

# The use of Trends in ICT to enhance Undergraduate Teaching: A South African case study

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Information and communication technology has a leading role in the way that information is distributed globally. There is an enormous potential in the use of ICT to provide information, accessibility to resources, enhance learning and research sources. Unfortunately, the research literature has for the most part neglected to supply empirical evidence of the value ICT holds for educational institutions, especially as it relates to developing countries. The majority of studies, in common with other emergent business philosophies are for the most part focused on large educational institutions of developed economies, where readily available implementation resources are an underlying assumption. From a large urban South African University engaged in numerous collaboration programs with industry, the authors have gained insight into the use of ICT to support undergraduate teaching. Findings highlight the fact that web 2.0 technologies such as Facebook, pbWiki and Alice, when used as educational tools, have a positive effect on learning and can be used successfully in a developing country context.

Key Words – Education, ICT, Social Networks, Economy, Social Computing

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## 1. INTRODUCTION

The historical trend of a classroom and textbook based educational system is becoming out-dated. The educational system of the future will no longer be regarded as classroom and book bound but rather as interactive and fun through technology based mediums (Licklider and Taylor, 1968; Honeyman and Miller, 1993; Kearsley, 2000; Keegan, 2002; Robinson, 2008; Slim and Radloff, 2008). Modern ICT trends in education include distance learning, open source, social networks, handheld or mobile devices and online learning among other trends (Salmon, 2000; Shields and Poftak, 2002; Slim and Radloff, 2008; Brown, Dehayes, Hoffer, Wainright-Martin and Perkins, 2009). These trends ensure that information is readily available, education over vast distances is possible and the cost of education is reduced. The ideal educational environment would be that a person in rural Africa with the required ICT technology can receive the same education at the same cost as a person in a first world country.

## **1.2 Literature review**

Using interactive learning tools and techniques in the classroom has become imperative in order to ensure, amongst others, an engaging and entertaining learning experience for the higher education scholars of today. Scholars are familiar with a vast array of digital technologies and are able to engage with multiple sources of information at the same time. Traditional teaching methods are not enough to keep scholars engaged and as such, traditional teaching methods are often supplemented by engaging learning methodologies and interactive learning tools. Many of these learning tools have their origins in intra/internet applications and Web 2.0 and have enjoyed wide-spread adoption in the education arena because of their potential as contemporary education technologies (Roodt, 2010a and b).

### *From the World Wide Web to Web 2.0*

The internet (World Wide Web) has become one, if not the most powerful tools in the higher educational environment. According to Ng'etich (2005), "what makes Internet a fundamental aspect of academic research is that it has some bearing on almost all stages of the research process, from identification of research problem, through literature review to data analysis and dissemination." In developed economies, tertiary institutions are linked through intra- and internets to facilitate access to secure library facilities for registered students. Scholars such as Green (1997) and Ng'etich (2005) argue that the Internet is no longer a luxury, but an absolutely necessity, providing a window of opportunity to developing economies to leapfrog the book famine and accelerate research production and dissemination. This is of extreme importance, especially considering that *"Most libraries in Africa are poorly stocked with current materials (journals and books). Even where books are available, they are difficult to access due to poor records management systems, most of which are archaic and often not up to date. Thus, many African researchers still depend largely on conventional information sources, particularly in print form for research"* (Ng'etich, 2005). From within a developing perspective, the internet can therefore play a vital and revolutionary role in taking the educational environment, particularly research, to more globally acceptable levels through information sharing and collaboration.

