Rhodes University

The Educational Value of Integrating a Learning Management System and a Social Networking Platform

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Abstract

Rhodes University uses a Moodle-based Learning Management System (LMS) called RUconnected to manage the delivery of course and course materials and other resources to students. It would be pedagogically desirable to engage students in peer learning activities online through the e-learning platform provided by the university. These activities can be done through the introduction of social networking features like friendship and group management, portfolios to enable students organise their work and receive feedback from peers, and blogs to promote creation for content etc. Research indicates that this sort of interaction can be encouraged and supported by the use of a Social Networking System (SNS). The Mahara SNS was identified as an ideal choice for trial in the Rhodes university environment because it was developed for academic use, has social networking features available in most SNSs and also because it integrates with Moodle. Mahara was integrated with a test implementation of Moodle that was customised to mirror the set-up of Rhodes University's main Moodle system. Testing and evaluation was carried out with a class of students over a period of five weeks. Analysis of the data gathered indicated that social networking services can have educational benefits if integrated in the students' studies but educational institutions intending on following the path should proceed with caution as many factors can affect the result.

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Chapter 1

Introduction

The Introduction of the Internet and the Web revolutionalised the way information was disseminated and accessed by enabling access to electronic copies of information from any other place and at any time, and by displaying the information in formats which are easily understood by human beings. The Internet and the Web also made the delivery of teaching and learning online possible and replaced the traditional distance learning where learning materials were distributed as hard copies. Internet-based e-learning has become increasingly prevalent with many education and training institutions implementing online Learning Management Systems (LMSs) to assist them to deliver training to learners who cannot be physically present in class at the time a course is being offered, or even to complement synchronous classroom learning.

The inception of Web 2.0 technology saw the proliferation of Social Network Sites (SNSs), which enable users to create communities and interact in the online space. This capability of SNSs to enable users to interact online

led to the development of SNSs to be used in education with the aim of promoting learner interactions. Two SNSs which were developed to be used for educational purposes are Elgg and Mahara.

1.1 Motivation for the Research

Rhodes University uses a Moodle-based system called RUconnected to manage the delivery of courses and course materials to students and also as a platform to engage staff and students. The system runs on the FreeBSD operating system and the version of Moodle which was being used at the time of the research was version 1.9. Some of the uses of the RUconnected LMS are as follows:

1. **A repository for course materials** - Students use the system to access course materials;

2. **Administration and submission of course assignments** - Lecturers upload course assignments on the system for the students and the students use the system to submit their completed assignments. Staff use the system to communicate student marks and to provide feedback on student's work;

3. **Advertisement of information to students** - Rhodes Administration and other staff use RUconnected to advertise various activities to students; and

4. **Communication among the users of the system** - RUconnected allows users who are enrolled on a course to communicate either through

a forum or to have a one-on-one chat through the inbuilt messaging system.

LMSs including RUconnected, by design, support well the creation of content by staff and the subsequent distribution of the content to learners. Little or no support is provided for learners to interact, create content and actively participate in the e-learning process [36]. Their focus is on institutions and courses rather than on students [8], which limits their capability to support different teaching and learning styles. In a LMS, students are mostly consumers of content created by staff and do not have an opportunity to author their own content or co-author content. On the other hand, SNSs which were developed to support learning allow learners to participate in the creation of content and they also facilitate collaboration and interaction among students and between students and staff. Despite LMSs having the limitations above, and SNSs being able to support the functions LMSs do not adequately support, LMSs are still very successful, widespread and popular [8]. The different functions LMSs and SNSs support make the two systems to be complementary and they cannot displace each other.

In order to improve the focus of LMSs to support the different teaching and learning styles, LMSs should shift their focus from institutions and courses to allow students to have an active role in the learning process not just as a mere consumer of content but also as a participant. This could be achieved by either modifying LMSs to include the specific social network tools which support the functions LMSs do not adequately support, or through the integration of a LMS and a SNS to take advantage of the useful features in both systems.

There have been several projects where SNSs and LMSs were integrated with the aim of overcoming the limitations in LMSs. One of the projects was the integration of Coome LMS and Facebook SNS by Rožac *et al.* [36]. The aim of the project was to improve the interactions in the Coome LMS using social networking features provided by Facebook. Similarly, Catalyst, a New Zealand-based software development company developed the Elgg integration block which was used to integrate Elgg and Moodle through a single-sign-on (SSO) allowing users authenticated with Moodle to access Elgg without being re-authenticated. According to [37], the Elgg integration block built by Catalyst only worked with the versions of Elgg prior to version 1.0. Version 1.0 of Elgg introduced changes which caused most of the plugins to fail. This caused frustrations among the developers of the Elgg integration block who then moved on to develop the Mahara system, a learner-centred SNS which also integrates with Moodle [26]. No further literature on similar works on the integration of a SNS and a LMS was found suggesting the need for an investigation of the pedagogical benefits of integrating a LMS and SNS.

It was also observed that, at the time the paper on the integration of Coome and Facebook by Rožac *et al.* was published, the integrated system was not yet implemented and tested in an academic environment to determine the impact it will have on students' learning. Similarly, no evidence was found where studies were done to investigate the pedagogical benefits of integrating Moodle and Elgg or Moodle and Mahara. Considering that there was already a study by Rožac *et al.* which used a SNS not necessarily developed for educational use, a study using a SNS developed to support students' learning was deemed necessary, and was expected to provide a different angle of results

and to contribute to the knowledge on the use of social network tools in LMSs. This knowledge is very limited at the moment, and such a study would further assist in making decisions on the use of social networking to support students' learning.

Considering the rich features available in Mahara for learning and the power Moodle offers as a LMS in terms of course content management and delivery, they were deemed good candidates to integrate so as to investigate the integration of a LMS and a SNS and try to gauge the impact the addition of a SNS would have on students' learning.

1.2   Brief Description of Research Approach

A LMS, Moodle and a SNS, Mahara, (both open source) were integrated through a SSO. The integrated system was tested with the students who registered for a Computer Science literary class (code CS1L2) for a period of 5 weeks. At the end of the test period, the students were requested to complete an online questionnaire which was developed using the questionnaire plugin for Moodle. An email was also sent to the tutors in the course requesting them to provide feedback on their experience using the system and their opinion on the suitability of using SNSs for learning.

1.3   Organisation of the Research Work

This thesis is organised into several chapters. Chapter 2 reviews the related literature on e-Learning, Peer Learning and Social Networking which estab-

lishes the background and related work. Chapter 3 discusses the design of the project which include the method used to collect data and how it fitted with the study, how the data was analysed, and the ethical issues which were considered. Chapter 4 discusses the technical implementation of the project and presents the results which were obtained. Chapter 5 discusses the results which are presented in chapter 4 and based on the discussions, conclusions are drawn in Chapter 6.

Chapter 2

Literature Review

2.1 Introduction

This project involves the investigation of the educational value of integrating a LMS and SNS using Moodle as a LMS and Mahara as a SNS. A review of literature on learning which happen both online and offline and how people interact within a social network will help to build the theory and understanding of the interactions in the two environments under investigation. A review of literature on learning will cover the learning which happen offline among peers, the learning which happens online using LMSs (e-learning), the different learning methods which happens online and their advantages and disadvantages. A review of literature on social networking will cover interactions which happen in the online social network environment using online SNSs.

2.2 Learning

Learning can either be formal, non-formal or informal. According to [32], formal learning is always organised and structured, and has learning objectives with the objective of the learner being to gain knowledge, skills and/or competencies. Informal learning on the other hand is never organised, has not set objective in terms of learning outcomes and is never intentional from a learner's point of view. Non-formal learning lies between formal and informal learning and it is organised and can or cannot have learning objectives.

2.3 E-Learning

Different authors use different terminologies including online learning, Internet learning, distributed learning, networked learning, tele-learning, virtual learning, computer-assisted learning, web-based learning and distance learning interchangeably with the term e-learning [1] [17] [30], making it difficult to come up with a generic term to define e-learning. The common factor in all these terms is the use of technology in the delivery of teaching and learning. Anderson [1] defines online learning as the delivery of teaching and learning over the Internet; Welsh [47] defines e-learning as the delivery of teaching and learning over the Internet and intranet; and Itmazi [17] in his definition of e-learning included any other multimedia technologies in addition to the Internet and intranet as the delivery media. According to [30], e-learning incorporates all educational activities carried out by individuals or groups either online or offline, synchronously or asynchronously via networked or standalone computers and other electronic devices. Naidu [30]

breaks e-learning down into the following modalities:

1. **Individualized self-paced online e-learning** where an individual learner accesses learning materials online;

2. **Individualized self-paced offline e-learning** where an individual learner accesses learning materials offline;

3. **Synchronous group-based e-learning** where a group of learners work together in real time via intranet or Internet; and

4. **Asynchronous group-based e-learning** where a group of learners work together through Internet or intranet but their interactions are not done in real time.

This thesis adopts and consistently use the term "**e-learning**" and it is used to mean the delivery of teaching and learning over a networked or standalone electronic platform. Based on this definition, learning which takes place through the Internet, intranet or storage media like CD-ROMs and DVDs will be considered to be part of e-learning.

Many universities around the world have installed facilities for e-learning such as LMSs, and other online learning resources, video-conferencing technologies and other audio-visual technologies, making e-learning "part of the normal educational provision of 'conventional' campus-based universities" than as a tool for distance learning as it has been viewed traditionally [14, p. 62]. Adoption and implementation of e-learning in universities has increased in recent years mainly due to increased ease of access to Information and Communication Technologies (ICTs) and the continuous decrease in the cost

of implementation of these technologies (to which reduced hardware costs has been a factor) [30]. A study by [14] on what university teachers think e-learning is good for in their teaching found that e-learning technologies can provide information to students, support occasional online communication, help to engage students in online discussions, and support knowledge-building tasks. All these activities do not require students to be at the same location or to interact in real time if an asynchronous LMS is used. The key attribute of e-learning using an asynchronous LMS is the flexibility it provides in eliminating the need for learners and instructors to be at the same location during course delivery and this has made asynchronous e-learning popular and successful.

Learners' self-motivation is very critical in e-learning especially in individualized self-paced, offline learning, where an individual learner is at the centre of the learning with no interaction and support from other learners and instructors. It is very unlikely for an individual learner, studying offline, to complete a course with the absence of self-motivation. In order to increase learners' motivation, e-learning modules should be interactive, interesting and informative [23].

The different types of e-learning may be appropriate in different situations and may produce different results if used in similar situations. Success of e-learning is dependent on the delivery method and course content [23]. Asynchronous and synchronous e-learning support different purposes [16] and it important that before an e-learning method is selected, the implementers should ensure that it is appropriate for the intended objective. Content used in a particular type of learning should also match with the objective to be

achieved.

2.3.1 Asynchronous E-learning

Asynchronous e-learning is the type of e-learning where learners study at the time of their convenience, and does not require simultaneous participation of instructors and learners [23]. This type of learning is commonly facilitated by media like email, online discussion groups or forums , bulletin boards etc. The learning materials used in this type of e-learning may include audio, text, graphics, video, animation or a combination of some or all of these features in order to make learning easier and more exciting. The key attribute of asynchronous e-learning is the flexibility it offers to learners in terms of study times and location.

