WhatsApp in Social Networking,

MXit with BB Messaging:

Can social networking sites be used to enhance learning?

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Abstract

When literature is studied, findings regarding the value of using social networking in education ranges from its use being a waste of time and a distraction from academic goals to its use being empowering and inevitable. From these diverging opinions it is clear that social network sites (SNS) bring new challenges to the learning environment. This paper reports on a social media intervention intended to increase student engagement and also enhance learning in the Systems Analysis and Design (SAD) subject offered as part of an Information Technology course at a South African university. Two issues are paramount in SAD, namely the fact that the subject offers a large theoretical and practical component, subsequently raising uncertainty about the cognitive level of competencies assessed. Although the subject and course teaches technology and technology is already central to teaching and learning SAD, this is the first introduction of the use of social networks to the students in the class. Most students at the university come from deprived backgrounds; therefore the intervention was intended to explore affordable, available and accessible possibilities. Since SAD consists of two modules offered over two consecutive semesters, the intention was to prepare fertile ground during the first semester by removing obstacles and get buy-in to ensure that the parties involved can use SNS to support the second semester where the focus changes from theoretical ground work being laid, to students needing to apply the concepts learned in a group project. The purpose of the study was to examine the possibilities regarding the students' perceived overall satisfaction and learning in a SNS supported learning environment. Explanations about findings and recommendations for the application of SNS tools to promote learning during instructional design are discussed in the conclusion. Results focused on how SNS can be utilised during the second semester of the subject, as well as future first semester offerings.

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Introduction

The use of Computer Mediated Communication (CMC), i.e. email and text-based conferencing, particularly in asynchronous mode, has rapidly increased within higher education. This usage is also fuelled by a belief that CMC promotes engagement and productive discussion. Despite its potential benefits, the effectiveness of CMC when used to support learning in higher education is very variable, making it important to identify those factors which best predict successful implementations (Tolmie & Boyle, 2000). Social networking sites (SNS) are a subset of CMC.

How individuals develop friendships and other forms of relationships using SNS has long been an area of study within the communication studies and psychology discipline (Boyd & Ellison, 2007; Bryant, Sanders-Jackson, Smallwood, 2006; DeAndrea, Ellison, LaRose, Steinfield & Fiore, 2012). However, little is known about how much, why, and how individuals use these sites for educational purposes (Pempek, Yermolayeva & Calvert, 2009). This is supported by Vrocharidou and Efthymiou (2012) confirming that despite the growing interest for the social uses of SNS, there is a lack of empirical research focused on the educational uses of SNS. Limited research is available about how adolescents and young adults interact on SNS.

The challenge in education is not the mere use of social media, but the integration of technology into the teaching and learning process to promote constructive engagement of students in the learning process. It is also important to consider the real reasons for using social media for learning in the first place; it should in some way extend or enhance the learning experience, or make the learning more accessible to students.

This study, therefore, has the aim of examining how student perceptions of collaborative learning, social presence, and level of learning are related, as well as identifying critical factors affecting the different levels of students' learning, as stated in the following research questions:

- What levels of thinking, using Bloom's Taxonomy, can be exhibited when using SNS?
- How can SNS be integrated with existing technology structures used in a SAD course?

This study is motivated by social constructivism, which is based on the idea that an individual person constructs his or her knowledge through the process of negotiating meanings with others. According to Ellison, Steinfield and Lampe (2007), social constructivism enhances social capital, which broadly refers to social resources that people accrue through their relationships with others. Instructional models based on the social constructivist stresses the need for collaboration among students

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(McMahon, 1997). An additional impetus for introducing SNS is the fact that media use provides an important backdrop for the social, emotional, and cognitive development of students, accounting for a large portion of their time (Roberts, Foehr, & Rideout, 2005). Research by Timmis (2012) support this, finding that students use SNS to give peer support, helping one another to become self-sustaining in their studies even though they will not necessarily exchange study material.

In the next section, the research gaps in the use of SNS in instructional design are highlighted. The paper then describes the teaching strategy, the context of its deployment, and the methods used in the study.

Review of Computer Mediated Communication

The Internet enabled the creation of social space and students make use of this social space by using computer mediated communication (CMC) applications, i.e. e-mail, instant messaging and social network sites, in order to satisfy social as well as academic needs. Social network sites constitute an integral part of daily communication practices for many students and the usage has increased significantly over the past few years. While there is general consensus that CMC tools can be used in the learning environment, there is a need to understand students' perceptions about the social and academic utility of their most preferred communication technologies better. It is important to develop pedagogically sound strategies in order to maximise learning. In addition to this, we need to overcome the cultural differences as well as differences in technological literacy, often related to socio-economic status.

Boyd and Ellison (2007) define SNS as Web-based services that allow individuals to construct a public or semi-public profile within a bounded system, articulate a list of other users with whom they share a connection, and view and traverse their list of connections and those made by others within the system.

Mobile Technology

In the case of the Vaal Triangle Campus of the North-West University with its 6000 students, 1780 (30%) students cannot afford tuition and rely on financial support from the state. Few students can afford laptops, but more than 95% have cell phones.