Apart from the impact the internet has on tertiary education, note should be taken of rate of adoption of mobile technologies. Studies conducted in developing countries showed that the impact of mobile learning may be twice as large in developing countries as in developed ones (Keegan, 2002). As an example, the use of mobile devices, in Africa's developing countries is amongst the highest in the world and there may be almost 300 Million mobile users in Africa. Cell phones and especially smart phones are making a significant impact on education and learning and provide interactive content in previously unreachable and remote locations (Dryer, Eisbach, and Ark, 1999). Amongst others, literature has shown that mobile phones have also been used as the subject of teaching e.g. teaching A-level Physics students about how mobiles work (Edwards 2000) and as a way of encouraging the creativity of young pupils in art lessons, e.g. through designing phone fantasy sculptures. Through palmtops, the Cooties' game has been found to encourage collaborative and group working and increase the amount of writing produced (Shields and Poftak 2002). Other uses of palmtops for learning have been: to

increase the amount of children's reading and writing (e.g. the Docklands Learning Acceleration Project (McTaggart 1997); to help with the collection and analysis of data for science fieldwork (Graham and McNeil 1999). Arguable, the biggest advantage regarding mobile devices in a developing context might be that it is giving people greater awareness of new communication technology, thus preparing them for change (Lakhan, and Jhunjhunwala, 2008).

### *Web 2.0, Social computing and Social networking*

*A Social network or "social computing" is "online services for communities of people who share an interest with one another to collaborate." (Yuen, 2008).*

Widespread use of mobile and internet technology are increasing interest in the use of application's such as blogs, wikis and Social Networks (SN) to support collaborative learning (Shields and Poftak, 2002; Roodt et al, 2009). While social computing and social networking is not a new phenomenon, it is something that is slowly and newly starting to be embraced in the educational world (Wang, Carley, Zeng and Mao (2007; Fun and Wagner, 2008). The technology that enables this new level of connection is a vehicle, one that has the potential to open up information to more people than has ever been possible at any point throughout human history. Many predicted that technology associated with web 2.0 would change the face of higher education, even in a developing context (Brown and Adler, 2008).

When used for educational purposes, SN provide a casual place of learning, allow students to find and share educational resources, allows one to create study groups, to communicate with classmates about course-related topics, encourages learner-centered activities, provides collaborative learning opportunities and gives one a sense of belonging (Thompson, 2007). Social networks offer a tremendously valuable yet relatively simple system to bring likeminded audiences together in a manageable environment (Franklin, 2007). As these technologies become more widespread, the boundaries of social networking continue to expand, with sites such as MySpace, FaceBook and Twitter redefining the traditional definition of what it means to be someone's friend.

The biggest drawback to technology enabled education in a developing context is that; not everyone has access to a computer; insufficient computer literacy of students; insufficient bandwidth, lack of face-to-face communication and ambiguity between teacher and student (McNamara, 2003). Many ICT-based distance learning projects is therefore not sustainable or have not been expanded to large scale after initial developmental piloting because they have lacked adequate government support (Singh and McKay, 2004; UNESCO 2005).

Unfortunately, much of the seminal work on Web 2.0's impact on education and especially higher education features large educational institutions or are too general when it comes to describe the institution in which these new efficiencies have a high probability of success. This is likely due to new technology first being implemented in large, first world organizations and education being no exception in this regard. For ICT "trends" in higher education to reach acceptance and understanding, more comprehensive studies in institutions of different sizes and in different economic sectors are drastically needed.

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### **1.3 Aim**

From a large urban South African University engaged in numerous collaboration programs with industry, the authors set out to gain insight into the use of web 2.0 and SN technology to support undergraduate teaching. The research took place in post-apartheid South Africa and some background is necessary to understand the context within which the research took place. There are 11 official languages in South Africa. A difficulty is that the language used in most tertiary institutions in South Africa is English, which may be a student's second or even third language. Many students find it difficult to ask questions in class or to participate in discussions, especially when the whole class is present. Students are often afraid that their language skills are inadequate and/or that their questions may be seen as naïve by the other students in the class. The census data in South Africa still distinguish between Black, White (Caucasian), Indian and Coloured. South African universities also have a number of international students, especially from Asia and the rest of Africa. In essence, the South African scenario can be considered a benchmark for developing economies characterized by continued change, diversity and even elements of silent intolerance and conflict.