Advantages of Asynchronous E-learning

Asynchronous e-learning is the common type of e-learning being used by different universities and organisations [42]. Its popularity is mainly due to the flexibility it offers to learners in terms of independence of study times, location and availability of space [23]. Where a LMS is used, learners log into the LMS at the time of their convenience, download course materials, and read and send messages to their teachers and fellow learners. Learners from different locations and time zones can participate in the same course and have access to the same learning materials at any time and from any other location. All the learners also have access to up-to-date course materials because changes of the course content in the LMS are reflected immediately [1]. Discussions in asynchronous e-learning systems are recorded and are acces-

sible to any other learner who logs into the system [23]. Learners who are trailing behind in the course benefit by referencing the discussion threads and this assists them with the directions the course is taking making it easy for them to catch up with their fellow learners.

Asynchronous e-learning allows learners to plan and take control of their learning times and they also have control over the pace they conduct their studies [23]. Absence of pressure to complete a course allows learners to proceed to the next level of the course after fully understanding the material they are currently studying. Learners also have control over the order in which they conduct studies [16]. This allows them to skip learning materials they already know and concentrate on what they need to learn, enabling them to successfully complete a course earlier than originally planned. Some asynchronous e-learning systems provide features to track progress of learners, and for the learners to bookmark a course in order to be able to stop and resume a course from a particular point [10]. These features are important because they can be used by instructors to provide proper guidance to learners and also for learners to easily track and manage their progress.

Flexibility of combining learning and work facilitates situated learning or immediate application of knowledge and skills gained during the course [1] which can further enhance a student's understanding of the subject. When asynchronous e-learning is used to complement other types of learning like classroom learning in what is called blended learning [21] they present additional benefits which are discussed in section 2.3.

Disadvantages of Asynchronous E-learning

As suggested by [16], asynchronous e-learning might not be appropriate in all types of learning leading to various challenges if not appropriately used. Absence of live interaction in asynchronous e-learning denies learners the opportunity to ask questions and receive immediate responses to their questions [16]. Learners only get immediate feedback if other learners or instructors are logged into the system at the same time they are asking the questions otherwise they have to wait until they login. Absence of real-time assistance may delay a learner's progress if successful completion of other modules is dependent on the successful completion of the current module. Learners' self-motivation is very critical in asynchronous e-learning because of the high level of control they have over their studies. With unlimited flexibility and less self-motivation, some learners struggle complete the course leading to lower success rate.

2.3.2 Synchronous E-learning

Synchronous e-learning is the type of e-learning where learners and instructors participate simultaneously and their interactions happen in real time [23]. It is commonly facilitated by media such as video conferencing, teleconferencing, online chat programs etc. This type of learning is similar to instructor-led classroom learning because of the real-time interactions which happen between instructors and learners and among learners. The advantage of this type of learning over traditional classroom learning is that it is independent of the geographical location of the instructor or the learner [1].

Advantages of Synchronous E-learning

Synchronous e-learning defeats the barrier of physical location to have real time interaction between instructors and students as mentioned above [1]. With proper technologies, learners from different locations and time zones can interact with each other and with their instructors in real time similar to what happens in a traditional classroom environment. Real time interactions afford learners an opportunity to get timely feedback from other learners and instructors on the questions they ask making learning easier for some. This type of learning is very important for learners who face difficulties understanding course materials without support from instructors or fellow learners, or learners who struggle with motivation. It also provides instructors with the liberty of delivering a course from any other location as long as the required equipment is available. The advantage of this type of e-learning over asynchronous e-learning is that it eliminates the isolation experienced by learners in an asynchronous environment due to limited or no interaction with other leaners or instructors [16].

Disadvantages of Synchronous e-learning

Synchronous e-learning has several disadvantages which mainly borders on technology. According to [17], synchronous e-learning is heavily reliant on technology which also determines the quality of the learning. Bandwidth limitations can compromise the quality of multimedia (video and audio) content causing unnecessary delays which affects student's understanding of course materials. The other disadvantage is that discussions during the course are not automatically recorded as is the case with asynchronous tex-

tual e-learning denying learners an opportunity to use the recordings for their revision, unless recording mechanisms are in place to do things like capture audio and video, or log real-time text chat. Students can only reference the discussions if they were recorded and posted in a LMS or distributed to them on other media like CD-ROMs.

2.4   Blended Learning

Blended learning is the mix of delivery methods for teaching and learning aimed at accommodating the various learning needs of a diverse audience in a variety of subjects [21]. Some of the delivery methods which can be blended are instructor-led classroom learning, asynchronous e-learning and synchronous e-learning.

Advantages of Blended Learning

Blended learning can be more effective than non-blended learning because it combines the strengths of the delivery methods in the blend [41]. King [21] suggests that blended learning allows instructors the flexibility of adapting a delivery method to meet the learning styles of different students. This can help to re-vitalise subjects that have lost their appeal by building interest in the students resulting in more effective learning. She however advises that for blended learning to be effective, the selected delivery methods should be appropriate to match with the subject matter and the audience.

Blended learning extends the reach of the audience as compared to using a single method of learning [41]. For example, instructor-led classroom

learning limits access to the course to only those who are physically present in the classroom. A blend of classroom learning with synchronous e-learning can accommodate students who cannot afford to be present in class during course delivery because of the limitation of their geographical location. Recording the proceedings of classroom learning and uploading them in a LMS can further extend the reach to those who are not able to be part of the course because of their location and time zone, or simply because of clashing commitments.

2.5 Peer Learning, Peer Tutoring and Peer Assessment

2.5.1 Peer Learning

Peer learning is the learning which happens among peers through helping and supporting each other [43]. In academia, it involves a group of students learning with and from each other [6]. Examples of peer learning groups include student-led workshops, study groups, assignment and project teams, class feedback sessions and Internet forums. As indicated by [6], the peer learning approach may either be established and monitored by a teacher or students might organize themselves in groups if they view working in groups to be beneficial. Where teachers are involved in the establishment of the groups, they do not control the proceedings of the groups even if group interactions happen in their presence. Teachers intervene only when they have been requested to do so or when they observe that the discussions are

proceeding in the wrong direction. The minimal intervention of teachers in the learning process provides an environment where students feel free to put forward their ideas and practice their communication skills on the subject being discussed.

Students are encouraged to learn in groups in order to afford them an opportunity to seek and give help to each other. Students who ask for help benefit by gaining different perspectives from their fellow learners, and those who offer help benefit by exploring their own understanding through their explanations. Even those who just observe benefit from the different kinds of explanations offered by other students which might assist them in solving problems they are experiencing [20].

Peer learning is commonly used in university courses where students are requested to write and submit assignments or to do projects in groups. Group learning includes students working collaboratively with others, taking collective responsibility for identifying their own learning needs and planning how these might be addressed, and deepening their understanding of specific course content [6]. Acceptance of peer learning by students and its ultimate success is dependent on the organization of the group, the group task, group membership and how the groups will be held accountable or assessed [4]. Students by nature are used to working individually and competing with each other for grades. Group work, however, requires them to share ideas, take risks, listen and agree or disagree with others, and generate and reconcile point of views [4]. It is therefore most likely that students will participate in group activities if they see sufficient benefits for the time they invest in the group work. The benefits students look for include higher grades, the help

they obtain from peers and the support and motivation they gain from other students from the group [20].

2.5.2 Peer Tutoring

Peer tutoring commonly involves advanced students in a class, or those studying in later years, taking limited aspects of a teacher's instructional role to teach other students [6]. In peer tutoring, there is a clear and consistent differentiation between the teaching and learning role though the teaching role is done by students. There is a high focus on curriculum content and there are usually clearly laid down procedures in which participants receive generic training [43]. In another method of peer tutoring called reciprocal peer tutoring, students act as both teachers and learners [15]. This arrangement is beneficial because it enables students to gain from both the preparation and instruction of the course in which tutors engage, and from the instruction that tutees receive.

2.5.3 Peer Assessment

Peer assessment is the process of having the members of a group evaluate and provide feedback on the extent to which each of their fellow group members have exhibited specified traits, behaviours, or achievements [19]. Peer assessment can enhance self-assessment and knowledge about when and how to use particular strategies for learning or for problem solving [43]. Peer assessment enables students to learn from the feedback they get from other students and also from reviewing and providing feedback on the work of others.

2.6 Social Networking Sites (SNSs)

According to [9], a social network is a group of individuals who share common interests. Some of the common interests of individuals in a social network include the community the individuals live in, their career and social interests, their common friends and their beliefs. Relationships in a social network can either be online through a SNS or can be in the offline environment.

A SNS is a "web-based service that allows individuals to create a public or semi-public profile within a bounded system, form relationships with other users of the system, and view their connections and the connections of other users of the system" [7]. SNSs are organized around users and they provide "a basis for maintaining social relationships, for finding users with similar interests, and for locating content and knowledge that has been contributed or endorsed by other users" [28, p.5]. Interactions in SNSs are done through posting and commenting on messages, pictures and videos on an individual's profile or profiles of other users to which an individual is connected; chatting through SNS's inbuilt programs similar to email and online chat; and making online voice calls (VoIP). Online social networking emerged and was popularized with the inception of web 2.0 technologies [50] defined as "more personalised, communicative form of the World Wide Web that emphasises active participation, connectivity, collaboration and sharing of knowledge and ideas among users" [27, p. 665]. Web 2.0 applications include wikis, blogs, SNSs and photo and video sharing sites.

2.6.1 Social Networking in South Africa and selected countries

According to the South African Social Media Landscape 2012 report on the study of the use of social media in South Africa by World Wide Worx and Fuseware [49], the use of SNSs among rural and urban dwellers and across different age groups has been increasing. According to the study findings, by August 2012 there were 5.33 million South Africans who were accessing Facebook through the Web while 6.8 million people were accessing Facebook through their mobile phones. The number of South Africans using Twitter, Mxit and LinkedIn were 2.43 million, 9.35 million and 1.93 million respectively. When the same study was conducted in 2011, it revealed that Twitter and Facebook had 1.1 million and 4.2 million users respectively; this translates to a growth rate of around 100, 000 new users per month for both Twitter and Facebook. Linked in had 1.1 million users in 2011, giving it a growth rate which is slightly lower than that of Twitter and Facebook.

A similar study was done in the U.S.A. by the Pew Internet and American Life Project, this time focussing on the usage of SNSs by different age groups. The results of the study conducted showed that 41% of 12 - 13 year olds and 61% of 14 - 17 year olds use SNSs [34]. The study further showed a universal use of SNSs among college students at different universities with 91% of the students belonging to the SNS Facebook.

Another study on the use of Social Media in Australia conducted by Sensis in conjunction with Australian Interactive Media Industry Association [40] found that 97% of social networking users used Facebook with an average user spending more than six hours a week on the site. Other popular SNSs

were LinkedIn with a 16% user base, Twitter with a 14% user base and
Google+ with an 8% user base. The study found that average users logged
in to Facebook 21 times a week, logged in to Twitter 23 times a week and
logged in to Linked in 5 times a week. The top reasons for using social
media was to catch up with friends and family, sharing photos and videos,
and coordinating social events. Females were found to use SNSs more than
males. There were however big variations on the use of SNSs by age group
with 90% of those aged under 30 using SNSs and those aged over 40 using
them less. An investigation on the reasons why some people do not use social
media found that the primary reason was lack of interest with 58% of the
participants stating this as the reason. This was followed by security concerns
(18%), and finding the use of SNSs too time consuming (15%). The least
number of participants (5%) preferred using phone to using a SNS. While
the statistics from the U.S.A. and Australia might not directly apply to the
South African scenario, they give a picture of the use of social networking
among different type of users including the youth and college students which
gives some guidance as to what might be expected in the absence of specific
South African data.