Social media can be accessed through a variety of devices, one being mobile technology. As the use of mobile technology forms an integral part of the study the next section focuses on mobile devices and their distinctive features. New developments in mobile technology and specifically the state of affairs in developing communities are highlighted.

According to the Oxford English Dictionary (2010), the word mobile as an adjective is "*capable of or characterised by movement; movable, not fixed or stationary*". A device is a noun and thought of as an appliance or apparatus, called a gadget when thinking of a small device; but has various meanings, among others the most interesting and applicable in the context of telephones: "*familiar conversation, talk, chat*", which originated from the French language. As a subset of digital technology; it is a computing device that is lightweight, portable and small enough to be hand-held. Feature phones, smartphones, personal digital assistants (PDA) and tablets are the

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most common categories for mobile devices.

The Oxford English Dictionary (2010), defines phone as a noun being "*a telephone apparatus; a telephone receiver or handset*", but also defines it as "*a speech sound, the smallest unit of sound in speech that can be distinguished from any other such unit*".

Cellular (or cell) as an adjective is defined by the Oxford English Dictionary (2010) as relating to a mobile radio-telephone system in which the area served is subdivided into 'cells' "*... each with one or more of its own short-range transmitter/receiver towers linked to an automated switching center*".

A mobile phone is therefore also known as a cellular or cell phone and a cell phone is a mobile device that can make and receive telephone calls over a wide geographic area. The use of multiple cells allows the same radio frequency to be used for different callers in different parts of the area simultaneously and the capacity of the system is thereby increased.

In addition to making phone calls, these devices can also:

- send text messages through short messaging services (SMS),
- provide a multimedia messaging service (MMS),
- send email,
- provide Internet access,
- allow short-range wireless communication like Bluetooth,
- run various applications,
- supply gaming opportunities,
- provide photographic capabilities,
- play music, and
- provide storage space.

Tullip (2012) distinguishes between smartphones as high-end devices and feature phones being low-end devices, but there is no official definition to distinguish the two categories, except price being an order of magnitude difference. Originally, smartphones meant mobile phones with more characteristics or features than "dumb" mobile phones; but these categories are not mutually exclusive.

A Smartphone is described by the Oxford English Dictionary (2010) as a noun being "*any of various telephones enhanced with computer technology*", it is "*a type of mobile phone which incorporates the functions of a palmtop computer or PDA*".

SNS use mobile messenger applications that run across platforms and use the existing Internet data of the mobile device, therefore incurring very little cost. This is opposed to short messaging services (SMS), an older messenger application with limited functionality and high cost when compared to SNS. Mobile technology has taken SMS to another level with the provision of free SNS tools such as WhatsApp and BlackBerry Messenger (BBM). The emergence of social media has created opportunities to establish peer-support networks outside the classroom and without

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constraints of geographical dispersion. Although research supports the notion that social media can be utilized to develop student-to-student and student-to-instructor connections; during instruction, the pattern still often takes the form of questions to, and responses from lecturers (Wilson & Whitelock, 1998; Rada, 1998; Trushell, Reymond & Burrell, 1998), hardly an improvement on traditional face-to-face instruction. Without an integrated strategy the use of SNS during instruction can still be unplanned and random interactions that do not contribute to constructive learning. To avoid much wasted effort, it is important to identify the pedagogic principles that determine successful implementation.

Several potential advantages of the use of SNS in learning have been identified. The biggest advantage is factors that normally hinder collaboration and group work are minimized when using this technology. Irrespective of geographical distances, students are able to interact with their instructors and classmates, both synchronous and asynchronous. Berkenkotter (1997) found that the use of technology for social needs does lead to more participation and removal of gender biased stereotyping. He reports of one instance that "*instead the electronic forum served as an open space for plethora of conversational topics introduced by students.... brought forth many voices and many student issues, feelings, and agendas that would have never surfaced in classroom talk*".

Disadvantages of online discussions emerged through other studies. A study by Anderson and Kanuka (1997) reported some participants found the limited social interaction and negotiated meaning of the online learning environment less satisfying than the face-to-face format. Dozier (2001) found a lack of flow in dialogue and absence of nonverbal communication such as facial expressions and gestures that occur in face-to-face contact, limited the strength of discussions. Romeo (2001) found that some students were intimidated by having to put their thoughts in writing. Encouraging research (Timmis, 2012) reports on finding students using emoticons, like :D or 😄 to show emotion and back-channelling, small verbalisations like lol or yea that maintains conversational flow and demonstrate understanding – to enable them to build rapport and establish common ground.

Research conducted by Ellison, Steinfield and Lampe (2007) revealed that most students preferred to use SNS for social, informal, peer-to-peer discussions rather than for formal communication with instructors. Teclehaimanot and Hickman (2011) found that students in general and female students in particular do not find active behaviour from instructors appropriate on Facebook. Active behaviour is represented by communication, while passive behaviour would be looking at a profile. From the above it is clear that the use of SNS varies and one therefore can conclude that unless it is integrated as part of a teaching strategy, little educational benefit is bound to take place. Also, it appears that SNS can possibly work better in certain learning situations than others.

