PREPAREDNESS OF BLENDED E-LEARNING IN STATE UNIVERSITIES TO AID DEVELOPMENT OF KNOWLEDGE IN ZIMBABWE THROUGH ADOPTION OF STEM INITIATIVES: CASE OF HARARE INSTITUTE OF TECHNOLOGY (HIT)

1Macdonald Nhakura and 2Ariel Muvhunzwi
1Senior Library Assistant, Harare Institute of Technology, Zimbabwe
   Email: mnhakura@hit.ac.zw ; mnhakura@yahoo.co.uk
2Librarian, Celebration International School, Zimbabwe
   Email: arielmuvhunzwi@gmail.com

Abstract
This paper focused on a case study carried out at Harare Institute of Technology (HIT) exploring the university community’s preparedness in the implementation and sustenance of blended e-learning. The target population comprised of lecturers, students and librarians. Blended learning is a formal education program in which a student learns at least in part through delivery of content and tutoring via digital and online media with some element of student control over time, place, path, or pace. It replaces the traditional classroom approach to introduce the virtual learning scenario and environment (Garrison & Vaughan, 2008).

Keywords: Social Media, Blended Learning, Information Literacy Skills, Academic Knowledge.

Introduction
Science, Technology, Engineering and Mathematics (STEM) are the cornerstone of economic development for any nation. Zimbabwe is not an exception and as such, investing in the STEM initiative is one of the most effective ways of accelerating the country’s socio economic development. His Excellency, Robert Mugabe initiated the introduction of these STEM subjects to high schools when he said, “there is need to equip learners with knowledge and values that guarantee economic growth and increased opportunities for employment creation, well rounded citizens who are relevant nationally and competitive globally” (STEM Initiative Magazine, 2016). In Zimbabwe life has a tendency of favouring the digital natives while curse of STEM will quickly ravage those unfriendly to science and to emerging technologies. Those resistant to the development of survival skills critical for knowledge-based economies will quickly meet their fate in the same manner as the dinosaur. Zimbabwe’s education is on the road to transformation after a decade of economic crisis. STEM and curriculum change are high on the educational agenda in Zimbabwe. Students are therefore encouraged to take science, engineering, mathematics and technology related disciplines seriously. For according to President Mugabe, these subjects are the cornerstone and pillars of industrialisation and one of the most effective ways of accelerating the
country’s socio-economic development. The success of the nation cannot be discussed without blended e-learning.

Against this backdrop, the government took a bold initiative where all O-level leavers registered for a full combination of these STEM subjects enjoy the privilege of having their fees, levies and boarding fees paid by the government as long as one is enrolled at the underprivileged Mission, Council and government schools. Due to technological advancement, the world is now a global village which is connected through ICT tools. The technology thrust was also adopted by the Zimbabwe Minister of Education, Dr Lazarus Dokora who demystified the usage of cell phones at schools and is now advocating for the inclusion of tablets, cell phones in the school curriculum. Primary and Secondary Education Minister Dr Lazarus Dokora said that there was nothing wrong with school children using mobile phones in school since the devices were necessary; “in this era of technological advancement.” He thus encouraged the parents to buy children mobile gadgets to enable them to acquaint themselves with mobile technology (Herald, 7 February 2016).

Universities in Zimbabwe are forced to look for alternatives other than traditional conventional learning so as to reach a wider range of students who have tight schedules and may not be exposed to traditional classroom formats due to various reasons. These students could have enrolled for parallel or block release lecture sessions. Blended e-learning has become one of the means that HIT is considering to implement. The need to develop students who will fit into the global market that requires technologically literate professionals is a major concern for HIT and other universities. The question that arises from this is whether individual universities are prepared for this radical change in the mode of delivery which will bridge the geographical barriers, time and space challenges. This technological adoption will thus enables 24/7 tutoring through cyberspace to reach all.