2.6.2   Use of Social Networking in Academia

SNSs are very popular among university students with a large number of
students belonging to at least one SNS [5] [25]. According to [50], SNSs
provide students with an additional channel to express themselves freely, to
establish relationships which might not be possible in offline environment
and to gain access to a wide range of information which assists them in their

learning. They support informal learning where learners acquire new skills and knowledge from experience and interaction with non-institutional and non-informal learning spaces [8]. Yu *et al.* adds that SNSs allow users to maintain close relationships with a small group of users in addition to establishing new relationships which expand their networks. A close relationship with a small group of users is very important for knowledge generation because it is where most interactions within a social network happen. SNSs provide a platform where students learn informally "by seeking, exploring and testing ideas with others within their own social network beyond the constraints of a classroom" [18, p.243].

A study on the use of SNSs for teaching and learning at the University of Cape Town (UCT) by [5] found out that students' use of SNSs is very varied with students using SNSs mainly for informal social networking, seeking support from peers, community building on campus, information sharing, and student activism. Users of SNSs varied and ranged from those who did not frequently log into and use the SNS on a daily basis; those who frequently logged in but did not actively participate in the various activities of the site but only observed the activities of their friends; to those who actively participated by uploading and downloading information and using the site's applications. It is therefore important that before using SNSs for learning, all the categories of users should be considered with the aim of making all the users participate as much as possible.

Empirical studies which have been done in the area of social networking have shown that social networking can have a positive impact on students' learning outcomes. A study on the pedagogical impact of online social net-

working on university students' learning by Yu *et al.* [50] found that online social networking has a positive impact on students' personal development through improvement of their psychological well-being and skills, and their relationships with peers. In addition, online social networking helps students to attain social acceptance and adapt to the university culture. Similarly Madge *et al.* [25] found that the use of social networking assists students in their settling process at the university which has a direct impact on their academic performance. These results indicate the immediate benefits universities get when they integrate social networking into their courses. Integrating social networking tools into a LMS at a university can be one of the easiest means of getting these benefits considering the popularity of SNSs among university students.

One of the critical issues is the acceptance of students of the inclusion of social networking tools as part of their learning. Students interviewed during a study at UCT by Bosch found it very beneficial being able to check class-related materials on a SNS while at the same time engaging in personal communication since they were already spending more time there. The students also acknowledged that friends on SNSs helped them to identify and find learning materials on the Internet, and provided them with a wide range of information which made their lives on campus easier. SNSs also allowed junior students to interact with and learn from senior students in the same field which was not possible in offline environment. Some students however felt that the use of a SNS for learning can be more of a distraction than a benefit to the learning process. It is therefore important that before including social networking as part of students' learning, all these challenges should be

considered and addressed. As suggested by [20], this could be done by having a proper implementation plan, with a clear purpose known to students, and a design and structure that meets the purpose.

2.7 Social Networking Platform Features Supporting Learning

There exist social networking engines that provide social networking features which are specifically developed to support learning. Some of these features are:

2.7.1 E-portfolios

A portfolio is a collection of works/artefacts developed across varied contexts over time representing an individual, group, organization or institution [45] [24]. An e-portfolio is therefore a portfolio which is in a digital format. The collection of digital works can either be online on the web or on other electronic media such as a CD-ROM or DVD [24]. An e-portfolio provides students and/or faculty with a way to organize, archive and display their pieces of work online enabling others including peers to review, communicate and assess them asynchronously thereby helping them to make improvements [45]. Lorenzo *et al.* [24] breaks down e-portfolios into 3 categories namely student e-portfolios, teaching e-portfolios, and institutional e-portfolios.

Student e-portfolios

Student e-portfolios are developed and maintained by students. They may include course assignments, student artefacts in response to assignments, reviewers feedback to students work [13], drafts of the students work and the students self-assessment of the work [22]. The artefacts can be in form of videos, dialogues, simulations, links to references, and interchanges of ideas in the chat room [13]. E-portfolios can be used to assess students on their abilities and how they have improved over time [22] and to document their specific learning outcomes in a course [24]. The accomplishments showcased in the student e-portfolios may also be shared with prospective employers. According to [24], one of the advantages of student e-portfolios is that they help students to become critical thinkers through reflection over the content and may assist them to develop their writing and multimedia communications skills [24].

Advantages of E-portfolios

As reported by [24, p.2], e-portfolios can be used to support "student advisement and career preparation; student or alumni credential documentation; sharing of teaching philosophies and practices; department and program self-studies; and institutional and program accreditation processes." E-portfolios make students' works to be easily accessible by different people [13]. Students can grant others students, instructors or anyone in the world access to their e-portfolios [13] enabling them to suggest new ideas and provide feedback on their work. Sharing e-portfolios with instructors allow them to assess and provide feedback online. Using a shared e-portfolio, students

can collaborate on work with other students or any other professionals in their field. E-portfolios also allows students to conduct self-evaluation and to reflect through examination of their works [13]. By reflecting on their works, students can create a meaningful experience of their work [24] which can enhance their understanding of their field of study. E-portfolios eliminate storage problems presented by traditional paper-based portfolios [13], by freeing physical storage space for use by other things.

2.7.2 Blogs

A blog is a web site consisting of a series of entries on various topics arranged in reverse chronological order which is frequently updated with new information [39]. The information on the site can be written by the blog owner, contributed by others, or can be links to other pages on the Internet. Blogs can be devoted to one or several subjects or themes. According to Wagner [46], blogs create opportunities for students to receive feedback on their work. Students can present the results of their research or any of their works on their blog and invite other students or professionals in their field to visit and appreciate or provide feedback or comments online on their blog entries. The feedback provided by others can assist the blog author to improve his or her works. Since by design the blogging software orders the entries, students can only focus on the content while the software takes care of the formatting. Students can also collaborate writing a blog which can lead to quality work supporting group learning. Tagging the blog allows entries on specific topics to be located easily by readers

2.7.3 Podcasting

Podcasting is the delivery of audio content to electronic media players on demand allowing users to listen to the content at the time of their convenience [31]. The audio content can be delivered automatically to electronic media players if users subscribe to feeds using technologies such as Really Simple Syndication (RSS) [3] or users can download the content manually. The delivery of video content in a similar manner is called videocasting [12]. As reported by [35], users who subscribe to their desired (RSS) feed do so through media aggregator software which automatically download predefined content to the users' electronic devices whenever there are new updates on the site.

Ractham and Zhang [35] suggest that podcasting eases content publication and subscription relieving users from time-consuming information searching, updating and downloading [35, p.314]. Academic materials such as class lectures, assignments, audio or video recording of class sessions can be uploaded on an instructor's website, tagged with RSS feeds and automatically distributed to students who subscribed to RSS feeds once an upload or an update has been made. This removes the need for students to go to the instructor's website to check whether content has been updated.

Podcasting also provides an opportunity for students to improve their social networking and collaboration activities on research work [35]. If students are collaboratively working on a research project, as is the case in research commons, podcasting enables them to get immediate updates of what their colleagues have done on the project through automatic downloads of updates making communication easier.

2.8 Learning Management Systems

A LMS is a software package that enables the management and delivery of course content and resources to students [44]. Most LMSs are usually web-based systems that allow students to access learning materials from anywhere and at any time [44]. Typically, LMSs allow students to register for a particular course and they provide facilities for instructors to create and deliver content, monitor participation of students and assess their performance [38]. Registered students can use LMS's interactive features such as threaded discussion forms, video conferencing facilities, and messaging systems. To understand the functions of a LMS, this paper presents common features which are present in the Moodle LMS (see section 3.2).

2.9 E-Learning with Peers

The Internet offers an improved means to create, share and distribute knowledge allowing instructors to deliver content to students online [35]. It also allows students to easily collaborate on academic work online. SNSs and LMSs are some of the media platforms on the Internet where students can interact and collaborate on matters which can either be academic or non-academic. LMSs are designed to be used for academic purposes while SNSs are currently most popularly used for non-academic purposes. The aim of LMSs is to ease the management and delivery of course materials rather than promoting social interaction. Interaction in a LMS is mostly among students who have enrolled on the same course. On the other hand SNSs are designed to foster social interaction in virtual environments [34] presenting a greater

opportunity for enhancing student interaction and learning when used for academic purposes.

Students are used to interacting on SNSs with different people on issues which are mostly non-academic. A study by [34] on college students' social networking experience revealed that 84% of the students used SNSs for communicating with friends. Specific responses revealed that 50% out of the total percentage (84%) used SNSs to communicate with friends not on campus, 17.39% with friends on campus and 13.04% with friends they rarely saw. The remaining 4.35% did not specify the type of communication. Using SNSs for learning can therefore present many opportunities because most of the students are already spending much time on SNSs, are familiar with the fundamental concepts thereof and enjoy the interaction.

2.10 Conclusion

The use of LMSs at universities and in different organizations is very wide spread because of the features they provide which simplify the management and delivery of course content to students. Regardless of their wide use, their focus is more on the delivery of content than on the learner. LMSs offer little or no opportunities for learners to interact and collaborate on different works and to author content which can contribute to the knowledge which is already available in the systems as provided for in most of the Web 2.0 applications which are the most common applications in use these days.

The inception of Web 2.0 technologies saw the rise in popularity and the wide usage of SNSs among people of different ages with a large population

of university students being members of one or more SNSs. Their popularity for use academically is however low as compared to LMSs because they are more associated with informal social activities which tend to occur in non-academic circles. Studies have shown that most of the university students who are members of a SNS use the site for interacting with friends who are either on campus or outside campus or for obtaining information which does not directly relate to their studies. SNSs, however, provide features which promote interaction and collaboration among users which are not available in most of the LMSs. Using the features available in SNSs for academic purposes can make learning easy and exciting. The potential power of these features for learning is what prompted the development of SNSs like Elgg and Mahara which were built with the purpose of supporting learning. Integrating these features into LMSs can help universities change the focus of LMSs from content delivery to learners and learner interactions without the need to completely rebuild the LMS or for the users to completely change the way they used the LMS or interact with each other within the system.

Chapter 3

Design

3.1 Introduction

To conduct the study, two open source software applications, a LMS, Moodle and a SNS, Mahara were integrated through a SSO which allowed users who were authenticated with Moodle to access Mahara through a link on the Moodle page without needing re-authentication for Mahara. The users could also move from Mahara to Moodle without any requirement for re-authentication. The original project plan was to integrate Moodle as a LMS and Elgg as a SNS. Moodle was selected because of the rich features which it provides for the management of the e-learning process and also because it is used by Rhodes University to manage the delivery of courses and course contents to students complementing their classroom learning. Elgg was selected because of the rich social networking features the software provides for learning and also because there existed an Elgg integration block which would simplify the integration process using any version of Moodle prior to

version 1.9 and any version of Elgg prior to version 0.9. However, the original plan changed because of the problems which arose, and which are discussed in section 3.4 below.

3.2   The Moodle LMS

Moodle is an Open Source LMS developed to assist educators to manage online learning. In Moodle, users are separated by the roles they are assigned in the system [29]. A role defines what a user is allowed to do within a system. The following roles are defined for the users of the Moodle:

1. **Site administrator**: Users in this category have permissions to perform any function within the system.

2. **Manager**: The manager role is similar to the administrator role but the difference is that the rights of a Manager can be edited while that of the administrator cannot be edited.

3. **Course creator**: Users in this category have rights to create new courses within the system.

4. **Teacher**: Teachers can do anything within a course, including changing the activities and grading students.

5. **Student**: A user with a student role can participate in the course activities.