Mobile technological developments in developing communities

Heeks (2009) defines the bottom billion as the fourth world who lives in sub-Saharan Africa and Central Asia. They are poorer in 2000 than in 1970. Only 2% of the bottom billion citizens were mobile phone subscribers in 2000, rising to 20% in 2009, while

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more than half of them could access a mobile telephone through neighbours, relatives and local call sellers. It is estimated that usage rates of cellular telephones might be above 80% of developing countries' population (Heeks, 2010). This rate continues to grow and it is estimated that in 2013, more than 90% of the sub-Saharan population will be within cellular telephone coverage (Denton, 2008).

Research shows that South Africa is one of the leading countries in terms of growth in access to mobile cellular technology (Kearney, 2011). This is illustrated by comparing the mobile phone subscriptions estimated at 71.06 per 100 people in 2005 with that of 2010; 100.48 per 100 people (UNCTAD, 2011). This growth is even more phenomenal when compared to fixed line telephone growth in South Africa, which is stagnant (Kearney, 2011).

According to Hamel (2010) 75% of the more than 4 billion mobile telephone subscriptions across the world are in developing countries. He reports mobile technology has the potential to empower its users to do business when owning a phone. According to Tullet (2012) the separation between two classes of mobile device users; "the fully digitised, smartphone-equipped elite and the feature phone mass market" are growing. Currently twenty one percent of cellular telephone users in South Africa are using smart phones, but the interesting fact is that although an economic barrier exist because of the fact that the most basic smartphone is an order of magnitude more expensive that the cheapest feature phone, a user's economic status is irrelevant – usage make the distinction, not income (Tullet, 2012).

Instructional Design

A detailed discussion of the approach to teaching SAD at the North-West University's Vaal Triangle's Campus is discussed by Smit (2012). The course offering relied on conventional classes, supported by a Learning Management System (LMS) – an open source Sakai development used by the university. Students were expected to come to class prepared. Classes commenced with baseline assessment, followed by class discussions and completion of assignments in class, facilitated by the instructor. A practical project spanned the full year and students applied concepts covered weekly to develop a practical system. Individual as well as group assignments formed part of the course structure. The focus of assignments was to encourage students to actively participate in the learning process. The group project and some of the assignments (towards the latter part of the semester) allowed students to learn collaboratively. During class various strategies and forms of media were used to accommodate different learning styles. A bonus mark scheme was implemented to encourage students to read and enquire broader than the prescribed course material.

The following learning outcomes on NQF level 5 were covered, which the student should have mastered at the end of these modules:

- Knowledge: Upon completion, students will demonstrate that they possess the necessary knowledge of and insight into the phases and techniques of the Systems Development Life Cycle to apply this to the planning, analysis and design of a system.

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- Skills: Students will be able to apply the phases and techniques of systems analysis, design and techniques of systems development in a project. They will be able to manage a project. Students will be able to apply creative skills when they develop a computerised system. Teamwork forms an integral part of their skills. The student will be able to solve problems creatively and develop a computerised system. Group work will be completed successfully.
- Attitude – awareness of the following is important:

⇒ Systems are developed for consumers and that their preferences and requirements have to be addressed during the analysis, design and development process;
⇒ Systems must be completed accurately and according to the agreed upon manner;
⇒ Client information have to be treated with the necessary confidentiality; and
⇒ Computer resources have to be used ethically and responsibly.

The framework for the application of system thinking forms the backbone of the course. This is a hypothetical methodology used throughout the course to demonstrate a representative systems development process. Students were also introduced to alternative routes and strategies like the waterfall development approach, the iterative development approach, model-driven development and the rapid development strategy.

The second semester had a stronger focus on self-directed learning. A depiction of the instructional strategy is shown in figure 1.