**Purpose**

This paper explores and assesses the status of implementation and sustenance of blended e-learning adoption at the Harare Institute of Technology (HIT). It examines eLearning strategies in higher education, locating the institutional participation and appreciation as national and international policy drivers. This move will culminate and catapult towards the achievement and establishment of a lifelong learner who is rooted in continual digital transformations. The main thrust and focus is on traditional face-to-face teaching scenarios
vis-à-vis the online strategies adopted by many international universities offering distance learning. Online learning means a bigger instructional shift from a face-to-face teacher to web-based content and instruction (Gosper et al. 2008).

**Literature Review**

Thorne (2003) and Mortera-Gutierrez (2006) suggest that blended learning is the integration between e-learning and traditional face-to-face instruction complementing each other. It does not advocate for the complete eradication of the former strategies but seeks to blend them into a combined powerful force which empowers and equips the learner. Blended learning is broadly defined as replacing seat time in courses with online activities to achieve learning objectives.

Garrison and Vaughan (2008) argue that blended learning is “the thoughtful fusion of traditional face-to-face and online learning experiences to compliment the student’s effort to learn. Blended learning is a formal education programme in which a student learns at least in part through delivery of content and instruction via digital and online media with some element of student control over time, place, path, or pace. It can replace or compliment the traditional classroom approach and introduces the virtual learning scenario and environment. Blended learning is divorced from the technology-rich instruction which shares the features of traditional teacher-led instruction with technological enhancements. This includes digital textbooks, online lesson plans, electronic whiteboards, Google Docs, virtual reality, and so forth. These tools may enhance learning experiences, but do not fundamentally shift instruction in a way that gives students some element of control.

Blended learning approaches have become progressively common in tertiary education around the world. These approaches often involve the use of self-directed learning materials conveyed through a learning management system (LMS) to compliment face-to-face teaching. Learning management tools include use of WhatsApp, blogs, quizzes, journals, online discussions-mail groups, video conferencing, virtual lectures and activities, e-portfolios, and feedback.

The advantages of blended learning are increasingly being recognized; these include the provision of new learning environments, more opportunities for learning, less dependence on
teachers, the facilitation of cooperation among students, and the recognition and underpinning of students’ efforts (Gil & Garcia, 2011).

Librarians are automatic allies and force to reckon with in the transition period because they are the drivers and spearheaders of Information Literacy Skills (ILS). Information literacy is a new concept that has emerged as a result of the challenges the world is facing in an information age. Information in the recent years is distributed, published, retrieved and acquired in different formats such as TV-screens, fragments of texts, snatches of music, by copy-writers, journalists, electronic devices, commentators, Internet and the web (Gosper et al. 2008). The term information literacy according to Hume (2002) refers to information competency, which generally mean the ability to access, evaluate, organize, and use information from a variety of sources. The advent of the internet has given rise to information explosion on the information highway and through ILS skills students and lecturers are able to sift through, analyze and extract the relevant academic sources of information to aid their education.

Blended learning fits with the constructivist approach to learning, which recognizes the role of the learner in constructing knowledge rather than receiving knowledge passively from the teacher. This approach entails the provision of a learning environment that is conducive to self-directed learning to fit with the learner’s own experience and cognitive ability (Condie & Livingston, 2007).

E-learning can enhance the efficiency of access to knowledge and qualifications due to the availability of large amounts of information, and access to specific expertise from online instructors. This can be hard to offer in smaller institutions or where there is a low population density in a particular region or country (Marc, 2002). E-learning can provide opportunities for interaction between learners through discussion forums and through eliminating the barriers that might hinder participation, such as fear of talking to others in a physical setting (Hameed, Badii & Cullen, 2008).

Learners can be classified into different personality traits which can affect their learning habits. Some are introverts and some are extroverts naturally. A great deal of past research has sought to find out the many ways that personality may affect individuals’ media use patterns, particularly on the Internet or online. This is because people are different in their
social and psychological circumstances, which may affect how and why they use the differing forms of media to fulfil their personal needs. These personality characteristics rely on several models differing between three and five total dimensions accepted as the universal, comprehensive elements of human personality including extroversion, neuroticism, openness, agreeableness, and conscientiousness. Research has noted that extroverts experience more successful social interactions online than introverts. Thus, it would seem that extroverts use social media more often because of their success (Warschauer, 2004; LaRose, Mastro & Eastin, 2001).