In addition to defining user roles, Moodle provides the following functions:

1. **Courses** - Courses are spaces in Moodle where teachers add learning materials for their students. Courses can be created by administrators, course creators and managers. Teachers can then add content and reorganise courses according to their own needs.

2. **Activities** - An activity refers to what a student can do to interact with other students or a teacher. Standard Moodle provides fourteen different types of activities some of which are explained below:

   - **Assignments** - This module allows students to upload assignments and teachers to review them and provide feedback including grades.

   - **Chat** - Chat allows course participants to have real-time synchronous discussion in a course module.

   - **Forums** - Forums allow students and teachers to exchange ideas by commenting on posts. Forums are used for asynchronous discussion on a particular topic.

   - **Workshops** - Workshops are peer assessment modules that allow students to submit their assignments and be able to assess assignments of their peers. Course participants get two grades which include the grade of the work they submitted and the grade of how well they assessed their peers.

3.3   The Elgg SNS

Elgg is an open source social networking engine that provides a robust framework on which to build all kinds of social environments [11]. As reported by O'Hear [33], and the founders of Elgg, Werdmuller and Tosh [48], the networking engine was specifically developed to support learning with a focus on learner interactions. The engine provides an informal space for learners to exercise their thoughts through "personal web publishing", to reflect, to connect with others, to create adhoc communities around similar interests in the online space, and to be able to share different types of files. It also allows the users to create their own personal network and tag their content with keywords in order to connect with other users with similar interests. Another useful feature is the option to create access controls over the content users create which determine the control other users have over the content. Access controls can range from fully public, enabling all the users of the system to comment on the content to only readable by a particular group or individual. Some of the useful features for learning offered by Elgg include blogging, podcasting, creating online profiles and an RSS reader. Elgg combines elements of blogging, e-portfolios, and social networking to create a personal landscape for learners [48]. A Personal Landscape/Learning Environment is an environment that provides learners with their own spaces to develop and share ideas which is under their control [2].

3.4   The Original Project Plan and Problems Faced

The original project plan was to integrate RUconnected and the latest version of Elgg. To do the implementation, the following activities were planned:

1. Install the previous versions of Moodle (version 1.8) and Elgg (version 0.8) which worked with the Elgg integration block;

2. Integrate the two systems using the Elgg integration block;

3. Conduct an investigation of how the Elgg integration block integrated these two applications;

4. Update the Elgg integration block based on the findings of the investigations in step 3 above to work with the latest version of Elgg and version 1.9 of Moodle. Moodle version 1.9 was selected to enable the integration of Elgg with RUconnected; and

5. Implement the integration of Elgg and RUConnected.

Task 1 was successfully implemented while Task 2 was partially implemented. The other tasks were not implemented at all because of some challenges which were faced during the implementation. In Task 2, the Elgg integration block was implemented to work with version 1.9 of Moodle. The integration of Moodle with Elgg was not carried out because the instructions to implement the integration are no longer available online. The original author, Penny Leach, was contacted but she responded that she could not assist with the instructions because she last worked on them in 2005 and did not have a copy

which she could share. She further explained that she had left the project implementing Moodle/Elgg integration the same year she developed the instructions and has never been involved in the project since then. Enquiries on the Moodle/Elgg integration online forum requesting the members' assistance, and direct emails to members who actively participated on the forums and worked on the project, all failed to yield useful results.

Research on the Moodle forums [29] as to why Moodle/Elgg integration is no longer being developed and supported yielded the following information:

1. Elgg had a major rebuild when version 1.0 was released which did not take into consideration the integration with Moodle which in turn broke most of the plugins;

2. The developers of the Elgg integration block disagreed with many technical decisions the main Elgg developers were making which made the Elgg integration block project unsustainable.

For the reasons mentioned above, the developers of the Elgg integration block moved on to develop the Mahara system.

3.5   A Solution to the Problem

In order to avoid delays to the project, a decision was made to replace Elgg with Mahara as the Social Network platform of choice for the research. Mahara is a system combining e-portfolio and social networking features as described in detail below. Like Elgg, Mahara is also open source software.

3.6 The Mahara SNS

According to [26], Mahara is a system that combines features of an e-portfolio, (that allows students to record evidence of lifelong learning) and features of social networking system that allows students to maintain and interact with a list of their friends within the system and create their own online communities. Mahara gives users control over which items and what information (artefacts) within their portfolio other users can see. To grant other users access to artefacts, owners of the artefacts bundle them up and place them in one area in what is called a View/Page. A user can have as many Views as he/she likes each containing a different collection of artefacts, and intended purpose and audience. Access to a view can be granted to a user as an individual or as a member of a group or community. E-portfolio owners can create Views with the following characteristics [26]:

1. e-portfolio owners can receive public or private feedback on their View and artefacts within that View.

2. Users accessing a View can report any objectionable material directly to the Site Administrator.

3. Users can add Views and artefacts within a View to their Watchlist and receive automated notifications of any changes or updates.

4. e-portfolio owners can submit a View for Assessment by a tutor or teacher allowing for a snapshot of the View and associated artefacts on a certain date.

Other features of the system include the following [26]:

1. **File Repository** - The File repository allows users to create folder and subfolder structures and upload multiple files.

2. **Blogs** - Mahara allows users to create blogs and configure them on whether or not comments may be received on the blog. Blogs and blog postings are considered artefacts and may be added to a View.

3. **Social Networking** - Mahara provides social networking features that allow users to create and maintain a list of friends within the system. Users can choose whether other users can add them to their friends list automatically or by request and approval.

4. **Resume Builder** - Resume builder in Mahara allows users to create a digital CV containing contact and personal information, employment and educational history, certifications, accreditations and awards, books and publications, professional membership, personal, academic work and work skills, and personal, academic and career goals.

5. **Profile Information** - Mahara allows users to share details through a variety of optional profile information fields including student ID, introductions, profile photos, Skype, MSN, Yahoo user IDs and postal address and contact phone numbers.

6. **Interface with Moodle** - Mahara provides a SSO capability that allows users, at the option of the administrator, to be automatically logged on to both their Mahara and Moodle accounts by providing a username and password at only one of these sites. The user can sign on at Mahara, and click on a link to her Moodle account, or sign on at

Moodle, and click on a link to her Mahara account.

As discussed on the Moodle forums [29], some of the advantages of using Mahara to integrate with Moodle over using Elgg for the same purpose are as follows:

1. Mahara and Moodle have similar plugin systems and a lot of underlying similarities in libraries;

2. Mahara was designed from the beginning to interface cleanly with Moodle;

3. Mahara has a tighter integration with Moodle through a SSO; and

4. Features of Mahara overlap with features of Elgg, and extend these

The replacement of Elgg with Mahara therefore did not affect the results of the research since the features of Elgg were replicated in Mahara. Switching to Mahara also enabled the author to interact with developers of Mahara/Moodle integration since the project was active.

3.7 The Integration of Moodle and Mahara

According to [8], there are two ways a LMS can be integrated with a SNS. The two ways are:

1. Extending a LMS through the inclusion of interfaces to allow integration with other systems which provide features for informal learning; and

2. Integrating features that allow informal learning directly in the LMS.

Both these approaches have advantages and disadvantages. To integrate Moodle and Mahara, we used the first approach mentioned above. The integrated system allowed users logged in to Moodle to access Mahara without being authenticated again through a SSO. The disadvantage of this approach is that it is only based on the exchange of information which is only in one direction. The exchange of information of the integrated system is only from Moodle to Mahara and not vice versa. The approach was however appropriate for our research approach because of the time limitations.

3.8   How the students Used the Integrated System

Students who registered for the CS1L2 course used the integrated system for 5 weeks. The class had a peer tutoring system similar to that suggested by Boud [6] where students from senior Computer Science classes were assisting the students during the practicals. All the practical assignments which were done during the 5 week period were uploaded and organised on a page the students created in Mahara. The page was shared with their tutors for marking and also for them to provide feedback directly on the page. The students were added to groups which were created in the system according to their normal tutorial groups. The aim of assigning them to groups was to enable them interact with other students (within their groups) and their tutors. All the users of the system had rights to create additional groups within the system as they wished.

To login to the integrated system, the users were using different login credentials to those they used to access the Moodle-based LMS used by Rhodes University. This created challenges because most of the students confused the credentials they used to login to RUconnected with those required to login to the integrated system. The other challenge was the accessibility of the system which was initially possible from the campus network only. This reduced the system usability because only students who were resident on the university campus were able to access the system after teaching hours. This was however taken care of after seeking permission from the ICT department to make the system accessible from outside the university campus.

3.9 Ethical Considerations

Clearance was obtained from the research ethics committee before the study commenced, as per the requirement to obtain clearance prior to conducting the study for all studies where human beings are subjects. An "Ethical Standards: Research Protocol" form was completed and submitted to the research ethics committee together with the consent form, the questionnaire, and the debriefing form for approval of the research.

Completion of the questionnaire was voluntary and the students were free to withdraw at any stage if they felt uncomfortable providing the information requested. To ensure that the students are aware of this, all the information was provided at the start of the questionnaire. The information included the aims and objectives of the research and the assurance of the privacy of the students at any other stage of the research. The students were assured

that any information they provided during the study would be used solely for the purpose of the study and that no student would be identified with the information they provided. Participants were required to respond to a mandatory question where they confirmed that they were informed and their participation was voluntary.

3.10 Conclusion

Despite initial setbacks in the design process caused by the state of the Elgg project, Mahara was found to be not only a suitable replacement but a better option, allowing simpler integration with greater benefits.

Chapter 4

Implementation and Results

4.1   Introduction

As indicated in section 3.4, the original project implementation plan was
to integrate a SNS with the Moodle-based LMS (RUconnected) used by
Rhodes University. The implementation, however, did not go as planned
because at the time of the project implementation, there was no-one as-
signed to maintain the Moodle software on which RUconnected was running.
For this reason, we ran a test server designed to emulate the university's
Moodle server. We sourced Moodle version 1.9 and modified it to look sim-
ilar to RUconnected by implementing the theme used by RUconnected and
installing additional plugins which were installed in RUconnected. To dif-
ferentiate between the Moodle-based LMS used by Rhodes University and
the Moodle-based LMS used in the study, the Moodle-based LMS used by
Rhodes University will be referred to as "RUconnected" while that used in
the study will be referred to as "test RUconnected"

4.2 Implementation Environment

The integrated system was installed on a virtual machine which was hosted at the data centre in the Department of Computer Science of Rhodes University. The operating system environment was Ubuntu Linux version 11.10 and both Mahara and Moodle used MySQL version 5.5.24 as the database engine.

4.3 Implementation of the SSO

The test RUconnected and Mahara were installed in the host environment before the integration was done. The following steps were followed to integrate the two systems:

1. Enabled network settings on the test RUconnected, a process which created a public encryption key to communicate with Mahara. A similar process (which also created a public encryption key) was carried out on Mahara for it to be able to communicate with test RUconnected;

2. Created an institution in Mahara to be used to communicate with the test RUconnected;

3. Installed an authentication plugin (XMLRPC) in Mahara for the institution which was created;

4. Configured the authentication plugin with the details of where the test RUconnected was installed, which included the details of the root directory of the test RUconnected, the listening port, and the direction

of SSO (which was from Moodle to Mahara). Other configuration information included the requirement to auto-create users roaming from the test RUconnected to Mahara on first access, and the importation of profile and the login information from test RUconnected to Mahara;

5. Mahara was added as a peer in test RUconnected, and Moodle fetched the public encryption key which was created on Mahara based on the peer configuration information;

6. Configured two services (SSO(Identity Provider) and SSO(Service Provider)) on test RUconnected. The SSO(Identity Provider) was published as a service to allow users to roam from test RUconnected to Mahara. By doing this, Moodle publishes a service to Mahara which identifies the users roaming to Mahara. The SSO(Service Provider) was activated as a subscriber service to allow users to subscribe to the test RUconnected services;

7. Enabled the Moodle Network Authentication plugin on test RUconnected and configured it with additional information of the host environment for Mahara;

8. Activated the function to enable the users to roam to Mahara which completed the integration process; and

9. Finally, a link was added to test RUconnected homepage to take the users to Mahara.

On first access to Mahara through the link provided on test RUconnected, the user details including profile information were imported from test RU-

connected to Mahara.