Figure 1 Systems Analysis & Design – Instructional Design

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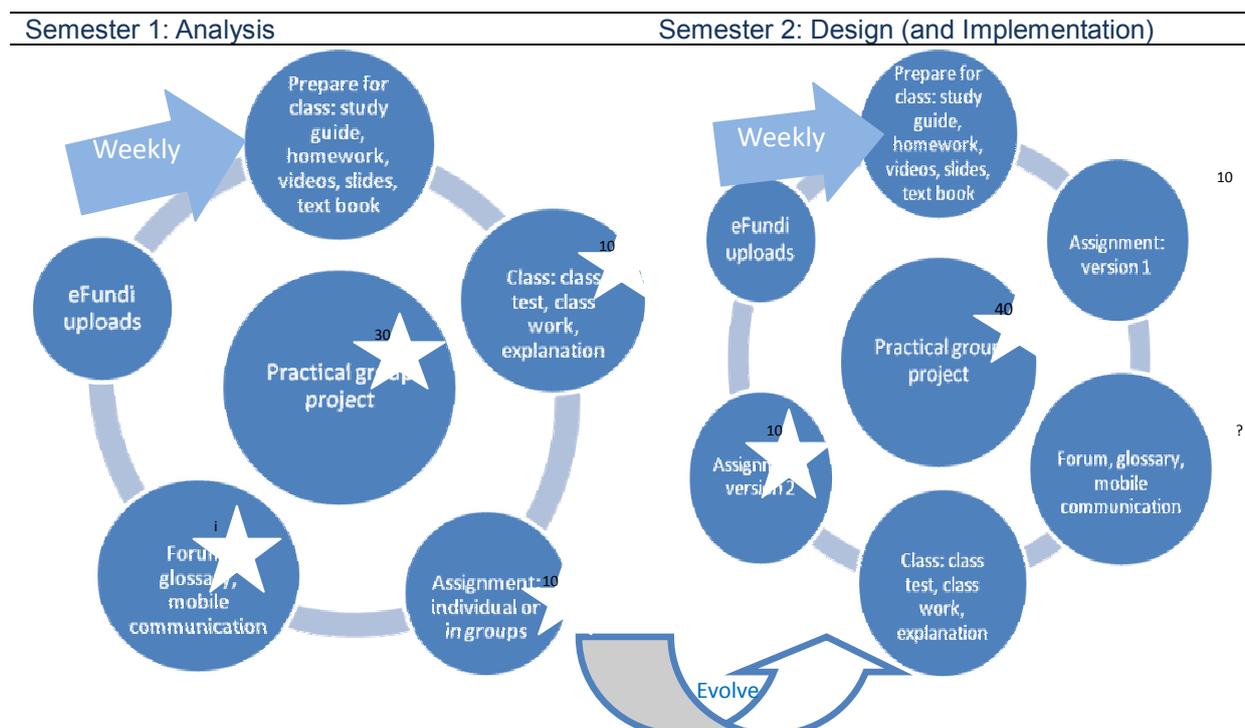
Notes:
- Bubbles with stars indicate assessments contributing to the participation mark.
- Semester Test (not shown in the depiction) are written every few weeks (3 per semester) and make up the remaining marks (50% in semester 1 and 40% in semester 2).
- Strict guidelines were established regarding the allocation of questions according to Bloom's taxonomy.
- During semester 1 forum and glossary contributions were evaluated to improve low scores for assignments/class tests.
- Examinations take the format of a first opportunity and a second opportunity if the first is failed. Both the paticipation mark and examination mark have a weight of 50%.
- Examination questions are drawn from semester tests, class tests, assignments / class work, homework and videos.
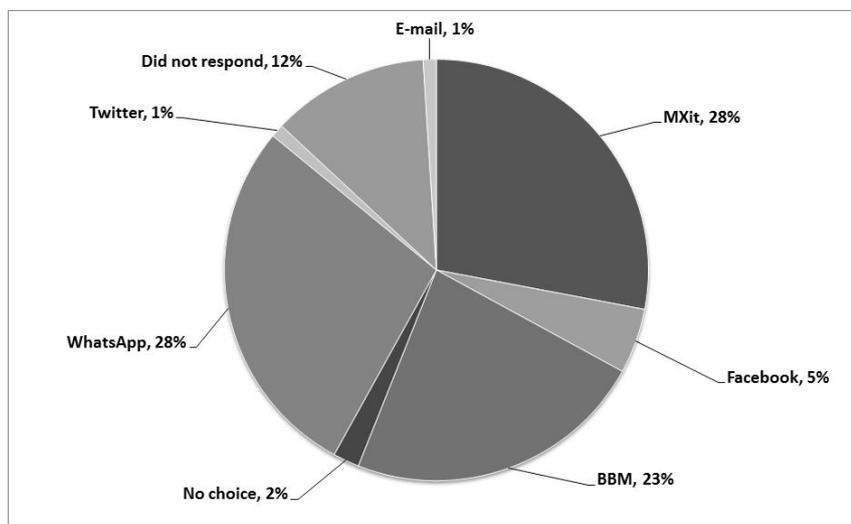
Although care was taken by the instructor to thoroughly explain concepts by using practical examples, students complained of an overwhelming workload. From student feedback two issues emerged as being paramount in SAD; the first one being the fact that the subject offers theoretical material (terminology and definitions) that is overwhelming. The second issue is the fact that the subject has a large practical implementation component and both competencies are assessed. The university uses Bloom's taxonomy to guide the cognitive level of assessment as shown in table

Table 1 Guidelines of academic support services of the levels that learning skills must be tested on various university levels (obtained from NWU Moderator's Report)

BLOOM'S LEVELS NQF LEVELS	Knowledge Bloom's levels 1-3: Factual, comprehension, application	Application Bloom's levels 4-6: Analyses, synthesis and evaluation
NQF 5 (First year)	80%	20%
NQF 6 (Second year)	60%	40%
NQF 7 (Third year)	40%	60%
NQF 8a (Fourth year)	20%	80%

Benjamin Bloom's work (1956) in the area of cognitive development encourages the use of complex thinking in educational experiences. Bloom's Taxonomy of Learning lists six hierarchical levels of thinking: knowledge, comprehension, application, analysis, synthesis, and evaluation. These levels build upon each other as the student gains knowledge and expertise, therefore leading the student to complex understandings and knowledge. Anderson and Krathwohl's (2001) revision of this work simplifies this taxonomy, making it easier to interpret. In their revision the cognitive process dimension includes the categories as indicated in table 2 in a hierarchal fashion with the first being the lowest level: remember, understand, apply, analyse, evaluate, and create.

