

Using Mobile Phones To Encourage Cooperative Learning In An Introduction To Computers Course At Bindura University: A Critical Discourse Analysis Perspective.

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Introduction

The bodies governing the universities in Zimbabwe, the Ministries of education and ICTs are policies that give universities pressure to move with the times and try to meet the set Millennium Development Goals. The pressure to implement these changes comes from a number of stakeholders including students who are advocating for change in the way education is delivered and the university academic body which seeks ways to maintain the University's image worldwide. This investigation is motivated by the heavy need for mediation in terms of Information and Communication Technologies as an intermediary in delivering education at Bindura University.

This paper uses the domains and factors as articulated in the matrix by Laura Czerniewicz and Shaheeda Jaffer (2007). A mobile application is then introduced as an intermediary proposal to work hand in hand with the current Learning Management System at the university. Responses from students' postings are analysed by using Critical Discourse Analysis (CDA) as adapted from D Ng'ambi, (2008). Fairclough's three-dimensional framework of Description (text analysis), Interpretation (process analysis) and Explanation (social analysis) is used to analyse posting made by students on the mobile application describing how they feel this intervention will achieve in their overall learning goal.

Background

The Head of State and Government, Commander in Chief of the Defence Forces, President of Zimbabwe (Cde Robert Gabriel Mugabe) had always been on the lead supporting ICTs by donating a wide range of computer equipment to primary and secondary schools, universities and many rural organisations countrywide. According to Rebecca Rogers, (), "educational research is always embedded in a context—whether it is a classroom, an after-school program, or a policy meeting". She further on articulates that "educational research always occurs within a social, political, and cultural context." In this article, socio-economic artefacts at country level, institutional artefacts in terms of organisational policies, pedagogical artefacts and technological artefacts will be looked at and an intervention that factors all these proposed and analysed using CDA.

Socio-Economic Artefacts

Zimbabwe set up a whole Ministry to be dedicated to ICTs in February 2009 which started by conducting an audit of national communication infrastructure and connectivity and came up with ICT policies and budgets for the country at large. ¹

The Ministry of ICTs focuses on ensuring that ICT Service providers perform to the best standards and international best practices, provision of ICT technical assistance to line ministries and government departments and set up training programs for various levels in the public sector. The ministry also develops ICT products paying particular attention to rural areas, people living with disabilities, gender balance, children and the aged and coordinate, develop and streamline the ICT sector to enable it to contribute to the national GDP. ²

The Ministry of ICTs came up with the ICT Policy, which aims at narrowing the “digital divide” (gap between individuals, households, businesses and geographic areas at different socio-economic levels with regard both to their opportunities to access information and communication technologies and to use the internet for a wide variety of activities (Patricia J.P, 2003)) through enhancing public awareness and education on ICTs; improving penetration in all economic sectors increasing access by all communities; expansion of basic and supportive communication infrastructure; developing relevant local content in vernacular; and establishing a business culture open to the new ICT based economic dispensation.

To come up with this the Ministry worked with the National Economic Consultative Forum, the United Nations Development Programme, National University of Science and Technology and all stakeholders who participated in this truly national effort to produce this ICT policy. ³

From an interview with the Ministry of ICTs permanent secretary, I gathered that the ministry came out with the ZimConnect: E-government Framework and Implementation strategy for the period 2011-2015 where they aim to implement an e-government. The ministry working with the Office of the President Cabinet (OPC) has purchased computer equipment comprising of a laptop and printer for all ministers, deputy ministers, permanent secretaries and principal directors of all government organisations. Through the central computing services (CCS) whose goal is providing ICT services to the public service, the Ministry set up an ICT government school in October 2010 to provide training to the e-government members. Through this program, the ministry expects to equip all government workers (the civil service) with computer training centers for the purpose of upgrading literacy among civil servants.

The ZimConnect Strategy also focuses on the effort by the government of Zimbabwe in its transformation towards the information age by utilising ICTs as well as benefiting from the

Internet revolution to provide excellent delivery of services to the community and finally facilitate the country attain better socio-economic growth.⁴

The Ministry of ICTs acquired computer equipment from World-links and other non-governmental organisations for the education sector. This has seen eighty computer labs being set up in the first phase so far in primary and secondary schools. The computer labs comprise of 40 networked computers with capped internet access and they are looking forward to setting up a Learning Management System for each school.