The statistic found by Kim, Sin and Tsai (2014) only supports this idea in saying that extroverts use social media more often, because it is hypothesized that roughly two-thirds of any population is composed of extroverts, with the remaining one-third introverts. It would then make sense that because the general population is made up mostly of extroverts, that extroverts would be heavier users on SNS than introverts. Specifically, the online environment is a place where individuals (both extroverts and introverts) can maintain existing relationships with one another and/or solidify offline contacts. Research has found that introverts are quite successful in social interactions online, find it easier to express themselves online and, in turn, oftentimes prefer it (Baxter, 2001). This translates to the fact that for blended learning purposes, it’s easy for a lecturer to get maximum contribution and collaboration from an introvert through blended learning technologies than the extrovert.

This is because introverts feel a need to control the amount of social interaction they subject themselves to and the online world is a place where they have this ability. Facebook has been described as the “ultimate communication platform for people who are more introverted because they can be connected with their own world online and be by themselves at the same time.” It has been said that Facebook offers introverts the opportunity and comfort to pre-screen their friends as they choose and present themselves in the way that they choose. In other words, Facebook offer introverts a painless, promising alternative to face-to-face interactions.

**Uses and Gratifications Theory**

The uses and gratifications approach has been used to give great insight into why individuals chose the various media outlets and why they interact with others the way they do. The uses and gratifications theory explains media exposure that has been applied to a wide range of
conventional mass media as well as interpersonal communication and now, to the Internet. This theory demonstrates that “individuals have unique sets of psychological and social needs as well as specific expectations relating to how a particular media outlet can fulfil those needs.” These exact needs and expectations of individuals contribute to the reasons behind why certain individuals chose to participate in different media outlets. Researchers found eight reasons or gratification factors for Internet use including: “to keep informed, diversion and entertainment, peer identity, good feelings, communication, sights and sounds, career, and coolness” (Hall, 2005). This theory thus impacts on the analysis of blended learning technologies as the lecturers and librarians choose the best technology to reach their intended audiences. It thus explains why some students, librarians or lecturers choose the best technology and avoid the other and this affects blended learning collaboration activities. Some students at HIT avoid the use of WhatsApp due to various social and religious backgrounds.

E-learning can be cost-effective for students as they do not need to travel, and efficient in terms of time. It can also be cost-effective for an institution reducing the need for physical classrooms and increasing the potential catchment area (Al-Musa & Al-Mobark, 2005). In e-learning the learner might suffer from isolation and the lack of direct social interaction, as sometimes found with distance learning, therefore requiring the learner to have relatively strong motivation and skills with regard to time management to mitigate this effect (Hameed et al., 2008). E-learning might have a negative impact on the development of communication skills of learners. In other words, although a learner might have acquired excellent academic knowledge, yet he or she might not have the skills to communicate this knowledge to others (Akkoynunlu & Soylu, 2006; Klein & Ware, 2003). E-learning might be less effective than face-to-face learning in terms of aspects of the learning process such as clarification and explanation, as these may be easier in face-to-face encounters. In addition, e-learning may lack the support provided by non-verbal clues provided or by observing the interactions of others (Al-Musa & Al-Mobark, 2005). In e-learning cheating may be easier in some circumstances as participation and even assessment tests could possibly be done by proxy unless appropriate safeguards are put in place (Marc, 2002).

The proliferation of social media amongst the population of Zimbabwe has given another dimension to how individuals can learn and get information using modernised educational approaches of access. The 21st century has realised the rapid growth and development of
ICTs in education. Training, retooling professionals in the education sectors is one of the topical issues amongst the government globally. Zimbabwe as one of the developing nations has quickly embraced this ICT inclusivity in education.

