was. Jane's credibility then propelled the study towards deliberate disclosure of her identity. Nobody could predict students' reaction to the unmasking. This study shows that students did not object to having a virtual student in their class. They protested not knowing of the presence of such a student, or who played the student's part. This research opens the door to creating similar virtual students to ease unique challenges in online classes.

I also probed the ethical aspects of a hidden student identity. Likewise, the ethical concerns surrounding the disclosure of this identity were uncharted territory. Jane was truly a pioneer. This research breaks new ground on the manipulation of virtual online identities in education.

Through Jane, we discovered that it is possible for an unknown (outsider) student to integrate with a virtual community of learners. Though the literature abundantly describes the benefits and characteristics of a virtual learning community, it does not describe the dynamics of its formation in much detail. Many authors cite social interaction as a precursor to formation of community. Jane illustrated that the passport to membership of the online community is high quality participation, and not previous acquaintance. Low-participating students do not join the community.

Davies and Graff (2005) indicated a significant difference in online participation between students who failed and those who passed online courses. I confirmed the dissimilar participation between those groups. Davies and Graf did not observe the same effect between average students and those who achieved high grades, nor did they indicate the presence and effect of community formation. The high-performing students in my course participated significantly more than the average students ($p<0,001$), replied more to peers' posts, and integrated perceptibly with the caring and supportive community. This study shows how dynamic participation fosters formation of a virtual community of learners, and how belonging to this community benefits learning.

A functional virtual community develops over time. The student community in this course established itself after only a couple of weeks, due to carefully shaped conditions that included a deliberately low facilitator profile, without sacrificing student support. In the low authoritarian, student-centred environment, students voluntarily took over many of the facilitator's tasks. The research shows that the so-called "ideal" facilitator visibility benchmark of below 15% of posts (King, 2002) is not always feasible, as students request more support when the nature of the course changes from predominantly discursive to technical.

Not all the students participated sufficiently to share in the learning success. Researchers have a responsibility to investigate the unique learning dynamics of students from previously disadvantaged communities, and incorporate this understanding into teaching with technology. Our responsibility is to find ways to bridge the divide that impedes their participation and, as a result, their learning.

The success of the tools aimed at supporting online students and facilitating online interaction makes a dual contribution. They deserve inclusion in the toolkit for designing successful online courses in the researched Master's programme, and to similar comparable courses. Researching the tools also shed some new light on how students interact and learn in online courses. This research contributes to understanding how the dynamics between the role players in an online learning environment leads to the formation of a virtual learning community and successful learning.

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