The current national budget statement highlight that ICTs are a critical champion issue in the 2011 Budget. From the budget statement by the governor, it was stated that a mere 10% increase in the use of mobile phones in any one given country will increase GDP by 1%. In Zimbabwe, ICTs have become so important that in 2009 they contributed 15.2% to GDP, second only to agriculture which was at 15.5%. This resulted in an increase in the budget as compared to the other years.⁵

Telecommunications providers also help by trying to improve on connectivity. Telecommunications provider (Econet Mobile) always gives an update on Base Stations Update and Fibre Optic cable installations to improve on connectivity.

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Organisational Artefacts

A body called ZIMCHAIR makes strategies and targets for all institutions and one of these is ICTs which makes the institution consider use of ICTs effectively. The institution, besides being changed by the pervasiveness of technology (national policies etc.), is also changed by the nature of the student body. A lot of pressure comes from students who always compare what the university offers to what other universities are doing and since these are the major shareholders the university needs to consider their contributions in order to have a competitive advantage over other universities. Virtual Open Distance Learning (VODL) block release students who are working require blended learning which has driven the need for ICTs to be implemented. According to the article by (Laura and Jaffer, 2007) Bindura University falls in the collegial organisations that have loose control over implementation and loose control over policy definition since the implementation and policy is not used as an evaluation tool, some educators tend to ignore it and just maintain a "marketing presence" on the e-learning platform.

Implementation of ICTs is one of the key strategies that the university practises for education delivery and marketing.⁶ There is an onsite institutional newsletter called Meeting Point, it has a column on ICTs either giving tips on effective use of the available resources or giving an update on ICT related information.⁷ Bindura University came up with a plan to help students get netbooks at cheaper prices on a long term payment basis. Staff members are also getting long term payment terms and the University is in the process of setting up a contract with a South African Service Provider. It makes the costs cheaper since there has been removal of duty on ICT equipment.

The Bindura University ICT User compliance Policy is informed by the national ICT policy, the VC's statements, the Portraz Regulations and the Network Service Providers' offerings.⁸

Claroline is an Open Source eLearning and eWorking platform allowing teachers to build effective online courses and to manage learning and collaborative activities on the web. This LMS has been adopted by the Faculty and Department of Computer Science. The ICT Department however is looking into other LMSs to compare and look for the best possible application to use.⁹

Computer Lab Regulations are put in place to help maintain the labs and ensure effective use of resources. Computers are continuously updated and upgraded to match the dynamic ICT changes.¹⁰

Pedagogical Artefacts

The introduction of a Learning Management System, designed using sound pedagogic principles at the institution. This was meant to assist lecturers in creating and managing effective learning communities. This was introduced as a pilot project helps or allows remote learners to interact with each other (Mayes & De Fretas, 2004) synchronously using the chat tool and with the content asynchronously using tools such as the forum and being able to access notes and other resources on their own space and time. This was not possible before the introduction of ICTs at the institution since everyone had to make use of the library for resources which is limited in space time and variety of learning material.

The Computer Science department introduced Claroline LMS and provides training for lecturers and students on the effective use of the LMS through organising seminars and workshops. Teaching and Learning workshops are done in different phases. Lecturers are taught how to create courses, design and give quizzes, post questions in forums, posting assignments and setting deadlines and managing and keeping track of all the activities done by the students. Students are also given training on how to view their enrolled classes, how to work on assignments from any connected computer, contributing to wikis, forums and chat, checking calendars and getting their results online.

In an interview with the ICT director at Bindura University, he expresses that although they encourage effective use of ICTs in teaching, it is not yet possible to make it a policy to be followed on a compulsory basis because of the lack of adequate equipment to make the connection possible. Also the Computer Science department is the only department trusted to have employees who are able to use ICTs effectively. He further discussed that there is need also for coming up with a strategic plan which involves training of staff as well as acquiring and putting in place all ICT equipment.

The Computer Science department has however made it policy that every course be available on the LMS and have also advised that even though the department has got experience with technology there is need to implement a good pedagogical design which ensures that there are no inconsistencies between the curriculum expected to be taught, method of teaching used, learning environment and assessment procedures adopted (Mayes & De Fretas, 2004)

The greatest shortfall at the institution however is the connectivity limitations owing to technical problems still to be resolved at country level. The solution to this problem is still depended on the country's initiative to connect many remote areas. The progress noted in this project is overwhelming since the national budget increased the funds that are channelled towards ICTs implementation in Zimbabwe.