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Table 2
Cognitive processes that clarify the six categories of Blooms' taxonomy (Anderson & Krathwohl, 2001)

Lower order thinking skills   Higher order thinking skills

remember	Understand	Apply	analyse	Evaluate	create
asking	Classifying	acting	criticising	Critiquing	adjusting
explaining	explaining	combining	differentiating	debating	assembling
identifying	extrapolating	executing	relating	judging	designing
recognising	interpreting	solving	sorting	measuring	generating
recalling	interrelating	using	verifying	solving	solving
telling	summarising				

Research Methodology

According to Myers (2011), various ways exist to classify research methodology. One of the most common ways is a distinction between quantitative and qualitative research. Quantitative research was developed to study natural phenomena, mostly in the natural sciences environment. Some quantitative methods used in the social sciences, include survey methods and numerical methods. Qualitative research was developed to study social and cultural phenomena in the social sciences. Some qualitative methods include grounded theory and action research. The reason for doing qualitative research, as opposed to quantitative research, stems from the fact that there is one aspect that distinguishes humans from the natural world - our ability to talk. The goal is to build a reality from multiple realities of participants and qualitative research methods are specifically designed to assist researchers in understanding people, as well as the social and cultural contexts in which they live (Creswell, 1998). Although researchers will in most cases use either quantitative or qualitative research, some researchers have combined these research methods in one study, allowing the corroboration of findings and enhancing its validity. This study used quantitative research in the form of surveys and statistics and qualitative research in the form of building a story based on the collective narrative supplied by students.

At the onset of the semester, students completed a questionnaire. The purpose of the questionnaire was to obtain information regarding their ownership and access to cell phones, their use of specific SNS as well as their preferences. The survey was conducted amongst 81 enrolled second-year SAD students of which 71 completed the questionnaire; resulting in a response rate of 88%. A depiction of the result on SNS preferences is represented in figure 2.

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Figure 2 Students' preferred choice of social technology for instruction

MXit, WhatApp BBM was ranked as the most popular and confirmed that a large group of students already used it. Students mentioned other SNS like facebook, twitter, 2go and gtalk in an open-ended question allowing students to indicate other SNS they use. E-mail was also listed by a few students.

As this intervention exercise was optional, the intention was not to include students at all cost. The initiative also had to be manageable from the student assistant's point of view and only three SNS were selected, namely WhatsApp (23 students), MXit (23 students) and BBM (19 students), representing 65 out of a class of 81 students, almost 80%. To simplify the work and lighten the workload, it was hoped that messaging from the student assistant could be done using a computer instead of a mobile phone, but the university's firewall did not allow it.

Throughout the semester groups of students were given concepts from the work completed to discuss on the LMS. They could use material from their textbook, the Internet and any other source to compile a short explanation, more detailed description and examples to ensure other students can use the information to obtain a clear understanding of the concept. The aim was to allow students to develop a complete subject dictionary that can be expanded as each year's new students add to concepts already listed to eventually have a facility that is rich in meaning. Two LMS tools were used to complete the first two steps:

➢ Step one was to use *forums* to express ideas on the concept to be developed. Students in a group could post facts until they felt they have listed the information relevant to the topic.
➢ After saturation one of the group members had to use the *glossary* to post the consolidated information. Based on this information a short message was compiled to be distributed via the SNS.
➢ A student assistant was appointed to provide technical support (eg. establish SNS groups; send out messages; and answer questions from students).

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It was accepted that SNS did not readily allow all the information on the glossary to be sent to students, but could assist in creating a basic understanding of concepts and lure students to the full explanation and example(s) available on the glossary. A positive point was that the SNS messages gave students access to short definitions on their phones. On this point, it was hoped that students would use the messaging facility to discuss the concepts with one another and form chat groups to explore difficult concepts.

Prompted by the receiving these concepts, students spontaneously started using the SNS to ask questions. Extractions from the SNS communication revealed that these discussions were focused on the lower order of Bloom's taxonomy. This is not surprising, since the first semester of SAD focusses on new knowledge. In figure 3 the second level of Bloom's taxonomy, namely "understanding" is illustrated when a student (shown in *italics*) and the assistant (shown in **bold**) comes to grips with two related data concepts, namely "instance" and "attribute".

Figure 3 Bloom's Taxonomy: Excerpt from BBM illustrating "Understanding"

What is the difference between an Instance and an Attribute. Apr 18 Wed 14:38

In what context? Apr 18 Wed 14:39

An entity instance is a "single occurrence of an entity" and "a student's Name is actually a compound attribute"....I thought Name of Student entity is an instance. Apr 18 Wed 14:42

It is a concept that abstractly represent all instances of a group of similar things. Apr 18 Wed 14:48

Entity is composed of instances and attributes. Instances refer to the data or records and attributes are the columns or field so an instance is composed of multiple attributes. Apr 18 Wed 15:09

Thanx a lot.......now I understand it more than I did before. Apr 18 Wed 15:11

Pleasure. Apr 18 Wed 15:12

So in other words: instances - rows and attributes – columns. Apr 18 Wed 15:14

Yes that's correct. Apr 18 Wed 15:18

According to Anderson and Krathwohl (2001) "understanding" represents "comprehension", one step removed from "remembering" which represents "knowledge". The student's questions focused on clarifying the difference between two related concepts; an attribute representing a database table column and an instance storing an attribute entry. The words related to the cognitive level of "understanding", is indicated in *grey* in figure 3.