Blended learning is a pedagogical mode that integrates the strengths of the traditional classroom environment in the physical world and the Internet learning activities in the virtual learning environment. Other studies revealed that educational institutions are progressively implementing social media to support learning and teaching activities.

Facebook also enables students to express their ideas in and after class and helps students to formulate their thoughts with the support of multimedia contents such as pictures, videos. Flickr and YouTube are frequently used in the education context. Students are encouraged to discuss and ask questions based on the video contents as well as to prepare and upload their videos for information sharing. Likewise, micro-blogging platforms (e.g., Twitter) are used to stimulate student engagement in the classroom. In particular, Twitter enables students to share their thoughts about a discussion topic within 140 characters.

**Methodology**

A mixed method research design was employed in the study. Hence, quantitative and qualitative data was collected. The choice of a mixed research approach enabled data to be gathered concurrently in the study. A questionnaire, face-to-face interviews and observations were used as research instruments to collect data. The triangulation of the research instruments enabled breadth and depth to the evaluation and offered both on-campus and off-campus students the opportunity to give voice to their experiences of engagement and learning. According to Cresswell (2008), the choice of the methodology can be shown as a skeletal road map to research.

Although the interviews were administered several weeks before the survey, each method was considered a primary method of data collection consistent with a triangulation mixed methods design (Gay, Mills & Airasian, 2006). The interviews were semi-structured and the researchers compiled sets of questions which were asked all participants. There was flexibility on the part of the interviewer to probe the interviewees for further clarifications. The structure of the questions was open-ended and divergent in nature to allow the
interviewees to reveal some much detailed responses. Lastly, the collected data was interpreted and analysed using the Statistical Package for the Social Sciences (SPSS).

According to the Harare Institute of Technology (HIT) (2013), the total student population is 1932 comprising of conventional, block and parallel students as indicated by Table 1:

<table>
<thead>
<tr>
<th>School</th>
<th>Male</th>
<th>Female</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>School of Information Science &amp; Technology</td>
<td>324</td>
<td>117</td>
<td>441</td>
</tr>
<tr>
<td>School of Industrial Sciences &amp; Technology</td>
<td>164</td>
<td>211</td>
<td>375</td>
</tr>
<tr>
<td>School of Engineering &amp; Technology</td>
<td>644</td>
<td>168</td>
<td>812</td>
</tr>
<tr>
<td>School of Business &amp; Management Sciences</td>
<td>189</td>
<td>115</td>
<td>304</td>
</tr>
<tr>
<td><strong>Totals</strong></td>
<td><strong>1321</strong></td>
<td><strong>611</strong></td>
<td><strong>1932</strong></td>
</tr>
</tbody>
</table>

Source: Harare Institute of Technology (2013)

The total population of the conventional students was 800. Size of population sampling according to John Currey is calculated at 10 per cent of the total population. The sample size was therefore 80 students as the respondents were mainly the conventional students. The population statistics compiled from the research revealed that 37.25 per cent were female respondents and 62.75 per cent were males. This is a true reflection of the statistics of the students at the Harare Institute of Technology as there are more males than females due to gender sensitive programmes offered which are mostly the male dominated engineering disciplines. Women in other Zimbabwean universities normally dominate the social sciences which are not offered at the HIT University.

With respect to the lecturers, the random sampling method was by the researchers. 8 questionnaires were distributed to each of the 5 departments to complete. All the 40 questionnaires were returned fully completed for analysis.

**Findings**

Below are the statistical representations of the population which was used to undertake the research.

**Blended Learning Strategy**

The adoption of blended learning at universities needs buying in of all the respective constituencies. Garrison and Vaughan (2013) concluded that blended learning has not
resulted in organizational change that significantly enhances the effectiveness of the teaching and learning transaction and suggest that institutions need to engage in critical self-reflection about the learning experience. The responsibility of redesigning learning in blended learning courses falls squarely on faculty and instructors. For the programme to be implemented successfully the Institution, Faculty, Lecturers and students all need to participate and complement each other accordingly.