Technological Artefacts

E-learning is one of the most central aspects of the organisation's policy. This can be seen from the range in the initiatives specifically focusing on the development and use of e-learning.

The ICT user compliance Policy aims at providing computer systems and networks that facilitate research, teaching and learning at Bindura University.

When we trace development in this area at the institution the following is a summary of the achievements by the institution:

- 2002---2003 Roll out of technologies where at the whole institution, computer labs were constructed, and the university acquired different computer equipment for lecturers, libraries and other members of staff in administration.
- 2003---2005 The University was pushing for a 3:1 student to computer ratio for all students doing a Computer Science degree programme. The university had acquired thirty computers for Computer Science students therefore they enrolled only thirty students per stream for the four year program.
- 2004 Introduced a compulsory course Introduction to Computers (CS101) across all disciplines. In this course, each student was supposed to learn different computer packages for MS Office suite, Basics of Computer Hardware and Software. This heavily increased the need more computer equipment and connectivity. The university had two sites i.e. Main Campus and Astra Campus, so these sites were connected via a radio link. The university received some computer donations from the president.
- 2007 The Zimbabwe economy went down with the political issues and sanctions. There was a heavy shortage of electricity. The university started looking for alternatives such as getting cheaper refurbished computers from Computer Aid, use of petrol generators for powering up computers when electricity is down.
- 2010 to date
 - Introduction of e-learning especially for the compulsory course CS101 to cater for the large numbers of students.
 - An "anywhere", anytime access owing to the introduction of Wireless access to all members of staff and students within a range of 300 meters around the campuses.
 - Introduced n-computing in computer labs to replace the refurbished machines which were not performing well.
 - Workshops and training sessions for all lectures and other non-teaching staff on use of Ms Office Packages and the Learning Management System.
 - Formation of a digital library to widen resource options and availability to all stakeholders.
 - Provision of facilities for students and lecturers to purchase laptops with long term payment periods.

Critical Discourse Analysis Theory

In this research the responses from the students' perceptions on the introduction of mobile application in a compulsory course will be analysed by Critical Discourse Analysis (CDA). CDA according to (Fairclough, 1995) "is an interdisciplinary approach to the study of discourse that views language as a form of social practice and focuses on the ways social and political domination are reproduced by text and talk". Van Dijk defines CDA as "a type of discourse analytical research that primarily studies the way social power abuse, dominance, and inequality are enacted, reproduced, and resisted by text and talk in the social and political context".

Fairclough came up with a three-dimensional framework for studying discourse, as shown below;

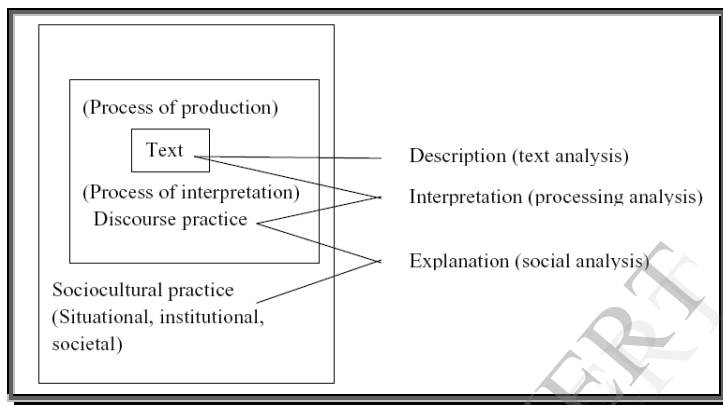


Figure 1: Discourse as text, interaction and context (Fairclough, 1989)

Fairclough separated three forms of analysis onto one another that is: analysis of (spoken or written) language texts, analysis of discourse practice (processes of text production, distribution and consumption) and analysis of discursive events as instances of socio-cultural practice. This can be explained from micro-level to macro-level according to the categories which (David Barry, Brigid Carroll and Hans Hansen, 4 May 2006) and (Alvesson, Mats, Dan Karreman, 2000) came up with in their different researches.