A second extraction from the BBM communication shown in figure 4, reflects the third level of Bloom's taxonomy, namely "application".

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Figure 4

Concatenated key - is a group of attributes that uniquely identifies an instance".......I don't understand what is meant by "identifies an instance". Apr 18 Wed 16:12

Instance is the row so example initials and surname can be used as a concatenated key - weak example - I know because there are people with the same name and surname, better example would be name, surname and date of birth. Apr 18 Wed 16:26

So name and surname and dob identifies that record. Apr 18 Wed 16:27

It must identify the uniqueness of the instance. Apr 18 Wed 16:30

Yes. But it is not always good practice to use concatenated keys. Apr 18 Wed 16:33

Because what if two people have the same details which is possible. Apr 18 Wed 16:34

That would be a problem then and u cannot use too many attributes then the key becomes too long but it's debatable. Apr 18 Wed 16:37

Some select a few characters from each attribute and concat them to create the key Apr 18 Wed 16:38

So e.g the two attributes that I choose should make it unique compared to the others? But should the candidate keys that I choose have different attributes or what? Apr 18 Wed 16:40

Yes that would be best. No it should not have different attributes, but it may have more or less I'd number or student number on its own can be a candidate key. Apr 18 Wed 16:56

Is this for your project? Apr 18 Wed 16:56

Yes we are busy with our ERD diagram. Apr 18 Wed 16:57

What system are you doing? Apr 18 Wed 17:01

Booking system. Apr 18 Wed 17:02

Create a primary key for all entities, example customer ID or customer_code

which is composite, employee ID same as above, booking

ID which is auto generated. Apr 18 Wed 17:07

Again, the same student (shown in *italics*) and the assistant (shown in **bold**) came to grips with the application of "concatenated keys" in a case study environment, as should be done in student projects.

According to Anderson and Krathwohl (2001) "*applying*" represents "*knowing when to apply, why to apply and transferring knowledge to new situations*", one step removed from "*understanding*" as discussed above. The student's questions focus on how to apply concatenated keys in their project environment, a booking system. The words and phrases related to "applying", is indicated in grey in figure 2. Here it can be noted that although the focus of the first semester is on obtaining new knowledge, after the first month of classes, students have identified group members and a topic to start applying concepts studied; enabling them to develop analysis documentation for a practical application. Also, it would be wise to follow the advice of Steyn, et al. (2012) to coach students and give them feedback on online chats, helping them to make

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contributions on a higher level of thinking – quicker.

Compared to WhatsApp and MXit, BBM was the only SNS that allowed proper interactive communication where messages were easily accessible on a mobile device and messages sent could be seen by the whole group, which possibly accounted for the fact that students who used BBM interacted with others after receiving messages from the student assistant.

At the end of the first semester a second questionnaire was completed by students, obtaining information on all the teaching and learning instruments used in the instructional design of the module. The questionnaire focussed on the value it had for the student, here ranking categories were used, with an open-ended question. The following categories were provided:

- did not use it
- no value
- sometimes useful
- quite useful
- extremely useful

The survey was conducted amongst 81 enrolled second-year SAD students, of which 59 completed the questionnaire; resulting in a response rate of 75%.

Findings

From the above-mentioned questionnaire only the following findings are discussed:

- the use of a LMS, as shown in table 3;
- the use of forums and glossaries (on the LMS) as explained earlier in this article – the findings are shown in table 4; and
- the use of the SNS WhatsApp, MXit and BBM as explained earlier in this article – the findings are summarised in table 5.
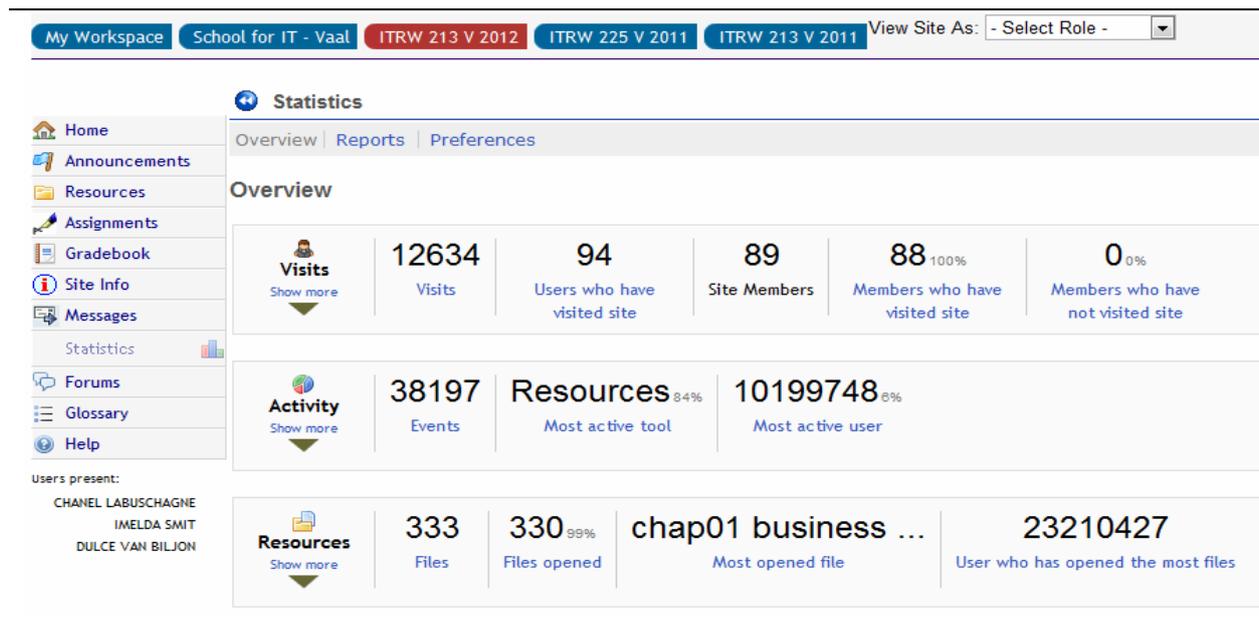
The findings of table 3 are included in the research findings, because it is an established environment in which the students are comfortable. It creates a basis with which the subsequent tables can be compared.