From within this extremely diversified setting, the intent is to move past theoretical propositions and report on how Web 2.0 and SN technologies can support undergraduate teaching, all from a developing context. The contribution of this paper is to address the research questions that follow:

- Can Web 2.0 and SN technologies be used successfully as educational tools in a developing context
- What type of technologies are preferred to enhance education in a developing economy, and why?

## **2. METHODOLOGY AND DATA COLLECTION**

As mentioned in the previous paragraph, from a large urban South African University engaged in numerous collaboration programs, the authors gained insight into the application of WEB 2.0 and SN technologies to enhance undergraduate education. The course selected is a mandatory subject for all first-year undergraduate students enrolling in the Faculty of Economic and Management Sciences, titled "Business Driven Technology" at the author's institution. The purpose of this course is to introduce students to computing and more specifically its application within a business context. Business Driven Technology is a multi-disciplinary subject, where information and information systems, and the integration thereof into the organisation, are studied for the benefit of the entire system (individual, organisation and community). At the end of this course student have a good understanding of the basic concepts, role and development of business information systems and the impact thereof on an enterprise.

As this course is presented as a service course, previous year's feedback regarding this course was extremely negative, with numerous students indicating that they dislike the subject as they do not understand what it is about nor do they see the point in taking it. Lecturing staff would generally prefer not to be involved with it as it was viewed in an extremely negatively light. The purpose of the intervention, and the decision to add "new

trends in ICT” to the curriculum”, could be seen as a necessity or rather an attempt to change the negative perception regarding the study of ICT. The intension was foremost to create a computer-supported collaborative learning (CSCL) environment that spark curiosity and challenge intellect.

Applying ICT in such a diverse setting necessitate that certain factors need to be taken note of. As an example, it was foreseen that some students will not have access to computer resources off campus, while others won't have experience in using technology. It was expected that some students may find it difficult to work with proposed applications. In deciding on what ICT tools to use, it was decided not to inhibit the students' learning experience, i.e. different learning styles were considered and subsequently used (Huang & Behara, 2007). The decision was also taken to base the selection of educational tools on mainstream adoption both within the public and educational sectors (Roodt et al, 2009). The table below shows the social technologies which the authors nominated to be used:

<b>Social computing concept</b>	<b>Technology chosen</b>
Social Networking	Facebook
On-line Collaboration	pbWiki
Programming	Alice Programming

**Table 1: Social computing technologies selected**

In selecting tools such as Facebook, pbWiki and Alice, students were exposed to a multi-faceted experience, and included the following tasks:

1. Creating an animation on Green Information Technology using the Alice application in order to generate awareness on reducing the carbon footprint of individuals and organisations alike;
2. Creating a Facebook group which all of their team members need to join, containing their student details;
3. Creating a pbWiki page for their group to which they needed to upload their Alice animation to;
4. Linking 1, 2 and 3 above by placing a link to their pbWiki page on their Facebook group profile.

As mentioned earlier, after completion of the course, a study was conducted to contribute to the body of collaborative Web 2.0 learning tools research by examining the experiences of the 890 1<sup>st</sup> year under-graduate students. As such, the authors created six categories of questioning pertaining to each of the three tools. These categories are (Oblinger & Oblinger, 2005:16):

1. **Use:** this category contained questions relating to the students usage of the specific tool under discussion

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2. **Purpose:** this category contained questions relating to the purpose for which students use the specific tool under discussion
3. **Attitude:** this category contained questions relating to the attitudes of the students towards the specific tool under discussion
4. **Ease-of-use:** this category contained questions relating to how easy/difficult the students found the specific tool to be to use
5. **Group work:** this category contained questions relating to the experiences of the students relating to the specific tool within the context of group work
6. **Course specific:** this category contained questions relating to students experiences of the overall 1<sup>st</sup> year undergraduate course