Rebecca Rodgers, (2004) came up with a framework to assimilate the context of the analysis and the context in which the analysis is located. The framework symbolizes the relationship between contexts at the local, institutional, and societal levels of analysis. Rodgers compares the local context for example in the case of Lewis and Ketter to be thought of as the teacher-research meeting, the institutional context being the social and political institutions that frame the local context for example in this case it is the schools in which their participating teachers and university researchers work. The societal context then is larger governing bodies, including policies, mandates, and political climates that influence the local and institutional contexts. Each of these contexts is said to be embedded within and informs the other. This is shown in Fig 2 which follows:

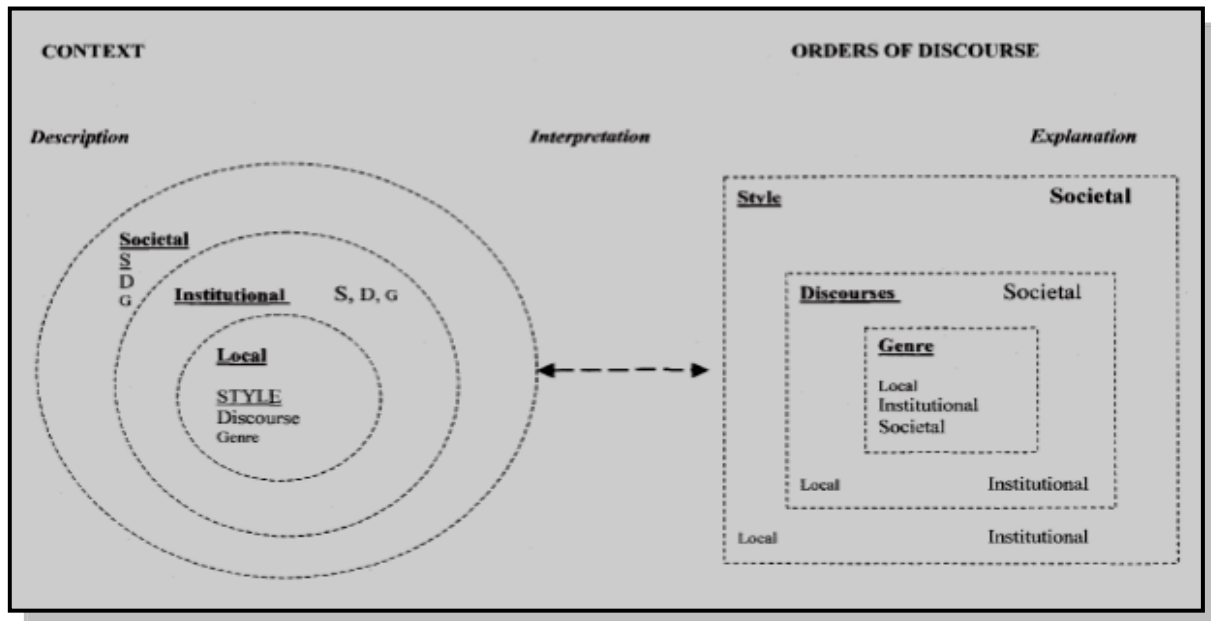


Figure 2: Critical Discourse Analysis Heuristic (Rodgers,2004)

Rodgers continues to define Orders of discourse as the network of Discourse practices that include genre, Discourse, and style that occur within local, institutional, and societal contexts

Genre, Discourse, and style are always linked together in discourse events. She draws on an example of a math lesson being the local including the genre of a transmission model math lesson, the discourse of individualism, and a style of negative ability. The institutional context linked to such a math lesson may have similar parameters for the genre (e.g., teacher-proof textbooks and curriculum), but a different Discourse and accompanying style for the teachers.

Methodology

Mobile learning can be defined in other instances as “Any sort of learning that happens when the learner is not at a fixed, predetermined location, or learning that happens when the learner takes advantage of the learning opportunities offered by mobile technologies.”(C. O’Malley, 2009) With the initiative taken by the Ministry of ICTs Zimbabwe to reduce the price for getting a mobile phone and a phone line to about fifteen United States dollars and one United States dollar respectively, a great number of people can now afford and have acquired a mobile phone which they basically use for making phone calls and sending and receiving messages. Most students however need smart phones for them to access social networks because of the smart phones’ “capability of running apps” (Malcom Brown, 2010).