4.4 Development of the Questionnaire

To assess the education impact of integrating a LMS and a SNS, the research was designed to gather and asses the opinions of students on their experience using the integrated system. A survey approach using a questionnaire was used to collect study data. After the first draft questionnaire was developed, Mrs. Ingrid Siebörger was asked to help to review the questionnaire and provide suggestions for improvement. Mrs. Siebörger was engaged because of her experience in questionnaire-based research. The questionnaire had four sections which were used to collect 1) the respondents demographic information which included their age, gender, degree they registered for and their year of study, 2) their use of RUconnected, 3) their use and familiarity of SNSs, and 4) their experience using the integrated Mahara and RUconnected. In order to reduce the time taken to complete the questionnaire and to simplify the process of completing the questionnaire, most of the questions required the participants to select answers that applied, rank the answers based on their importance with few open-ended questions to collect information which the questionnaire did not include but applied to the participants. Likert scale type of questions were limited to 4 choices in order to discourage the respondents from selecting the middle choice which in most cases is neutral. The likert scale questions of the questionnaire module of Moodle which was used to develop the questionnaire is designed to use a 1 to 5 scale which led to responses being rated with decimal points. To improve the visibility of the

questionnaire, it was accessible through the main test RUconnected page and also on the page the students accessed course materials.

4.5 Data Gathering

The questionnaire was distributed to applicants using the questionnaire module in test RUconnected, and the students were requested to complete it, although they could opt out of participating if they wished to do so. In addition to the online questionnaire, the tutors were requested to give their opinions on the use of the integrated system, by email. The questionnaire which was used to collect data for the research was run from 24th September, 2012 to 4th October 2012 to allow the participants to have ample time to make a decision on their participation since completion of the questionnaire was voluntary.

Out of the 207 students who registered for the CS1L2 course, 63 students completed the questionnaire. Out of the 14 tutors for the course, 7 tutors responded to the email mentioned earlier requesting feedback on their experience of using the integrated system. The results of the survey are discussed in detail below and the discussion is based on the major sections of the questionnaire and the objectives of the research.

4.6 Data analysis

The questionnaire module in Moodle groups related questionnaire data together and produces graphical representations of the data. The plotted

graphs were used to analyse the data collected using the online question-naire.

4.7 Respondents' Demographic Information

The majority of the participants (60%) were female and the remaining participants (40%) were male (Figure 4.1).

Response	Average	Total
Male	40%	25
Female	60%	38
Total	100%	63/63

Figure 4.1: Respondents' distribution by gender

The largest group of the participants (98%) were in the age range of 18 - 24 years and the remainder (2%) was in the age range of 25 - 29 years (Figure 4.2).

Response	Average	Total
18 - 24	98%	62
25 - 29	2%	1
Total	100%	63/63

Figure 4.2: Respondents' distribution by age

The majority of the participants (61%) were pursuing a Bachelor of Pharmacy degree. The other participants were pursuing Bachelor of Law degree (5%), Bachelor of Arts, Humanities degree (8%), Bachelor of Science degree

(6%), Bachelor of Commerce degree (2%) and the remainder (2%) did not specify the course (Table 4.1).

Course	Number of Students
Bachelor of Pharmacy	41
Bachelor of Law	3
Bachelor of Arts, Humanities	5
Bachelor of Science	4
Bachelor of Commerce	1

Table 4.1: Distribution of respondents according to courses

As can be seen in figure below (Figure 4.3), the majority (73%) of the participants were first year students. The other participants were in second year (16%), third year (2%) and fourth year (6%).

Response	Average	Total
1	75%	46
2	16%	10
3	2%	1
4	7%	4
Total	97%	61/63

Figure 4.3: Respondents' distribution by year of study

4.8   Use of RUconnected

The study collected information on how the students used the RUconnected LMS before they started using the integrated system so as to have a basis

for comparison of their behaviour using the integrated system. A total of 59 students responded that they had used or were using RUconnected in the courses for which they were registered. The remaining 4 students did not respond to this question. As can be seen in the figure below (Figure 4.4), the students used RUconnected mainly to access course materials which had a rating of 3.8, and to submit assignments which had a rating of 2.9. The students rarely used the system to interact with other students or staff on non-academic work, both of which had a rating of 1.3. The students seldom used RUconnected to interact with peers on academic work and academic staff on academic work, collaborate with peers on academic work and assess work of their peers.

	Average rank				
	Never	Seldom	Almost Often	Frequently	
Accessing course materials				▮	3.8
Submission of course assignments			▮		2.9
Interacting with peers on academic work		▮			1.7
Interacting with peers on non-academic work	▮				1.3
Interacting with academic staff on academic work			▮		2.1
Interacting with staff on non-academic work	▮				1.3
Formal collaboration on academic work e.g group assignments			▮		2.0
Assessing work of peers		▮			1.6
Other	▮				1.4

Figure 4.4: Students' use of RUconnected

As can be seen in the figure below (Figure 4.5), the majority of the students (97%) found the features for downloading of course materials to be

the most useful in RUconnected. The other useful features were for submitting assignments online with 62% of the students mentioning this feature as being useful and for accessing online news and announcements with 52% of the students mentioning this as being useful. The least useful features were for instant messaging (5% of the students indicated this), discussion forums (8% of the students indicated this), online calendars (21% of the students indicated this) and online quizzes (14% of the students indicated this).

Response	Average	Total
Discussion Forum	5%	8
Online sssignment submission	23%	39
Downloading of course materials	37%	61
Instant messaging (Chat)	2%	3
Online Calendar	8%	13
Online news and announcements	20%	33
Online quiz	5%	9
Other	1%	1

Figure 4.5: Students' perspectives of the useful features of RUconnected

The students found RUconnected to be very effective for accessing course materials (rating of 3.7) and for obtaining help from their lecturers (rating of 2.8). They found the system partially effective for giving to or obtaining help from peers on academic work and as a platform for interacting with peers on non-academic matters (Figure 4.6).

	Average rank				
	Not effective at all	Less effective	Moderately effective	Very effective	
Giving or obtaining help from peers on academic work		▪			2.3
Interacting with peers for non-academic purposes	▪				1.7
Obtaining help from lecturers			▪		2.8
Obtaining learning materials				▪	3.7

Figure 4.6: Effectiveness of RUconnected

4.9 Use of and Familiarity with SNSs

The study also collected information about the students' existing behaviours using a SNS service - their familiarity with SNSs and the reasons they used SNSs - so as to have a basis for comparison with their use of Mahara. Facebook was the most popular SNS among the students with 97% of the students responding that they were using the site or have used the site in the past. The second most popular SNS was Twitter (53%) followed by Google+ (51%) (Figure 4.7). There was one participant who indicated not belonging to any SNS. There was no participant who indicated having used or using Orkut or Bebo SNSs even though there were on the list of SNSs the students were given to select from. Most of the participants, who listed using other SNSs which were not on the list provided, indicated using Skype, Whatsapp and Mxit indicating a high interaction among the students using instant chat programs.

The students used SNSs mainly to connect with family and friends with 97% of the students indicating this as their reason for using SNSs (Figure

Response	Average	Total
Facebook	32%	61
Google+	17%	32
LinkedIn	3%	6
Hi5	2%	3
Flickr	5%	9
Myspace	7%	13
Netlog	3%	5
Badoo	2%	3
Twoo	2%	3
Twitter	19%	35
Tagged	2%	3
LiveJournal	1%	2
Friendster	2%	3
None	1%	1
Other	5%	10

Figure 4.7: List of SNSs the students use or have ever used

4.8). The other uses were information and news gathering (52%), sharing media (51%), making new friendships (48%) and accessing entertainment (41%). The least used functions were blogging (10%), searching for jobs (8%) and interacting with brands (10%). The students rarely used the SNSs for non-formal educational purposes with only 30% of the participants using SNSs to access educational materials and 25% of the participants using SNSs to conduct research.

Instant messaging is the most popular feature in SNSs among the students with 83% of the respondents indicating this feature to be the most useful. This was followed by asynchronous messaging similar to email (68%), image uploading (65%), photo sharing (62%), friendship management (accepting

Response	Average	Total
Connect with friends and family	21%	61
Make new friendships	10%	30
Information and News gathering	11%	33
Free SMSs	6%	16
Sharing media	11%	32
Research	6%	16
Blogging	2%	6
Searching for jobs	2%	5
Accessing entertainment	9%	26
Playing games	6%	16
Share opinion	7%	20
Interacting with brands	2%	6
Accessing educational materials	7%	20
Other	1%	2

Figure 4.8: Students' use of SNSs

and denying friendship requests) (54%) and social networking groups (46%). The features considered least useful among the students are blogging (9%) and forums (8%) (Figure 4.9).

4.10 The Impact of Integrating Moodle and Mahara

4.10.1 Perceived Usefulness of the Features of Mahara

The participants did not respond finding the features of Mahara (including the features they used as part of the CS1L2 course and those they might have used at their own initiative) particularly useful for their learning. These fea-

Response	Average		Total
Chat room		6%	18
Instant messaging		16%	52
Image uploading		13%	41
Blogging		2%	6
Social networking groups		9%	29
Forumns		2%	5
Games		4%	13
Tagging		6%	19
Messaging (similar to email)		13%	43
Photo sharing		12%	39
Listening to music		6%	20
Friendship management (Accept/Deny)		11%	34
Other		0%	1

Figure 4.9: Students' perspective of the useful features of SNSs

tures they were requested to rate were the file repository (which they used to upload, store and download files during the course), the journal (which is used for blogging, but they were not requested to use during the course), social networking (which they used to make friendships and groups and communicate both synchronously and asynchronously with other participants), and creation of an online profile (that could identify them in both Mahara and Moodle) (Figure 4.10).

	Average rank				
	Not useful at all	Less useful	Moderately useful	Very useful	
File repository (File uploading, storage and downloading)			▮		2.1
Blogging		▮			1.7
Social Networking (Interacting with peers)		▮			1.9
Building and displaying your profile with additional feature provided on RUconnected to other users		▮			1.9

Figure 4.10: Rating of the usefulness of the features of Mahara

There was an equal split on the perceived usefulness of the features of Mahara in terms of helping students to organise their work from the feedback provided by the tutors. Half (three tutors) responded that they found Mahara to be useful for organising the work of the students while the other half (three tutors) responded finding it to be complicated and therefore not useful for organising the work of the students. The remaining tutor did not give his opinion. Those that found Mahara to be useful cited the ability to comment directly on the work of the students and the use of tags which made it easier to search for specific work as some of the most useful features. The tutors who disagreed felt that the system was too complicated to be used for just organising the students' work and integrating Mahara with test RU-connected was unnecessary because RUconected provided all the necessary functions.