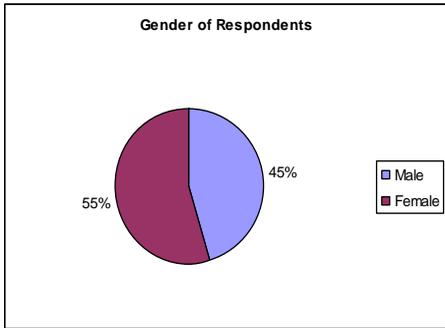
Over-and-above the categories highlighted above, the authors also asked demographic and ICT access type questions. To aid in the capture of data, the authors created a web-based questionnaire containing both closed and open-ended questions. The same set of questions was asked in the context of the specific tool under discussion, firstly being Facebook, then pbWiki and lastly Alice. The questionnaire was uploaded onto the institutions web-based course platform so that students could access the questionnaire both on-campus and off-campus. The questionnaire was setup to start at a certain time on a certain day and to end at a certain time on certain day and no maximum time limit was set for the completion of the survey. Students were informed of this in class, on Facebook (through the course group) and on the course platform via a pop-up announcement. Students were incentivised to complete the questionnaire in the form of bonus marks.

### ***2.1 Research Population***

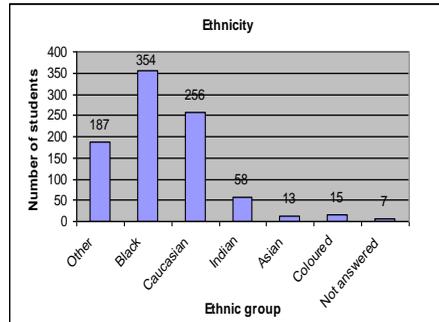
For the 2009 year, there was 1510 students enrolled for the course and 890 of them completed the questionnaire. To determine the basic demographics of respondents, three questions were asked being:

1. What gender are you? [Male/Female]
2. What is your age? [Fill in the blank]
3. From which ethnic group are you? [Caucasian, Black, Indian, Asian, Coloured, Other]

The finding for each of these questions is depicted below.

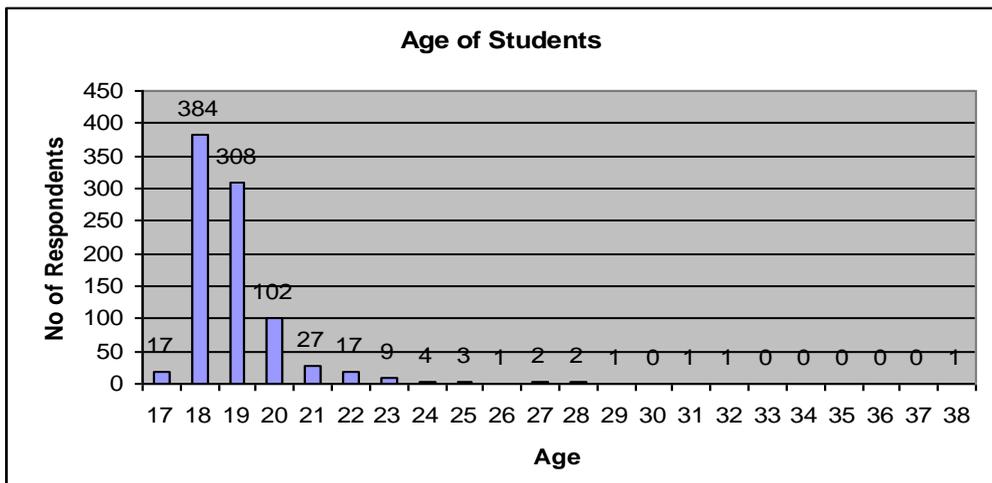


**Figure 1: Gender Distribution**



**Figure 2: Ethnic Distribution**

From Figure 1 above it can be seen that 55% of the respondents were female and 45% were male which indicates that the majority of respondents were female but only by a relatively small margin. Figure 2 shows the ethnic groups of respondents. As can be seen from this figure, 354 respondents are Black, 256 are Caucasian, 187 are Other, 50 are Indian, 15 are Coloured, 13 are Asian and 7 did not answer the question.