The Ministry facilitated removal of duty on Computers and Mobile Phones and accessories which further reduced the amount needed for the purchase of these products by about fifty per cent. Therefore for a Chinese product of a smart phone, the general price is around thirty United States dollars which saw many students being able to afford one. The price for browsing the internet is also about sixty five (65) cents for 10Megabites which is affordable to an average person and has proved to be far cheaper than making voice calls or sending messages. With the availability of smartphones to about ninety per cent of the students at Bindura University, a mobile application if well designed would mitigate the unavailability of the Learning Management System for the Introduction to Computers course.

The mobile application was designed using Winksite, “a leading mobile content management and social networking software company whose solutions connect publishers to their audiences and audience members to each other.” (<http://winksite.com>). The affordances of Winksite are its mobility ability that is the ability to be used anytime and anywhere. This makes the application convenient and effective since students can connect at the time that best suits them without the limitations of time, connectivity and availability of the current Learning Management System on computers which is in some way centralised. On the site tools, members are grouped as a community which gives a feeling of belonging to students. There are other tools such as the Chat and Forum which are what the students are used to on their social networks. This means that the students can use this as a social and educative platform as well. When the mobile application was launched, students joined the community upon invitation on email and were able to use the guidelines for joining to the community on their own as the students were on vacation. After joining and confirmation the students were able to browse the sample mobile application which had different topics of the Introduction to computers (CS101) course and were asked to send a response as to their perceptions on the introduction of this new learning method in a resource constrained environment.

The following is a screenshot of the mobile application created for the course:



Figure 3: Mobile Application for CS101 (Introduction to Computers)

The sample responses received are shown in the screenshot below:

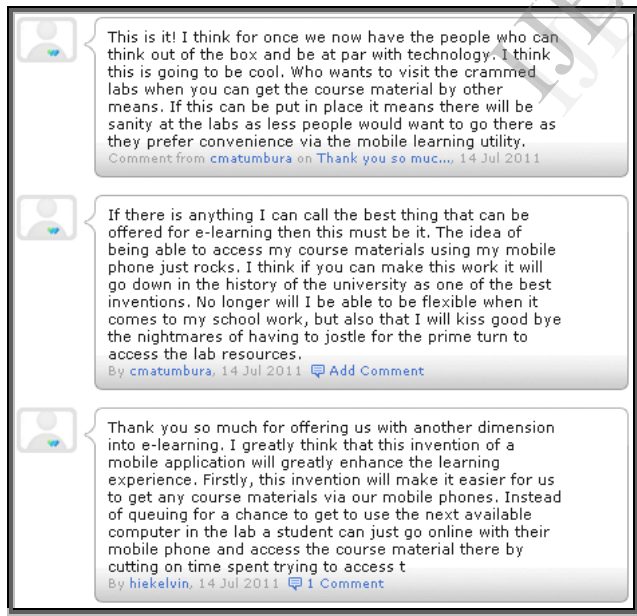


Figure 4: Sample responses from students to be analysed using CDA

Analytical Framework

The analysis of data was carried on the postings made by the students who had been introduced to the mobile application. The following table was adapted from Ng'ambi, (2008) as used by Roode et al, (2004):

Table 1 Analytical framework used to analyse postings adapted from Roode et al, 2004

Speech Genres and Discursive Types identified in this Analysis	
Speech Genre (SG)	Discursive Type (DT)
1. Confidence	1. Technocracy
2. Factual information	2. Legitimacy
3. Humour	3. Neutrality
4. Persuasion	4. Corporatism
	5. Tech(nological) optimism
	6. Pragmatism

Issues of power and domination are examined by identifying certain generic specific genres and discursive types (Roode et al, 2004) in the data analysis carried on postings from students. As adapted in this paper from Ngambi, (2008), Text genres and discursive types are outcomes of the process of production and interpretation of text (see Figure 1). It follows that an iterative analysis (moving from text to social action) of CDA (i.e., Description, Interpretation, and Explanation) would help unravel social practices embodied in text. The following is a table created to define the discursive types used.

Table 2 Definitions of Discursive Types (DT)

Discursive Type (DT)	Definition
1. Technocracy	technocratic discourse
2. Legitimacy	authoritative discourse
3. Neutrality	discourses that are not taking sides on a topic of discussion
4. Corporatism	discourses that imply collaboration
5. Tech(nological) optimism	discourses that acknowledge the technology's potentials
6. Pragmatism	discourse addressing practical issues

Analysis of Results

The following posting was the main text created by the Lecturer on the forum tool of the mobile application to introduce the mobile application to the students and at the end students were requested to post what they thought about the platform.