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Table 3
Use of LMS

Results	Feedback by students

	Extremely useful	• Individuals stay updated about what is happening in their study field • Keep you updated - it's like your own PA • It helps to arrange my work schedule • Resources and communication between lecturer and students is mobilised • It's like a communication centre • One place where I can find slides/videos/notes and announcements • It is the backbone of our course because it allows us to communicate
	Did not use it	• Some of my questions I posed were unanswered • Try to create an alert for everything that the lecturer uploads
		• No comments in the "Sometimes useful" category
		• No comments in the "Did not use it" category

From the 92% of students who found the use of the LMS "*extremely useful*", it is clear that the SAD instructor, student assistants and students used the LMS extensively in SAD. This fact is also reflected in the usage statistics kept by the LMS as shown in figure 5. It is truly the "*backbone*" of the module as all material relevant to the module is uploaded by the instructor, assistants, supplemental instructors and students.

Figure 5 LMS statistics for SAD

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Open-ended responses revealed students found the LMS a useful tool to stay informed and connected in a busy academic environment. It was also used for time management and communication purposes and provided access to additional material – catering for different learning styles.

An unintended consequence of using the LMS extensively was the magnitude of information uploaded, causing students to miss important uploads - as mentioned by one of the respondents. To assist in this regard the instructor started using the LMS landing screen to share what is happening and new. An example of the landing page is provided in Figure 6.

Figure 6 Example of a LMS landing page
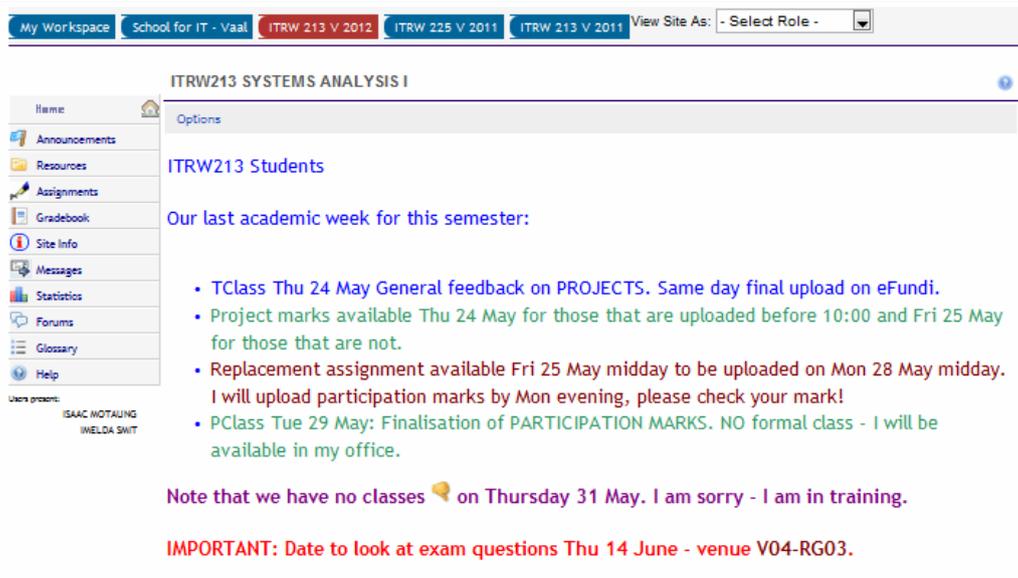
The advantage of using the landing page is that students do not have to decide on 'what to open' to obtain new information, but can only read what is displayed to guide

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them. Colours are used when many facts are displayed to help students to distinguish between different facts.

The usage of the LMS forum and glossary is summarised in table 4.