**Figure 3: Age of Respondents**

Figure 3 give an indication of the age distribution of respondents. From the graph it can be seen that most of the students are between the age of 18 to 20 with a few students being both younger and older than that range. The above graph shows that the majority of the students were born between 1989 and 1992. This puts the students who answered the questions squarely within the categorisation as part of the Net Generation<sup>1</sup>.

### 3. FINDINGS AND LIMITATIONS

With reference to Appendix A (q 1), students indicated that Facebook is used most, followed by Alice and pbWiki. Possible, this was because students were already familiar with Facebook, but not with pbWiki and Alice programming (q 28 and 29). None of the

<sup>1</sup> The Net Generation is defined as the generation born between 1980 and 1994.

Web 2.0 and SN technologies is used for more than one hour a day. Students indicated that they either use tools for socialising (Facebook) or too empower them to complete assignments (pbWiki/Alice (q 2). For both Alice and Facebook the attitude of the students was positive (q 3), with the majority claiming to have enjoyed using it, while pbWiki was seen merely as something they had to use in order to pass the course. The students found Facebook very easy to use, most likely from their familiarity with the program, while both pbWiki and Alice presented some difficulties to the students in terms of ease of use (q 4). For the section concerning group work (q 5 to 27), students generally felt that the use of tools made the course material more interesting (q 16) and had a positive effect on their learning process and experience. Students indicated that where a higher level of technical expertise is required, i.e. programming and on-line-Collaboration vs. SN group work is preferred (q 5). Apart from indicating that students enjoyed working with SN tools (q 6 and 11), findings hinted at tools: 1) Encouraging group motivation, idea sharing, learning and responsibility (q 6, q 19, q 20); 2) Helping to understand course material better (q 12, q 15, q 17) Enhancing co-operation with others and receiving benefits from everyone's ideas (q 18 and 19). In essence it became quite clear that the use of these tools helped encourage group work and assisted them in their self development. One interesting point to note in the group work section is that many students felt that Facebook could be useful in future career opportunities (q 23), while pbWiki and Alice less so. Another interesting point is that even though the students enjoyed using these tools and felt that they could assist in terms of group work and enhancing the curriculum of INF 112 (q 30), when the students needed assistance from each other they generally preferred not to use the tools provided, and most likely reverted to face-to-face discussions (q 13). Of interest is that technology with which students are familiar (such as Facebook) and/or are perceived to have a future value regarding career options, are preferred above on-line collaboration and programming tools.

## 4. CONCLUSION

This paper represents a major effort to investigate the use of ICT (Facebook, pbWiki and Alice) to support undergraduate teaching in South African. Literature would suggest that by incorporating trends such as SN and web 2.0 technologies into the educational system, a higher quality education can be provided at a lower cost, spread over a larger segment of the population. From within a developing context, by incorporating SN and web 2.0 technologies in the curriculum of a course dealing with understanding of IT application, we found that Web 2.0 and SN technologies do indeed support undergraduate teaching. While the majority of students had only used Facebook prior to the course, most felt that the use of SN tools was of value, easy to comprehend, having a positive effect on their learning process and experience.

In this paper, students self-report is adopted to evaluate the usefulness of ICT in education. A limitation to the paper is that research findings are currently reported in descriptive statistics and sample responses. For a more sophisticated study, more analysis and discussion in depth are required. An across-factor analysis may bring more interesting findings. For example, is there any relationship between attitude and group work? However, this study provides valuable baseline data which can support further studies of both local and global scope and significance on the value SN and web 2.0

technologies add to education. A standard test score may therefore be considered as a more objective indicator of the effectiveness for future study. Such investigations can explore varying perceptions of the use and applicability of SN technology in education, outside the scope of this study. However, this study does set the stage for investigating diversity in conceptions and implications for perceptions of educational modes.