“Hi all,

From the previous groups doing CS101, the department noted that the student numbers are continuously increasing as compared to the available resources for the course. This mobile application was created to enhance learning through the means available to a greater number of the students as compared to the availability of the e-learning platform which is only accessible on connected computers. Please comment on whether this intervention will help and explain your position.”

Students were asked to post their messages either as a comment on the forum or to post as a message on the home page of the CS101 mobile application.



Figure 5: Comments posted by members

The mobile application had seven members who joined the community. There was also an option of being able to post a comment without necessarily becoming a member to the community. There were thirty views of the mobile site within the first three days. The posting attracted eight responses within the first week and five of these were randomly selected and analysed using CDA. The analysis was adapted from D Ng’ambi, 2008 in his research, who cited (Roode, Speight, Pollock and Webber, 2004) where certain generic specific genres are identified by examining issues of power and domination.

Response a) -- Student

“Thank you so much for offering us with another dimension into e-learning. I greatly think that this invention of a mobile application will greatly enhance the learning experience. Firstly, this invention will make it easier for us to get any course materials via our mobile phones. Instead of queuing for a chance to get to use the next available computer in the lab a student can just go online with their mobile phone and access the course material there by cutting on time spent trying to access the lab computer. This means I can reallocate the saved time towards other items. Secondly it will also cut on travelling expenses for those students who are at a distance to the lab. Instead of travelling one can just access the

course material from where ever they are using their mobile phone. To add to that, one can just access the material at whatever time they feel like as long as the site is online rather than the lab which at times has restrictions on access time.”

Analysis a)

Description (Text Analysis)	Interpretation (Discursive Types)	Explanation (Social Practice)
<p>Happy – the student shows appreciation for the introduction of another technology</p> <p>Factual Information – use of phrases such as “another dimension to e-learning” and “it will cut travelling expenses”</p> <p>Confidence – that “this invention will make it easier for us to get any course materials via our mobile phones”</p>	<p>Pragmatism => student is addressing practical issues:</p> <ul style="list-style-type: none"> (i) not having to queue to get access to a computer, (ii) cutting travelling expenses (iii) unlimited access time wherever whenever <p>Tech(nological) optimism - acknowledge the technology’s potential to enhance learning and also reduce access costs</p>	<p>Students speaks on behalf of others by using the phrases “thank you so much for offering us” and “this intervention will make it easier for us”. This suggests a benefit to a community of students. Also use of the phrase “thank you” shows students addressing authorities (department, faculty)</p>

Response b) -- Student

“If there is anything I can call the best thing that can be offered for e-learning then this must be it. The idea of being able to access my course materials using my mobile phone just rocks. I think if you can make this work it will go down in the history of the university as one of the best inventions. No longer will I be able to be flexible when it comes to my school work, but also that I will kiss good bye the nightmares of having to jostle for the prime turn to access the lab resources. I'll be happy if we can have this as an option to access our course materials.”

Analysis b)

Description (Text Analysis)	Interpretation (Discursive Types)	Explanation (Social Practice)
<p>Humour – “the idea of being able to access my course materials using my mobile phone just rocks” student jokingly states how the intervention is advantageous to him</p> <p>Factual Information – student describes the current situation as not effective since it is difficult to accessing lab resources</p> <p>Confidence – that “ If there is anything I can call the best thing that can be offered for e-learning then this must be it ”</p>	<p>Pragmatism => student is addressing practical issues:</p> <ul style="list-style-type: none"> (i) accessing course materials by mobile phone (ii) getting a turn to access lab resources was difficult 	<p>The use of the phrase “if you can make this work it will go down in the history of the university as one of the best inventions” student speaks on behalf of the student community and also addresses the staff community as the authorities able to bring change.</p>

Response c) -- Student

“This is it! I think for once we now have the people who can think out of the box and be at par with technology. I think this is going to be cool. Who wants to visit the crammed labs when you can get the course material by other means? If this can be put in place it means there will be sanity at the labs as less people would want to go there as they prefer convenience via the mobile learning utility.”