**The Role of Faculty**
The faculty needs to agree on the curriculum changes to factor in the extra work which the lecturers will be engaged in so that they can be remunerated accordingly or reduce their other course workloads to accommodate and appreciate the efforts. There should be a survey to establish the training needs of the lecturers so that they can accomplish the tasks accordingly. The researchers adopted the Uses and Gratification theory and assessed through qualitative interviews that the Faculty needed to establish through a survey the best technology to use for blended learning since some were highly influenced by religious and moral reasons henceforth were not comfortable to use WhatsApp or Facebook but were comfortable with e-mails rather.

**The Role of Lecturers**
The interviews also revealed that the lecturers should also participate by being flexible on their timetables to accommodate the extra work which may infringe somehow into their personal lives due to the constant interactions which can extend even after hours. More than 70 per cent of the lecturers indicated that they were not comfortable using Whatsapp for student engagement because it could be abused and infringe into one’s personal life. The introverts definitely resented it.

**The Role of Institutions**
The institutions should put processes, structures, and support the programme. The institutions must provide necessary supporting equipment in terms of hardware and software and also increase in bandwidth to accommodate the ever increasing activities which can obstruct the network due to downloads of various shared educational materials. Some universities attempt to provide students access to ICT by maintaining ‘computer labs’ or similar facilities: some provide students with tablet computers. Universities sometimes require students to have ICT access for certain courses, but not for all. Other institutions expect students to provide their
own equipment, but make access available to an institutional ‘learning environment’ or ‘learning management’ system requiring extensive infrastructure. Each of these has cost and support implications for the institution, its staff and its students. The expectation that digital resources can alleviate the shortage of books and other study assets in developing countries can be set with problems due to limited or unreliable infrastructure, particularly internet access (Asunka, 2013; Gulati, 2008).

At HIT there was once an ICT policy which banned the usage of YouTube and Social media technologies because of the belief that bandwidth was being overcrowded by the downloads which were not educational. The Librarian intervened to lift the ban and argued that the platforms could also be used for blended learning. What was simply required was the orientation and appreciation of the platforms and exploit them academically.

**Role of the Student**

The adoption and acceptance by students need flexibility. Statistically, it is said that one in every 5 young people has an addiction on social media and internet such that they wake up in the night just to send and check messages on social media. According to the research published in the *Journal of Youth Studies*, this night time activity is making the teenagers three times more likely to feel constantly tired at school during the day. The use of social media appears to be invading the “sanctuary” of the bedroom, said Professor Sallt Power. One of the students interviewed on online course had revealed that, “having online lectures was good. If you missed something or couldn’t understand it in class, one could fall back on the lectures and listen again. The online engagement thus acted as an extra backup memory”. Some students revealed that discussion activities in the classroom can be continued after class in a virtual environment. Students can still collaborate through twitter and Facebook and continue brainstorming on any particular discipline (*Herald*, 11 February 2017).

Students on parallel programmes at HIT were interviewed and revealed how relevant online courses and recorded lecturer sessions are. Since it’s laborious to hustle from work and always timeously attend lecture sessions, they revealed how Jabref tutorials and You Tube lecture sessions were quiet enhancing to complement missed lecture sessions. The online sessions are also advantageous in that if one is a slow learner, you can replay the same tutorials as many times as you want unlike the humiliating classroom atmosphere which may cause somebody to hide and feel embarrassed to probe further to understand a concept. 30 per
cent of introvert students revealed that they don’t participate even if they know the answers and nobody else knows. They would rather write on social platforms should the chance arise.

This finding is consistent with Motteram’s (2006) study of blended learning in a teacher education programme in which it was found that the blended learning course structures allowed students to deal with topics in their own time and promoted good learner autonomy. The staff facilitation and support throughout the course was recognised as crucial by some students for their learning. Some qualitative interviews revealed that some students may have serious religious orientations and engagements which may cause them to decline attending Saturday lessons due to Seventh Day Adventist church programmes. Such students have also found their time compensated by use of online sessions.