Further studies can probe the significance of, technological advancement, cultural differences, age, ethnicity, gender, etc. in both further defining agreement on the meaning of these terms and also exploring the implications of such insights for using and adapting Web 2.0 and SN technologies to suit all spheres of educational diversification, including leveraging its potential for educational innovation and advancement.

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## Appendix A: Questionnaire

<b>Category 1: Use</b>	
Options: 1. More than 5 hours a day; 2. Between 3 to 5 hours a day; 3. Between 1 to 3 hours a day.; 4. Less than 1 hour a day; 5. Never	
Question x.1 Use of Facebook/pbWiki/Alice: How often do you use Facebook/pbWiki/Alice (if you do)?	<i>The most common response for Facebook was "Less than 1 hour a day" with 49%, for pbWiki "Never" with 74 % and for Alice "Never" with 51 %.</i>
<b>Category 2: Purpose</b>	
Options: 1. For socialising; 2. For personal information gathering; 3. For entertainment; 4. For academic information gathering; 5. For business related purposes; 6. Only for my INF 112 practical assignments; 7. Other	
Question x.2 Purpose of Facebook/pbWiki/Alice use: Why do you use Facebook/pbWiki/Alice (if you do)?	<i>The most common response for Facebook was "For socialising" with 72%, for pbWiki "Only for my INF 112 practical assignments" with 70% and for Alice "Only for my INF 112 assignments" with 78%.</i>
<b>Category 3: Attitude</b>	
Options: 1. I enjoy using it; 2. I use it because I have to for my course; 3. I use it because my peers do; 4. I do not enjoy using it; 5. I don't care either way	
Question x.3 Attitude towards Facebook/pbWiki/Alice: What is your attitude towards Facebook/pbWiki/Alice?	<i>The most common response for Facebook was "I enjoy using it" with 81%, for pbWiki ""I use it because I have to for my course" with 43% and for Alice "I enjoy using it" with 40%</i>
<b>Category 4: Ease of Use</b>	
Options: 1. Very easy; 2. Easy; 3. Average; 4. Difficult; 5. Very difficult	
Question x.4 Ease of Use of Facebook/pbWiki/Alice: How easy did (do) you find it to use Facebook/pbWiki/Alice?	<i>For Question 3.4, the most common response for Facebook was "Very easy" with 47%%, for pbWiki "Average" with 44% and for Alice "Average" with 41%</i>
<b>Category 5: Groupwork</b>	
Options: 1. Always / Definitely; 2. Frequently / Nearly always; 3. Occasionally / Seldom; 4. Never	
Question x.5 Facebook/pbWiki/Alice and Groupwork 1: I have learnt more in the group when using Facebook/pbWiki/Alice than I would have learnt on my own	<i>The most common response for Facebook was "3. Occasionally / Seldom" with 36%, for pbWiki "1. Always / Definitely" with 33 % and for Alice "1. Always / Definitely" with 40 %.</i>
Question x.6 Facebook/pbWiki/Alice and	<i>The most common response for Facebook</i>