4.10.2 Perceived Impact of Using the Integrated System for Learning

The students found integrating the test RUconnected with Mahara to have few direct educational benefits (Figure 4.12) and to have minimal impact in establishing new connections or relationships with other students, strengthening existing relationships with other students, improving access to a wide variety of information, simplifying the process of obtaining help from fellow students, simplifying the collaboration of students on academic work, or simplifying the process of obtaining and providing feedback to other students on academic work (Figure 4.11). This is despite the students having created friendships and collaborated on one of the practical assignments. Almost all the students had friends in the system with some having over twenty friends on their list of friends. A close look at the different friendships which existed in the system shows the likelihood of the students replicating the friendships they had either through other SNSs or offline. Most of the students had friends from the same year of study and few students had friends who were in a different year of study.

Most of the content the students created in the system were their profiles and the work they uploaded after completing their practicals. The practical assignments were shared with their tutors for marking and feedback and they were not accessible to other students. The students did not create, at their own initiative, pages containing work which they could have shared with other students for comments and feedback. There were however some students who communicated through writing on the walls of their friends asking each other about the progress they were making on their practical

	Average rank				
	No impact at all	Minimal impact	Moderate impact	Great impact	
Establishing new connections or relationships with other students		▮			1.8
Strengthening existing connections or relationships with other students		▮			1.8
Widening access to a variety of information		▮			1.9
Accessing help from fellow students		▮			1.9
Simplifying collaboration on academic work		▮			1.9
Simplifying the process of obtaining and providing feedback on academic work		▮			1.9

Figure 4.11: Students' perspective of the impact of using integrated RUconnected and Mahara

assignments, but many received no responses, preventing conversation and ensuing peer learning from taking off. The same problem of lack of willingness by other students to use Mahara in the same way they used other SNSs might have demotivated the students who were keen.

4.10.3 Perceived Usability of the Integrated System

The results of the study show that both the tutors and students found the user interface of Mahara problematic. According to the feedback obtained from the tutors, the students complained of the many steps they were required to perform to complete a particular task. For example, to share their work with a tutor, the students created a page, uploaded their files to the system, dragged and dropped the files to the page they had created and finally they had to find their tutor on the system and then share their files

with the tutor. In the subsequent practicals, the students were not required to do all these steps but just add their new work to the page they had already created and shared with their tutors. The aim was to help the students to organise all their practical work in one page to which they could easily refer. However, some students were creating a new page for every practical assignment which made the task of submitting their assignments each time through Mahara significantly more complicated than doing the same in RU-connected. In RUconnected, the students performed only one step to submit their work which was to upload their files to the system. The complication of Mahara might have discouraged the students from logging in frequently to Mahara with the same frequency they logged in to other SNSs (Figure 4.12).

The feedback provided by the tutors on the usability of the integrated system from their perspective echoes the responses of the students that Mahara is not user friendly even though some tutors did not directly mention this. Only three out of seven tutors provided feedback on the usability of the integrated system from their point of view. The other tutors responded to the question but their answers were from the point of view of the students. The first tutor responded that the system was easy to use since they were experienced in the use of such systems. The second tutor responded that the system seemed easy to use but did not elaborate. The third tutor mentioned that the system was difficult to use. Among the challenges the tutors faced were moving between students' submissions for a particular practical submission which made marking of students' work difficult. They also mentioned the lack of spell-check facility, the absence of the option to select a student grade which tutors were familiar with in RUconnected and missed in Mahara,

and the difficulty to correlate the feedback to a particular student's work on a page which contains more than one work for a particular student. The tutors were however of the opinion that the interface for providing feedback to the work of the students in Mahara was easy despite these limitations.

Most of the tutors complained on the use of aliases as display names by most students, in the same way they did in other social networks which caused problems for the tutors when marking their work. The tutors had problems identifying the students from their aliases. They therefore proposed removing this flexibility to avoid these problems. When creating a profile in Mahara, users input their first name, last name, display name (optional) and an introduction (optional). If a user has a display name, the real name is not visible to regular Mahara users except administrators who are able to see both the real name and display name.

The tutors were of the opinion that the integrated system should have been tested with students who had never used RUconnected before, suggesting that the experience the students had of using RUconnected affected the way they used the integrated system. They observed that there was reluctance by some students to switch to using the integrated system. The students felt that RUconnected managed by Rhodes University met their needs and it was not necessary to use a separate system to do similar work. Students displayed little understanding of the benefits of using social networking for peer learning and some made comments to the tutors and lecturers that indicated some resistance to the very idea of social networking in a formal educational space. For example, one of the students sent a message to a tutor which read *"This is my work for the 2nd excel practical. By the way*

I think this social networking thing is going too far. Why can't we hand in our work through the normal RUconnected ..." when submitting the second assignment. The tutors also complained of lack of training for them. They believed that if they were trained more extensively on how to use the system, they would have assisted the students better which would have led to more favourable responses. The tutors also believed that testing the integrated system with the Computer Science literary class was not a good idea because of the level of computer skills of the students in the class. They felt that it would have been better if it was tested with the Computer Science (CS102/102) first year students who would have learned how to use the system faster. This however would not have been representative of the average students of the University.

4.10.4 Perceived Appropriateness of using Social Networking as a Pedagogical Tool

The results of the study show that the students were not ready to adopt social networking using an unfamiliar SNS as part of their studies. This can be seen from the students' responses where they indicated that they are more interested in using familiar SNSs like Facebook and Twitter, although there is no data indicating whether they would be happy using these as part of formal educational courses. A similar recommendation was made by one of the tutors who suggested that using a familiar SNS would have made the students easily accept the use of social network as part of their studies.

There were mixed comments among the tutors on the use of social networking as part of studies with some for it and others against it. Some of

those who were for using social networking indicated that Mahara made it easy for them to interact with the students. They were able to interact with students both as individuals and as a group. They however indicated that social networking would have been educationally beneficial if the social networking features were included as part of RUconnected rather than being integrated through a separate system possibly due to students already being familiar with and having committed to using RUconnected for academic purposes. Some of those who were against using social networking as part of studies felt that it promotes laziness among the students. One tutor mentioned that the students' interactions encouraged them to give each other answers and did not encourage them to think on their own and understand how to solve problems which would affect them during examinations where interactions are not allowed. Some felt that RUconnected is robust enough to support student learning and integrating with a SNS just make things complicated. They did not seem to see many potential benefits offered by making e-peer-learning possible, and their opinions were very possibly coloured by the students feelings and use of Mahara, and the fact that they did not experience much benefit from it.

	Average rank				
	Not applicable	Less applicable	Moderately applicable	Very applicable	
Having a social networking platform integrated with RUconnected made me log in more often to the system than I used to do using RUconnected alone	▮				1.5
The new features Mahara offered were useful to me		▮			1.8
There is direct educational benefit in using Mahara software		▮			2.0
I used social networking features of Mahara to get to know my classmates better		▮			1.7
The integrated system made it easier to find people to work with for informal peer learning, or to contact about course-related matters (e.g. Finding someone to ask about a test or something similar)		▮			1.8
I found that I could take advantage of the connections I made for other academic purposes		▮			1.8
I found that I could take advantage of the connections I made to totally non-academic purposes e.g. using the social network component to arrange to meet friends	▮				1.6
I found the interface for the social network easy to use		▮			1.9
I am only interested in using familiar social networking software like Facebook or Twitter			▮		2.7
I dislike familiarising myself with new software		▮			2.0
I found being limited to interacting with classmates frustrating and would have used Mahara more if I had been able to interact with friends who are not in my class		▮			2.0

Figure 4.12: Rating of the usefulness and the impact of using the RUconnected integrated with Mahara

Chapter 5

Discussion

5.1 Introduction

This chapter discusses the findings which were presented in the previous chapter. The discussions will form the basis for a conclusion which is made in the next chapter. The discussions are based on the direct responses of the participants, the pattern observed in the responses, and the observations which were made during the study.

5.2 Use of RUconnected

The students used RUconnected mainly as a repository for course materials rather than as a platform for interactive and informal learning. Figure 4.4 shows this pattern where students responded using RUconnected mainly to access course materials and that they rarely use it to interact with peers on both academic and non-academic work and to collaborate on academic work.

This usage of RUconnected is also confirmed by the pattern of responses in Figure 4.6 where the students indicated finding the system to be very effective for obtaining learning materials and partially effective for giving or obtaining help from peers on academic work and as a platform for interaction with peers for non-academic purposes. Little or no difference to students' learning would have been experienced if no LMS was in place and the learning materials were distributed as hard copies or as soft copies on external data storage devices, except for potentially making these resources harder to access and easier to lose. The reason the students responded finding the system to be effective for obtaining help from lecturers (Figure 4.6) might have been because of the feedback the students receive on their assignments.

As discussed in section 2.5.2, user interactions are high in SNSs because they allow the users to establish close relationships with a small group of other users in addition to allowing them to establish new relationships which expand their networks [50]. In RUconnected, there are no features similar to those in SNSs that allow users to create online communities with similar interests. Students are only grouped together in the system via being enrolled for the same courses and they do not have rights to create custom groups. The use of RUconnected mainly as a repository for course materials backs up anecdotal evidence suggesting that students log in to the system most frequently when new assignments or course materials were uploaded in the system, when they were submitting their assignments for marking, and before exams and tests. The students did not, on their own, use the system either as a tool to assist them in their learning in a regular manner or to collaborate and share knowledge.

The low rating in terms of importance of the features for instant messaging and discussion forums (Figure 4.5) which were designed to promote student interaction in RUconnected may have been due to the same reason that the students rarely use them or do not use them at all. It might also be because the students have used them but did not find their implementation user-friendly. RUconnected has potential to be used as a platform for students' interactions although to a lesser extent than a SNS like Mahara, but the system does not appear to be used as such leading to the students failing to appreciate the usefulness of these features. While features like workshops (which allow peer assessment) are available in RUconnected, based on the feedback given by the students, they do not seem to be required to use these features by staff making the students fail to appreciate the usefulness of the system for peer learning. This was as suspected and it was hoped that the introduction of a SNS component (which the students are already familiar with in other SNSs) to their learning environment would change the situation.

The features of RUconnected designed to support learner interactions are limited, confirming the theory that LMSs are mainly designed to support the creation and distribution of content to students with little or no support for student interactions and their active participation in the studies [8]. It is possible that the lack of interaction on both academic and non-academic matters among the students and between staff and students in LMSs, using the limited features available, is either due to the LMSs not providing a good platform for interactive and informal learning, or the university staff rarely using the system to promote interactions between students and between staff and students. For a LMS to be used for both formal and informal learning,

students need to be encouraged and given proper guidance in how it works.

5.3 Familiarity with and Use of SNSs

Students like to interact with others as evidenced by the high response on the use of SNSs to connect and interact with friends and family. Except for one participant who indicated not using any SNS, all the participants used at least one SNS. The popularity of SNSs among the students made the use of social networking in education a promising option for promoting student learning through interaction, particularly if they were included as part of a LMS. This was suggested by previous studies and was part of the motivation for testing Mahara with the students at the University. As discussed in section 5.2, the students are not using social networking features in the RUconnected LMS naturally and might therefore need guidance and encouragement for them to start using the features for interactive learning. Another option is to extend the SNS with additional social networking features, similar to those in the SNSs they already use to encourage interactions which was what was done in the study. The students' responses (Figure 4.8) also show that they were using SNSs as a platform for informal learning as shown by the number of responses on the use of SNSs for information and news gathering. However, the use of SNSs as a platform for non-formal learning is very low as shown by the responses on the use of SNSs to access education materials and to conduct research. The trend in Figure 4.8 could suggest that students perceive SNSs as a platform for informal interaction and informal learning rather than for formal educational purposes.