Table 4 Use of LMS forum & glossary

Results	Feedback by students
Extremely useful ↕ **Did not use it**	**Extremely useful** • It helped me to interact with other students • We shared knowledge and understanding • It can be reviewed before uploading • Help to focus on important items • Very useful - like a mini-dictionary • It is a lot of work and time consuming • I was quite lost in the beginning when we used it • If you make it compulsory students will take it seriously • Did not see any value because most of the class did not contribute • I did not see the importance • The same information can be found in the textbook • Rather put examples, so that we can learn how to apply it • Prefer to use my own summaries when it comes to learning new concepts

From students' uncertainty regarding the use forums and glossaries, it was concluded that they have not used these tools before. Initially the work that students had to do here, did not account for any contribution towards their participation mark. Towards the end of the semester though, it was used as an option to improve students' participation mark. Although only 54% of respondents found it useful, with 26% of those finding it "*extremely useful*", it is encouraging, taking the above-mentioned factors into consideration.

The result regarding the use of the SNS BBM, WhatsApp and MXit is displayed in table 5.

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Table 5 Use of WhatsApp, MXit and BBM

Results		Feedback by students
	Extremely useful	• Extremely useful and easily accessible on a daily basis • We can communicate as students and help each other with difficult concepts • Found out about things I didn't pick up on eFundi • We acquire knowledge in the form of fun • Instant answers I obtained them in case of emergency
		• Nice to read a definition that pops up, but very annoying when people talk about rubbish
		• It helps a lot because I get time to participate in group discussions via BBM
		• It makes the course more organised and controlled
	Did not use it	• The messages did not make sense • No valuable information was discussed • It needs some sort of structure • It did not provide answers to my questions
		• Definitions given with poor grammar
		• I do not want to use my phone for studies
		• I do not like short updates about things that are not important

A large percentage of respondents (49%) did not find SNS communication useful. Of those more than a third (34%) did not use it at all; some because they did not have access to a phone or did not want to use it for studies. When considering the fact that this instrument was used to supplement other instruments already explaining the concepts covered and the fact that participation was optional, it is encouraging that more than half of the respondents did find SNS communication a useful learning tool; as it encouraged students to "*communicate daily*", "*acquire knowledge in the form of fun*", "*help each other*" and "*get instant answers to urgent questions*".

Conclusion

The research results indicated that the technology options used in the study complement one another to enrich and bring new functionalities to the learning environment.

Table 6 includes a summary of comments from tables 3-5, categorised as positive and negative (without looking at the categorisation used in the questionnaire) and associating the comments with the percentages linked to it.

When comparing the three sets of findings from the second questionnaire, it is clear that the functionality provided by a LMS is extremely useful for students. The use of a

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LMC as a CMC tool is well established among students, they understand its value and use it effectively as an "*own PA*", to "*arrange work schedules*", as "*communication centre*" to "*mobilise communication between instructor and students*". It is clear that a LMS fulfils the role of a "*resource centre*".

From this vantage point the original purpose of the forum and glossary functions, namely creating a quick reference wiki for students to use and distinguish between concepts confusing them, is still valid. Although students were not as positive about its implementation as its use was perceived as "*a lot of work and time consuming*", the basic structure has now been developed and future students can build on it reducing the workload.

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Table 6 Positive and negative comments linked to percentages (refer to tables 3, 4 & 5)

	92%	26%	47%
Positive comments	• own PA • arrange work schedule • communication between lecturer and students is mobilised • a communication centre • place where I can find • backbone of course	• interact with other students • shared knowledge and understanding • focus on important items • mini-dictionary	• easily accessible on a daily basis • help each other with difficult concepts • find out about things (supports eFundi) • acquire knowledge in the form of fun • Instant answers • participate in group discussions via BBM • makes course more organised and controlled
	8%	74%	53%
Negative comments	• Some questions I posed were unanswered • an alert for everything that the lecturer uploads	• a lot of work and time consuming • I was quite lost in the beginning • make it compulsory students will take it seriously • most of the class did not contribute • I did not see the importance • same information can be found in the textbook • put examples, so that we can learn how to apply it • prefer to use my own summaries	• messages did not make sense • no valuable information was discussed • it needs some sort of structure • it did not provide answers to my questions • poor grammar • I do not want to use my phone for studies • I do not like short updates about things that are not important
	eFundi	**Forum & Glossary**	**eFundi**

When studying students' feedback, it appears that those who used SNS are positive towards using it in an academic environment to learn. Future semesters can build on this. According to students it is "*easily accessible on a daily basis*", they can "*help each other with difficult concepts*", it provides "*instant answers*" when needed most. On the negative side there were problems since "*messages did not make sense*" and "*no valuable information was discussed*" and it lacks "*structure*". It is clear that future SNS messages should be structured in the form of posed questions different from the ones found in the text book, guiding students to solve problems, rather than only supplying them with information. To support the sharing of "difficult concepts", BBM

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surfaced as the best tool since it allows pictures to be attached to messages. It appears that the other tools used, namely WhatsApp and MXit do not support the "*sharing*" of "*difficult concepts*" as well as BBM. Answers to such questions can be guided by the instructor until it is satisfactory.

Where the LMS fulfilled the role of a "resource centre", the integration of SNS into the instructional design enabled quicker accessibility to information, as well as enabled a peer support network. From the research findings, it is clear that this approach enhances the learning environment.

The use of social media in an educational context is an increasing trend. This study confirms that social media can not only support but also enrich the learning experience. The importance of a structured approach is emphasised by the findings from this study. More research is needed on how to support student in their learning processes through social media and how to evaluate the pedagogical aspects in social media systems used in educational context.

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