<p>Groupwork 2: I enjoyed working in a group using Facebook/pbWiki/Alice</p>	<p>was “1. Always / Definitely” with 33%, for pbWiki “2. Frequently / Nearly always” with 36 % and for Alice “1. Always / Definitely” with 40 %.</p>
<p>Question x.7 Facebook/pbWiki/Alice and Groupwork 3: The group motivated me to do my share of the work for the Facebook/pbWiki/Alice component</p>	<p>The most common response for Facebook was “1. Always / Definitely” with 40%, for pbWiki “2. Frequently / Nearly always” with 37% and for Alice “2. Frequently / Nearly always” with 36%.</p>
<p>Question x.8 Facebook/pbWiki/Alice and Groupwork 4: The groupwork relating to Facebook/pbWiki/Alice helped me to understand the course material better</p>	<p>The most common response for Facebook was “2. Frequently / Nearly always” with 37%, for pbWiki “2. Frequently / Nearly always” with 37% and for Alice “2. Frequently / Nearly always” with 35%.</p>
<p>Question x.9 Facebook/pbWiki/Alice and Groupwork 5: I learned to co-operate with other people using Facebook/pbWiki/Alice</p>	<p>For Question 3.9, the most common response for Facebook was “1. Always / Definitely” with 41%, for pbWiki “2. Frequently / Nearly always” with 34% and for Alice “2. Frequently / Nearly always” with 36%</p>
<p>Question x.10 Facebook/pbWiki/Alice and Groupwork 6: The Facebook/pbWiki/Alice group work caused me to be dependable and do my assignment</p>	<p>The most common response for Facebook was “2. Frequently / Nearly always” with 40%, for pbWiki “2. Frequently / Nearly always” with 38 % and for Alice “2. Frequently / Nearly always” with 36%.</p>
<p>Question x.11 Facebook/pbWiki/Alice and Groupwork 7: It was fun working in a group using Facebook/pbWiki/Alice</p>	<p>The most common response for Facebook was “1. Always / Definitely” with 43%, for pbWiki “2. Frequently / Nearly always” with 33 % and for Alice “1. Always / Definitely” with 42%.</p>
<p>Question x.12 Facebook/pbWiki/Alice and Groupwork 8: In the group I got the benefit of everyone's ideas when using Facebook/pbWiki/Alice</p>	<p>The most common response for Facebook was “1. Always / Definitely” with 39%, for pbWiki “2. Frequently / Nearly always” with 35% and for Alice “1. Always / Definitely” with 37%.</p>
<p>Question x.13 Facebook/pbWiki/Alice and Groupwork 9: When I had problems I got help from group members via Facebook/pbWiki/Alice</p>	<p>The most common response for Facebook was “3. Occasionally / Seldom” with 28%, for pbWiki “4. Never” with 36 % and for Alice “4. Never” with 30%.</p>
<p>Question x.14 Facebook/pbWiki/Alice and Groupwork 10: The work got done faster and more work was done using Facebook/pbWiki/Alice</p>	<p>The most common response for Facebook was “2. Frequently / Nearly always” with 35%, for pbWiki “3. Occasionally / Seldom” with 33% and for Alice “2. Frequently / Nearly always” with 34%.</p>
<p>Question x.15 Facebook/pbWiki/Alice and Groupwork 11: The Facebook/pbWiki/Alice group work gave me an opportunity to talk and discuss the</p>	<p>The most common response for Facebook was “2. Frequently / Nearly always” with 37%, for pbWiki “2. Frequently / Nearly always” with 33% and for Alice “2.</p>