The students' preferences for features in SNSs correspond with their responses on what they use SNSs for. Students mostly use SNSs to connect with family and friends and this is done mainly through instant messaging or sending each other asynchronous messages. The high preference for the features that enable students to upload images to SNSs also relates to high use of SNSs by students to share media files. The low preference for blogs and forums relates to the low use of SNSs to write blogs and as a discussion forum. It is possible that the low usage of forums in SNSs may have led to low usage of the forums in RUconnected. However, the popularity of messaging systems in SNSs does not match with the low popularity of the same features in RUconnected, which is significant, and could indicate that they find the implementation of the messaging system in RUconnected to be poor or difficult to use, or that they use other systems for messaging.

The low rating of the features of Mahara (Figure 4.10) contrasts with the rating of similar features in the other SNSs the students use informally. Except for blogging which the students reported either not using or rarely using in the other SNSs, the students found the features on other SNSs which are similar to those in Mahara to be very useful. For example, Mahara has features which the students used to interact with peers and tutors and to upload images and files which are similar to those they use to interact with family and friends and to upload images in the other SNSs. It is possible that this perception of the social features of Mahara might have been influenced by how the students used the social features in RUconnected, and their understanding of the tool was something for formal learning rather than for use for informal purposes.

The limited usage of forums and messaging features in RUconnected by the students could have been for three reasons which are 1) they had tried these features and found they did not work well/were not user friendly, 2) they tried peer interaction over these features and found it to offer no significant positive contribution to learning, 3) they did not appreciate the usefulness of these features for formal learning, given their usual experience of using these sorts of features informally. The first option was addressed to some extent by trying an alternative software platform offering the limited social networking features offered by RUconnected as well as various others offered by Mahara. The second option is possible to address but would contradict a number of studies on the benefits of peer learning as suggested by [6]. The third seems as likely if not more likely a possibility than the first, given participants feedback about their usage of RUconnected for other courses.

5.4 Use of the Integrated System

The integration of the test RUconnected and Mahara did not make the students log in frequently to the integrated system in the same way they log in to other SNSs (Figure 4.12). According to the results of the study by Sensis in conjunction with Australian Interactive Media Industry Association, users log in to SNSs up to an average of twenty three times a week which translates to an average of three times per day [40]. It is possible that the frequency the students logged in to the integrated system was lower than the frequency the students logged into RUconnected because the students were

still using RUconnected for other courses and having two separate systems
used for similar purposes made them use RUconnected more because they
were already familiar with it. The absence of news and advertisements in
the test RUconnected probably played a role on the failure to attract the
students to use the system. Since the integrated system only hosted course
materials for CS1L2 course, the students would have seen less of a reason to
log in and use the integrated system regularly. One of the indicators of the
low login frequency was that many students requested a reset of their pass-
word just before each practical or when new course materials were uploaded
on the system, showing they had not logged in for a while and had forgotten
it.

It is also possible that the students used the features of Mahara because
they were requested to use it as part of CS1L2 course and did not use them
on their own or explore other features of the system to appreciate the impact
they could have on their learning. This could account for the friendships the
students made within the system not having much impact on their relation-
ships and them not taking advantage of Mahara-based relationships to solicit
from or provide help to other students as it is expected in peer learning. They
either did not do this at all, or used other more familiar channels. This could
be related to the learning culture at Rhodes University, where students did
not report using even the existing LMS software for peer learning activi-
ties, which indicates a lack of use of these features in teaching and learning
by staff. Neither the students nor staff seem to have done what Boud [6]
suggests is necessary, which is to establish peer learning as something that
students do and see value in. There were however students who were keen

to use Mahara in the same way they used other SNSs, and sent friendship requests to other students in Mahara the moment they started using it without being told to do so, possibly carrying over behaviour learned from other SNSs in a more positive way. Lack of willingness of peers to use Mahara the same way they used other SNSs might have demotivated these students - it is no good having friendships within a system if your friends are not logging onto the system and using it. Some students also communicated through writing on the walls of their friends asking each other about the progress they were making on their practical assignments, but many received no responses, preventing conversation and ensuing peer learning from taking off. The same problem of lack of willingness by other students to use Mahara demotivated the students who were keen. It seems the way some students used the social networking features of RUconnected was carried over to the use of Mahara and the students could not adjust and start using the social features of Mahara interactively.

The setup of the tutorial groups might also have affected the way the students used the integrated system. As suggested by [4], students' acceptance of peer learning and its ultimate success mainly depends on the setup of the groups, the group tasks, group membership and how the group is held accountable. In the CS1L2 class, the students were grouped according to tutorial groups and they did not have an option to select the group of their choice. This affected how the members of the group related to each other which in turn affected group interactions. If the students were allowed to select their own groups, it might have been easier for them to create close relationships which would have led to increased interactions both online and

offline [50] and would have led to better interactions in Mahara.

5.5   Usability of the Integrated System

The reason the students and the tutors found the interface for Mahara problematic might have been the omission of training on its use. The users of the system were given instructions on how to use the integrated system which were uploaded on the test RUconnected. The assumption was that the tutors being senior Computer Science students will learn how to use the system very easily, by reading the instructions, and they will assist the students. The assumption however proved to be incorrect and many students and some tutors did not appear to have read the instructions. Even with the support of tutors, some students could not master the process of creating and sharing content in Mahara. The concept of using a page to hold the files was also confusing to many students and they repeatedly asked the tutors to help them check if the files were added to the page. The students are used to directories or folders holding their files rather than adding files to a page, as this fits the standard Windows Explorer model used in the public computer labs at Rhodes University, and the model used by RUconnected. As suggested by Kear [20], a proper implementation plan with a clear purpose known to students and tutors, either through training or an orientation session, was very critical for the success of study.

5.6 Educational Benefits of Integrating a LMS and a SNS

The students found using Mahara to have few direct educational benefits. The possible reasons for this may have been how they used the social features in RUconnected which carried over to Mahara as discussed in section 5.3 above; how the students were made to use the integrated system; or the usability problems of the system. For example, one tutor created a shared folder in Mahara where students were uploading their work in order to simplify the process of submitting assignments through Mahara. This defeated the whole purpose of using Mahara to assist the students to organise their work which they could share with others and get feedback electronically. Creating a single folder where students dropped in their work meant that the tutor could not provide online feedback to individual students on their work which they could access at the time of their convenience. The tutor being referred may have used the system in this manner because of insufficient training on how to use Mahara and lack of orientation on the aim of using the system for learning as discussed in section 5.5.

Lack of content in the system which was accessible to other students also contributed to the integrated system being of not much benefit as a source of information for both academic and non-academic purposes. As discussed in section 4.10.2, most of the content the students created in the system was limited to their profiles and the assignments which they uploaded to the system which were not shareable with other students. The students did not take advantage of the benefits of SNSs as suggested by [8] of helping stu-

dents move from being consumers of content which mostly happen in LMSs to participating in the creation of content facilitated by the social features provided by Mahara. There were however three groups out of the fourteen groups in the system that discussed how to solve some of the problems on one of the practical assignment they had through the forum in Mahara. The content created through the interactions of these groups was, however, too little to have a significant impact and the number of students involved in the interactions was too small to obtain a positive response on the educational benefits of their interactions.

One of the reasons the students were reluctant to collaborate on the practical even though they were given the opportunity to do so might have been the benefits the students envisaged would gain after participating. As discussed by [4], students by nature are used to working individually and competing with each other for grades and would only participate in group activities if they see sufficient benefits for the time they invest in the group work. In the practical work, the most likely benefit was the grade which some students could have obtained by working on their own. The other reason the students created little content which was shareable could once again be related to the organisational culture of Rhodes University where staff do not encourage online peer learning and the limitation of RUconnected to support content creation. It would have been useful to be able to poll the students directly on their responses, or be able to correlate which students responded to the questionnaire with which students tried the group collaboration exercise, but this was unfortunately not possible due to the anonymity guaranteed by the survey.

The use of an unfamiliar SNS in the study might also have led to the resistance from the students to use the social networking features in Mahara and therefore not appreciating the educational benefits social networking can have on learning. Many of the studies on the use of social networking as part of learning which received a positive response used familiar SNSs like Facebook which could be skewing the results of those studies; alternatively the message might be that students do not like to try new technologies, although feedback from the questionnaire suggested this was not the case initially. There is, however, potential for social networking to make an impact on students' learning even with unfamiliar SNSs as evidenced from the responses where the students indicated that they did not find being limited to interacting with classmates frustrating. The students also responded that they have no problems familiarising themselves with new systems, but possibly motivation plays a big role. If the integrated system was used for a longer period, and in most of the courses the students were registered, the students could possibly have become very familiar with it, and the use of social networking in their studies could have made a positive impact. Another indication of this potential is one on the messages the author received from one of the students at the end of the CS1L2 course which read *"the way I understand Mahara now, it is a pity that we will not use it again"*. This suggests that the students started to understand the aim of Mahara more each time they used it, but that this understanding came close to the end of the test period for some students, and might not have occurred at all for others.

Chapter 6

Conclusion and Further Work

6.1 Discussion and Inferences Drwan

In our study, the use of social networking for educational purposes did not receive a positive response from the students as was the case with similar studies discussed in Chapter 2 due to among other factors, the following:

1. The students were not familiar with Mahara, and had difficulties learning how to use the system due to the series of steps they were required to perform to organise their work and to share with their tutors. This together with no training being provided on how to use the system made their learning of the system slow, leading to many students being frustrated. The period the integrated system was tested with the students also proved to be short given the pace at which the students were learning the system.

2. The students were already familiar with and very committed to using

RUconnected which led to their resistance adopting the use of the integrated system. The same also applied to their adoption of Mahara because most students were already committed to using other SNSs like Facebook where they had already established relationships with classmates and other friends outside their classes which was more appealing than being limited to classmates only in Mahara. The students did not initially seem to understand the reason of duplicating the relationships which were already in place digitally elsewhere;

3. The limitation of the system being accessible on campus only (during the first weeks of the system test) did not help in attracting students to use the system. Students staying off-campus had a bad first impression of the system because of this limitation, and they preferred using RUconncted alone (which was accessible off-campus) to using the integrated system;

4. Having the students use Mahara formally to organise and submit their work rather led to the students believing that the aim of Mahara was for formal use and organisation as was the case with RUconnected and test RUconnected rather than mainly as a social network where informal learning and interaction could take place. This together with the reluctance to use the social network for informal academic reasons led to poor adoption and use of the integrated system.

In our study, most students created friendships in the system and collaborated on one of the assignments because they were requested to do so and they did not naturally adopt social networking to support their learn-

ing. This was influenced by the problems discussed above and the way the students were organised for peer learning. In the study, the students were grouped according to their tutorial groups. The ideal situation would have been allowing the students to organise themselves into peer learning groups with close relationships among the members to promote their interactions, and with no control of group interactions by staff as suggested by Boud *et al.* [6].

The results of the study do not rule out the possibility that social networking services can have educational benefits if integrated in the students' studies. For this to work, however, the problems experienced in this study and discussed previously must be avoided/addressed as follows:

1. Proper training must be provided to all involved. As suggested by [20], it is necessary to have a proper implementation plan with a clear purpose known to all (students, teachers and tutors) who will be involved and are key to the success of the idea. The assumption that students' enthusiasm for SNSs like Facebook will be automatically transferrable to their use of SNSs introduced to support academic development, and that social networking platforms will automatically produce positive results if used for academic support, is a mistake.