Analysis c)

Description (Text Analysis)	Interpretation (Discursive Types)	Explanation (Social Practice)
<p>Factual Information – “this is it”- the awaited intervention has finally been implemented. Also “crammed labs” means there is limited access.” there will be sanity at the labs” currently the labs are congested and there is no order</p> <p>Confidence – in the authorities who introduced the technology. “I think for once we now have the people who can think out of the box and be at par with technology”</p> <p>Humour – “this is cool” student humorously states how the intervention is advantageous to them</p>	<p>Pragmatism => student is addressing practical issues:</p> <ul style="list-style-type: none"> (i) congested labs (ii) mobile phone alternative <p>Tech(nological) optimism - acknowledge the technology’s potential to provide a more convenient service</p>	<p>The use of the phrase “for once we have people” student speaks on behalf of the community of students, also addresses the staff community as the authorities able to bring change by use of phrase “ people who can think out of the box and be at par with technology”.</p>

Response d) – Student

“Yea if implemented this mobile application will surely help us as students, especially in terms of time management and flexibility. This will guarantee that i can do college work on my own time without really following some of the hectic timetables. With the abundance of mobile gadgets now i think most students will really have access to it and do away with Labs. But make sure it’s always available!”

Analysis d)

Description (Text Analysis)	Interpretation (Discursive Types)	Explanation (Social Practice)
<p>Humour – “Yea” student is happy</p> <p>Factual Information – “this application will surely help us” student is certain that the intervention will be an advantage “ With the abundance of mobile gadgets” shows majority of students</p>	<p>Pragmatism => student is addressing practical issues:</p> <ul style="list-style-type: none"> (i) accessing course materials by mobile phone (ii) getting a turn to access lab resources was difficult <p>Legitimacy – student authoritatively</p>	<p>The use of the phrase “will surely help us as students” student speaks on behalf of the student community. “But make sure it’s always available” student addresses the staff community as the authorities able to maintain the new implementation.</p>

<p>do have access to mobile phones as compared to accessibility in labs. "hectic timetables"</p> <p>Uncertainty – student not sure if the mobile application will always be available</p>	<p>suggests that the mobile application should always be available by use of phrase " But make sure it's always available"</p> <p>Tech(nological) optimism - acknowledge the technology's potential to help manage time better and better flexibility</p>	
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Response e) – Student

"With the speed at which IT is moving, I will need only to move around with my mobile. So being able to do e-learning through mobile will be greatly accepted by many people."

Analysis e)

Description (Text Analysis)	Interpretation (Discursive Types)	Explanation (Social Practice)
<p>Factual Information – student describes IT as moving at a fast rate. " will need only to move around with my mobile" student acknowledges possession of a mobile phone</p> <p>Confidence – that "mobile will be greatly accepted " confident that students will accept change</p>	<p>Pragmatism => student is addressing practical issues:</p> <p>(i) being able to do e-learning through mobile phone</p>	<p>The use of the phrase " will be greatly accepted by many people " student speaks on behalf of the student community</p>

Conclusion

The students involved in the research are students with an experience of using the Learning Management System for the course Introduction to Computers and had the opportunity to have the course introduced on a mobile phone. Students had an option of posting their responses to the mobile application anonymously. This resulted in getting postings from students in secrecy which proved to be more effective as genuine concerns were shared. Understanding the different backgrounds that these communities have will make it possible to come up with interventions that will greatly benefit the students and not blindly looking at the technology. This means that technology changes must not force change in the way things are done, rather there should be thorough investigations that will lead to implementations that address the practical issues on the ground. More considerable advances in learner accomplishment are achievable where the use of ICTs is strategically planned, organized and incorporated effectively.

The introduction of the mobile application has also been possible because of pressure coming from the students to keep up with the dynamic changes in the education system worldwide as well as the regulations coming from the different governing boards at country level.

Finally this research has shown that interventions that are possible should be investigated not only on a local level, but there is a broader picture that affects any changes thereof. This includes country's socio-economic artifacts, organizational artifacts, pedagogical artifacts and technological artifacts and thorough investigation is recommended first in order to come up with the intervention that best suits a particular context hence the adoption of Critical Discourse Analysis perspective in this article.

Further analyses as mentioned by D Ng'ambi, (2008) where application of CDA could be beneficial are analysis of e-mail correspondence; Short Message Services interaction; and analysis of Weblogs and podcasts.

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