course material	<i>Frequently / Nearly always” with 34%.</i>
Question x.16 Facebook/pbWiki/Alice and Groupwork 12: The Facebook/pbWiki/Alice group work made the course material more interesting	<i>The most common response for Facebook was “1. Always / Definitely” with 37%, for pbWiki “2. Frequently / Nearly always” with 33% and for Alice “2. Frequently / Nearly always” with 36%.</i>
Question x.17 Facebook/pbWiki/Alice and Self-Development 1: I feel that using the Facebook/pbWiki/Alice group adds value to my understanding of the contents of the course	<i>The most common response for Facebook was “2. Frequently / Nearly always” with 36%, for pbWiki “2. Frequently / Nearly always” with 35 % and for Alice “2. Frequently / Nearly always” with 33%.</i>
Question x.18 Facebook/pbWiki/Alice and Self-Development 2: I learned more in a group that I did by myself when preparing part of the Facebook/pbWiki/Alice group content	<i>The most common response for Facebook was “2. Frequently / Nearly always” with 35%, for pbWiki “2. Frequently / Nearly always” with 35% and for Alice “1. Always / Definitely” with 34%.</i>
Question x.19 Facebook/pbWiki/Alice and Self-Development 3: I experienced group learning using Facebook/pbWiki/Alice as successful	<i>The most common response for Facebook was “2. Frequently / Nearly always” with 37%, for pbWiki “2. Frequently / Nearly always” with 35% and for Alice “2. Frequently / Nearly always” with 36%.</i>
Question x.20 Facebook/pbWiki/Alice and Self-Development 4: I felt responsible for the successful learning of my group using Facebook/pbWiki/Alice	<i>The most common response for Facebook was “2. Frequently / Nearly always” with 39%, for pbWiki “2. Frequently / Nearly always” with 33% and for Alice “2. Frequently / Nearly always” with 34%.</i>
Question x.21 Facebook/pbWiki/Alice and Self-Development 5: I would think twice before cancelling a course when learning in a group using Facebook/pbWiki/Alice	<i>The most common response for Facebook was “2. Frequently / Nearly always” with 32%, for pbWiki “2. Frequently / Nearly always” with 29% and for Alice “2. Frequently / Nearly always” with 32</i>
Question x.22 Facebook/pbWiki/Alice and Self-Development 6: Learning to use Facebook/pbWiki/Alice will help my career opportunities	<i>The most common response for Facebook was “1. Always / Definitely” with 35%, for pbWiki “3. Occasionally / Seldom” with 32% and for Alice “3. Occasionally / Seldom” with 33%.</i>
Question x.23 Facebook/pbWiki/Alice and Self-Development 7: I would like to do other courses using Facebook/pbWiki/Alice groups in my studies	<i>The most common response for Facebook was “2. Frequently / Nearly always” with 28%, for pbWiki “3. Occasionally / Seldom” with 34% and for Alice “2. Frequently / Nearly always” with 30%.</i>
Question x.24 Facebook/pbWiki/Alice and Self-Development 8: I believe the group learning approach using Facebook/pbWiki/Alice can open alternative approaches to education and	<i>The most common response for Facebook was “2. Frequently / Nearly always” with 37%, for pbWiki “2. Frequently / Nearly always” with 36% and for Alice “2. Frequently / Nearly always” with 32%.</i>

training	
Question x.25 Facebook/pbWiki/Alice and Self-Development 9: Time is used productively in group learning when using Facebook/pbWiki/Alice	<i>The most common response for Facebook was "2. Frequently / Nearly always" with 36%, for pbWiki "2. Frequently / Nearly always" with 38% and for Alice "2. Frequently / Nearly always" with 34%.</i>
Question x.26 Facebook/pbWiki/Alice and Self-Development 10: People fit in quite naturally into a group learning environment when using Facebook/pbWiki/Alice	<i>The most common response for Facebook was "2. Frequently / Nearly always" with 41%, for pbWiki "2. Frequently / Nearly always" with 37% and for Alice "2. Frequently / Nearly always" with 34%.</i>
Question x.27 Facebook/pbWiki/Alice and Self-Development 11: The pace of a group learning environment when using Facebook/pbWiki/Alice is conducive to understanding course material	<i>The most common response for Facebook was "2. Frequently / Nearly always" with 45%, for pbWiki "2. Frequently / Nearly always" with 40% and for Alice "2. Frequently / Nearly always" with 36%.</i>
<b>Category 6: Coursework</b>	
Options: 1. Yes; 2. No	
Question x.28 Facebook/pbWiki/Alice Feedback 1: I have used Facebook/pbWiki/Alice groups before	<i>The most common response for Facebook was "Yes with 60%, for pbWiki "No" with 88% and for Alice "No" with 90%.</i>
Question x.29 Facebook/pbWiki/Alice Feedback 2: Have you used Facebook/pbWiki/Alice before doing the INF 112 practical assignments?	<i>The most common response for Facebook was "Yes" with 86%, for pbWiki "No" with 79% and for Alice "No" with 82%.</i>
Question x.30 Facebook/pbWiki/Alice Feedback 3: Do you think that learning to use Facebook/pbWiki/Alice as part of the INF112 was successful?	<i>The most common response for Facebook was "Yes" with 86%, for pbWiki "Yes" with 79% and for Alice "Yes" with 82%.</i>