2. Students should be helped to see clear benefits in using the new system to support their learning which are not offered by existing SNSs of which they are a part. Students should embrace the idea of using social networking in their studies if they see sufficient benefits (which might be both academic and non-academic) for the time they invest in social networking [20]. Among the benefits the students look for

in social networking are being able to interact with other students in addition to classmates, and having freedom and flexibility in using the SNS, like creating groups, as is the case in other SNSs.

3. Lack of system availability and other factors likely to cause frustration must be planned and avoided;

4. The pedagogical reasoning behind the system must be clarified. On top of this, educational institutions interested in using social networking to promote peer learning should seriously look at the following before implementing social networking as part of the e-support structures for students' studies:

   - local and general factors involved in motivating students to use social networking to support their studies;

   - local and general factors that might prevent students from using or wanting to use social networking to support their studies.

5. The educational institutions' staff and policies would need to support and encourage the use of the social networking in education as well.

6.2 Statement of Contribution Made to the Field

This study contributes to the knowledge which already exists on the use of social networking for the purpose of promoting learning. The results of the study suggest that the use of social networking cannot automatically lead

to a positive learning experience for the students. A proper implementation plan of the use of social networking for learning and adequate motivation of the students to use social networking in their learning are key to the success of the use of social networking to promote students' learning.

6.3 Further Work

Future extensions to this study include an investigation of the following:

1. How students' informal use of the Internet tools correlate to their formal use of similar tools for learning and how this can affect the implementation of e-learning programs in formal education;

2. the extent to which the behaviour of staff influences the way students use technology and the extent to which the students naturally carry over this behaviour from formal environments into informal environments and how it affects their learning; and

3. whether using an application that works as a plugin for a SNS like Facebook and offers features tailored for educational use but leverages off the strong popularity of the SNS could create an e-learning support tool that might be more enthusiasticalyl embraced by students.

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Appendix A

Questionnaire

RUconnected

RHODES UNIVERSITY
Where leaders learn

RUconnected ▶ Questionnaires ▶ The education value of a Social Networking Platform integrated with a Learning Management System ▶ Questionnaire Report ▶ View All Responses

RUconnected

You are logged in as System Administrator (Logout)

View	**All responses (63)**	Advanced settings	Questions	Preview

View All Responses   View By Response

View Default order   Ascending order   Descending order   Delete ALL Responses   Download in text format

View All Responses. **All participants**. View Default order ⓘ   Responses: **63**

The education value of a Social Networking Platform integrated with a Learning Management System

Project Title

The education value of integrating a social network platform and a learning management syste

Project Description

In this project the researcher hopes to investigate the impact of integrating a learning management system and a social networking platform on students' learning both formally and informally and on their social interaction. The study is also aimed at investigating whether there are effects on informal social interaction which might feedback into learning and offer indirect educational benefits.

Researcher's Name: Chikumbutso Gremu

About Research

This research aims to understand the impact of integrating a Learning Management System and Social Networking Platform on university students' learning, both formally and informally, and on their informal social interaction. The study is also interested in determining whether, if there are effects on informal social interaction, this might feed back into learning and offer indirect educational benefits. The study uses Moodle as a Learning Management System and Mahara as a Social Networking Platform.

It is hoped that this questionnaire will provide insight into the way students use technology in their daily lives to directly support their learning activities, and also into whether or not a Social Networking Platform can support learning indirectly.

In addition, we hope to identify those factors which both negatively and positively impact on the use of a Social Networking platform and its associated e-learning features for the purposes of teaching and learning.

Please note: Your participation is completely voluntary and you can refuse to participate in answering any of the questions in this questionnaire. In addition, all information retrieved during the course of this study/questionnaire will be treated as strictly confidential. Data that may be reported on in the research report will not include information that identifies you as a respondent in the study.

CONSENT FORM

1. I have received information about this research project
2. I understand the purpose of the research project and my involvement in it
3. I understand that I may withdraw from the research project at any stage
4. I understand that participation in this user study is done on a voluntary basis
5. To my best knowledge I have no physical impediments that will stop me from completing this study
6. I understand that while information gained during the study may be published, I will not be identified and my personal details will remain confidential.

1. I have read and agree with the 6 points listed above

Response	Average		Total
Yes		100%	63
Total		100%	63/63

Section A: Personal Information

2. Your age range

Response	Average		Total
18 - 24		98%	62
25 - 29	2%		1
Total		100%	63/63

3. Gender

Response	Average		Total
Male		40%	25
Female		60%	38
Total		100%	63/63

4. Degree for which you are registered and associated faculty (e.g. BSc., Science).

#	Response

1	BA Law and English
1	B.PHARM
6	BA
3	bpharm
8	Bpharm
1	BA Law
12	BPharm
1	BA., Humanities
1	Bcomm, Psychology
1	BSc Law
1	BSc., Science
1	BSc, Science
1	BA, HUMANITIES
2	BPHARM
4	B.Pharm
1	No
1	b.pharm
4	BSc
1	B.PHARMACY
1	B. Pharm
1	B.Pharmacy
1	B PHARM
1	Pharmacy
1	BPharmacy
1	humanities: Social Science
1	BPharm, Pharmacy
1	BSS
1	b-pharm
1	Bsc Science
1	B/Pharm
1	BPharm.

5. Year of study

Response	Average	Total
1	75%	46
2	16%	10
3	2%	1
4	7%	4
Total	97%	61/63

For Sections B and C below, please respond about your use of RuConnected and Social Networking Systems BEFORE CS1L course.

Section B: Use of RUconnected

6. Do you use Rhodes University RUconnected (hosted at ruconnected.ru.ac.za)?

Response	Average	Total
Yes	100%	59
Total	94%	59/63

7. If you answered Yes in the above question, how often do you use RUconnected for the following purposes?

	Average rank				
	Never	Seldom	Almost Often	Frequently	
Accessing course materials					3.8
Submission of course assignments					2.9
Interacting with peers on academic work					1.7
Interacting with peers on non-academic work					1.3
Interacting with academic staff on academic work					2.1
Interacting with staff on non-academic work					1.3
Formal collaboration on academic work e.g group assignments					2.0
Assessing work of peers					1.6
Other					1.4

8. If you use RUconnected for other purpose(s), please specify them in the space below.

#	Response
1	downloading lecture slides
1	look for grades and notices
1	None
1	I use ruconnected to view academic work.

9. Which features of RUconnected do you find most useful? Please tick all the appropriate answers

Response	Average	Total
Discussion Forum	5%	8
Online sssignment submission	23%	39
Downloading of course materials	37%	61
Instant messaging (Chat)	2%	3
Online Calendar	8%	13
Online news and announcements	20%	33
Online quiz	5%	9
Other	1%	1

10. If you selected other in the question above, please list the other features in the space below

#	Response
1	None
1	Test and tutorial results

11. How effective is RUconnected in terms of the following?

	Average rank				
	Not effective at all	Less effective	Moderately effective	Very effective	
Giving or obtaining help from peers on academic work					2.3
Interacting with peers for non-academic purposes					1.7
Obtaining help from lecturers					2.8
Obtaining learning materials					3.7

Section C: Use and familiarity with Social Networking Systems

12. Which social networking sites have you ever used? (Tick as many as you have used)

Response	Average	Total
Facebook	32%	61
Google+	17%	32
LinkedIn	3%	6
Hi5	2%	3
Flickr	5%	9
Myspace	7%	13
Netlog	3%	5
Badoo	2%	3
Twoo	2%	3
Twitter	19%	35
Tagged	2%	3
LiveJournal	1%	2
Friendster	2%	3
None	1%	1
Other	5%	10

13. If you have selected other in the question above, please list the other social networking sites you have ever used in the space below

#	Response
1	skype, msn
1	Gmail chat and skype
1	Skype
1	instagram,whatsapp,mxit,
1	whatsapp bbm
1	whatsapp
1	Mig33 and Mxit
1	Whatsapp and Mxit.

14. For what purpose(s) do/did you use social network sites? (Tick as many uses as you use)

Response	Average	Total
Connect with friends and family	21%	61
Make new friendships	10%	30
Information and News gathering	11%	33
Free SMSs	6%	16
Sharing media	11%	32
Research	6%	16
Blogging	2%	6
Searching for jobs	2%	5
Accessing entertainment	9%	26
Playing games	6%	16
Share opinion	7%	20
Interacting with brands	2%	6
Accessing educational materials	7%	20
Other	1%	2

15. If you selected other in the question above, please list the other uses in the space below

#	Response
1	Whatsapp

16. Which features do/did you find most useful on the social networking sites you use(d)?

Response	Average	Total
Chat room	6%	18
Instant messaging	16%	52
Image uploading	13%	41
Blogging	2%	6
Social networking groups	9%	29
Forumns	2%	5
Games	4%	13
Tagging	6%	19
Messaging (similar to email)	13%	43

Photo sharing	12%	39
Listening to music	6%	20
Friendship management (Accept/Deny)	11%	34
Other	0%	1

17. If you selected other in the question above, please list the useful features in the space below.

No responses for this question.

For Section D, please respond in terms of where you are right now, having used Mahara system integrated with RUconnected during the CS1L course.

Section D: Impact of integrating a Learning Management System and a Social Networking platform

18. Please rate the impact of having Mahara integrated with RUconnected across the following metrics

	Average rank				
	No impact at all	Minimal impact	Moderate impact	Great impact	
Establishing new connections or relationships with other students		▮			1.8
Strengthening existing connections or relationships with other students		▮			1.8
Widening access to a variety of information		▮			1.9
Accessing help from fellow students		▮			1.9
Simplifying collaboration on academic work		▮			1.9
Simplifying the process of obtaining and providing feedback on academic work		▮			1.9

19. Please rate the usefulness for learning of the following features provided by Mahara

	Average rank				
	Not useful at all	Less useful	Moderately useful	Very useful	
File repository (File uploading, storage and downloading)		▮			2.1

Blogging	■	1.7
Social Networking (Interacting with peers)	■	1.9
Building and displaying your profile with additional feature provided on RUconnected to other users	■	1.9

20. Please indicate the extent to which the following statements apply to you

	Average rank				
	Not applicable	Less applicable	Moderately applicable	Very applicable	
Having a social networking platform integrated with RUconnected made me log in more often to the system than I used to do using RUconnected alone	■				1.5
The new features Mahara offered were useful to me		■			1.8
There is direct educational benefit in using Mahara software			■		2.0
I used social networking features of Mahara to get to know my classmates better		■			1.7
The integrated system made it easier to find people to work with for informal peer learning, or to contact about course-related matters (e.g. Finding someone to ask about a test or something similar)		■			1.8
I found that I could take advantage of the connections I made for other academic purposes		■			1.8
I found that I could take advantage of the connections I made to totally non-academic purposes e.g. using the social network component to arrange to meet friends		■			1.6
I found the interface for the social network easy to use		■			1.9
I am only interested in using familiar social networking software like Facebook or Twitter				■	2.7
I dislike familiarising myself with new software		■			2.0
I found being limited to interacting with classmates frustrating and would have		■			2.0

used Mahara more if I had been able to interact with friends who are not in my class		
I found integrating social network features in learning very distructive	▌	2.1

21. If you used Mahara for purposes other than course work, please specify what you used it for in the space below

No responses for this question.

Thank you so much for taking your time to complete this questionnaire. If you have any queries, please do not hesitate to contact me on g12g1792@campus.ru.ac.za

ⓘ Documentation for this page

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