**HIT Internet Access**

The majority of the staff and students have access to the internet through their offices, dormitories and personal computers connected to the HIT Wifi and Hotspots. The staff members from the S Block and some few lecturers had challenges in accessing internet because they share some internet ports and have to take turns with the others.

**Gadgets Used to Access Internet**

<table>
<thead>
<tr>
<th>Gadgets used to access Internet at HIT</th>
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</thead>
<tbody>
<tr>
<td>Desktop</td>
</tr>
<tr>
<td>Laptop</td>
</tr>
<tr>
<td>Tablet</td>
</tr>
<tr>
<td>Smartphone</td>
</tr>
<tr>
<td>Other</td>
</tr>
</tbody>
</table>

ICT has exerted a differential impact upon various groups within society, creating a ‘digital divide’ and ‘digital inequality’ (Selwyn, 2004). Younger and more affluent people are more likely to have greater access to technologies and to make use of them for a wider range of
purposes than others. The results indicate that the Institute needs to source out more desk computers to assist the students in accessing the materials distributed through blended learning. Statistics reveal that not all students own smartphones and therefore some of them may be hindered from participating accordingly.

It is evident that the students will be mostly on the internet during lessons. The danger is that they could be abusing social media and sharing non-academic information. If these gadgets are forcibly incorporated for blended learning, the students won’t be found do work on the side but will be forced indirectly to engage academically on these platforms. Interviews revealed that 70 per cent of the off campus students can engage in a blended learning mode compared to on campus peers. The general assumption is that those off campus students have an inward intrinsic fear that those on campus are continually engaging and cover a lot of ground academically so they check on their other peers’ progress in order that they can operate on the same wave length. Fortunately some databases like EBSCO Host are user friendly and can allow them to collaborate through e-mail and share whatever downloads they would have acquired. All the off campus students can now access and download materials from e-resource platforms as a result of the institutional subscription to Ezy proxy. Research results also indicated that, it is apparent face-to-face learning procedure affords students with less autonomy and flexibility for learning, thwarting the enhancement of lifelong learning and self-regulating problem solving skills of students.
It is apparent from the above diagram that the students share more of jokes than academic information evidenced by the 78 per cent and 36 per cent respectively. Most students do not like to participate in communication activities such as group discussion and answering questions in the classroom because they consider the communication situation as relatively unrewarding or unexciting. Nowadays, students feel less interested in traditional face-to-face communication and turn to the cyberspace as an alternative communication channel. Such problems can be resolved by using social media such as Twitter to facilitate communication between teachers and students.

Information Shared on Twitter

Most students revealed how they now avoid face to face communication and derive pleasure in online communications. There’s a psychological bearing on the inclination that the physical presence of an individual is not more interesting in communication than when one tends to later communicate with that individual through cyber space.
Psychological syndrome of internet and social media

More than 60 per cent of the students studied disclosed that they were victims of this unknown psychological phobia that the one who is not physically present with you is more exciting to chat with than the one in your physical presence. The picture below displays what happens during family visits, lecture sessions, workshops, meetings, etc. Many meetings suffer from maximum participation by the individual present who are psychologically derailed by the internet platforms and doing something else in the course of the meeting.

One day you will look up from your phone and your parents and grandparents won't be there........

Information shared on LinkedIn

LinkedIn proved to be popular for sharing academic information and collaboration as recorded statistically by the 60 per cent of the respondents. This is shown by the bar chart below.
Challenges Encountered in Usage of the Internet

The study revealed that the respondents encountered a number of challenges in the use of the Internet. These ranged from electricity problems (90%) to hacking (55%). This is depicted by the chart below.

![Chart showing challenges encountered on the Internet](chart)

**Problems Encountered on Social media by Students**

Conclusion

It is therefore suggested that it is possible to design approaches to blended learning which adopt the positive aspects of e-learning and can combine them with those of face-to-face teaching and avoid some of the disadvantages adopted on the way.

References


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