# Using Facebook to Transfer Knowledge into Practice and Aid Student, Lecturer and Content Interaction
## A Case of Bachelor of Information Technology Undergraduate Students at Makerere University

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Abstract: Employers have criticised graduates for inadequate skills to apply knowledge into practice due to the traditional teaching and learning methods which concentrate more on theory than practice. Technology affords several teaching and learning methods like social media which students are already motivated to use. The research therefore used Facebook technology to facilitate students' application of operating systems knowledge to record and upload a video installing a virtual machine and operating system onto a group; to promote content access, and interactive and cooperative learning. The results from the study show that the overall effect of Facebook on students learning process and experience was positive because it enabled putting knowledge into practice, sharing, collaboration, interaction, flexibility and learner – centred activities, among others. Therefore, to increase learning outcome, motivation, desire and interest, new educational technologies should continuously be explored by educational institutions, educators and learners for teaching and learning in the digital era. In this light we recommend that Facebook should be assessed in more studies and integrated as a tool for learning at the university since students appreciate it, find it easy to use and familiar.

## 1 INTRODUCTION

Although social media, like Facebook, is used for sharing learning experiences, research, academic events and getting latest information (Hussain et al., 2012), its use for learner-centric teaching is underutilized. Facebook has potential of sharing of videos, which can aid in transferring knowledge into practice, which is a challenge today. In Uganda there is more concentration on theory compared to practice, which leads to a mismatch between what students expect and what educationists deliver. The education system currently does not emphasize use of technology and practical skills development. Facebook technology is an online application that students are familiar with and can support, connect and engage students outside formal in-class hours (Monopolis, 2014). Facebook has stronger roots in the academic community, since it was developed as a university project (Bosch, 2009). Beldarrain

(2006) notes that today's workplace requires individuals who can create and collaborate within constraints of time and place. Therefore, he highlights the need for real-time communication and tools to create a stronger learning community where members can build expertise and develop problem-solving skills. For students to be prepared for the complex and rapid changing work demands, they need a variety of skills including analysis, critical thinking, decision-making and problem solving (Mbarika et al., 2010). Therefore, educationists need to tap into technology that affords students the ability to learn effectively learning and be productive to address this mismatch.

## 2 BACKGROUND

Makerere University has not yet embraced e-learning to its full potential since technology use in

teaching and learning is noncompulsory. An optional e-learning policy exists for the individual Colleges or lecturers. A customized Moodle, Makerere University E-learning Environment (MUELE), is used to disseminate notes to students, however, collaboration tools are not used. The lecturers only upload notes which students access at convenience, therefore, there is limited interaction, engagement, and collaboration.

## 2.1 Context, Problem and Goal

Bachelor of Information Technology second year students undertaking the Operating Systems (OS) course unit took part in the study. The course unit provides basic knowledge and skill in using, evaluating and managing existing OSs. Employers have expressed concern that graduates hardly apply knowledge and skills acquired to solve real life problems at work (Bagarukayo et al., 2012; Mbarika et al., 2010). The education system concentrates mainly on theory and not practice, which contributes to this problem. Therefore the mismatch between teaching methods in the digital era does not address different learning styles. Therefore, there is need to develop learning activities where students can transfer knowledge into practice to develop skills to address real world issues and yield greater productivity and return on investment. Therefore, the goal was facilitating students' application of OS knowledge to record and upload a video installing a virtual machine and OS onto a Facebook group; to promote content access, and interactive and cooperative learning.

# 3 LITERATURE REVIEW

## 3.1 Transferring Knowledge into Practice

Learning is acquiring new information, knowledge and sharing best practices and for a permanent learning process, time should be invested in transferring knowledge into practice and understanding the outcomes (Tenkasi and Hay, 2004). Hands-on opportunities provide a rich learning space in supporting students to transfer knowledge into practice and test newly acquired skills. Applying newly learned skills and behaviors for the workplace greatly enhances knowledge retention. The gap between knowledge generated through studies, evaluations and application of

these findings in practice needs to be addressed.

Bloom's Taxonomy emphasizes the need for holistic learning (Churches, 2001). Before one analyzes a concept, they must be able to apply it and before they can evaluate its impact, they must have analyzed it and before they create it they must have remembered, understood, applied, analyzed and evaluated it. Therefore, before students create an artifact, they should remember, understand, apply, analyze and evaluate it. Bloom notes that applying knowledge is using information, concepts and ideas in a new situation and includes implementing, carrying out, using, executing, doing, running, loading, playing, operating, uploading, sharing and editing (Churches, 2001). Applying involves digital activities of running and operating, playing, uploading, and editing.

## 3.2 Research Studies That Have Used Facebook

Murumba et al., (2015) noted that integrating social networking tools into learning is beneficial to students for better engagement and motivation, better instructional materials, better communication and interaction, increased family involvement and application of real world skills. They state that teachers enhance professionalism and collaboration with peers and gain opportunities to build relationships with students. Bagarukayo and Kalema (2015) advocate for social software approach to promote learning activities that improve the learning process since there is a paucity of research on its use for academic purposes in Africa as compared to the developed world. Students are engaged in social media platforms and therefore educators need to tap these spaces for the learning process. Monopolis (2014) said Facebook facilitates communication and collaboration between faculty and students, allows interaction and information sharing. Bosch (2009) reported that learners are more engaged with Facebook and prefer it to the Vula Learning Management System (LMS) and a lecturer said it was quicker to 'talk' to learners on Facebook than finding them in class. Facebook enabled lecturers to be more accessible and approachable in a less formal environment and made students ask questions freely.

Facebook is effective for academic discussions because students find it familiar and easy to navigate (Hurt et al., 2012). Ractham et al., (2012) reported that 55% of the students found Facebook helpful in learning and 78% found it a useful supplemental learning tool. Facebook facilitates interactive communication, enhances participation and

discussion, and provides personal and professional growth (Barczyk and Duncan, 2013). It facilitates the development of community of practice that pinnacles in knowledge sharing, collaboration and interaction, and learner-centered activities. Rinco and Sandoval (2014) say Facebook was the greatest host (81%) therefore, making it the most popular social network. Learners were more familiar with Facebook and preferred it for discussions (Brady et al., 2010). Cloete et al., (2009) notes the benefits of Social Networking Sites like Facebook as a higher level of engagement, development of digital literacy skills, and integration in learners' daily practices, potential to make identity information more relevant during class discussions, adding a 'social' peer to peer component and managing alumni through the group.

According to Beldarrain (2006), technology as a delivery method should encourage contact between students and faculty, develop reciprocity and cooperation among students, use active learning techniques, give prompt feedback, emphasize time on task, communicate high expectations, and respect diverse talents and ways of learning. Facebook as a tool affords these 7 principles and was used as an interaction tool to increase collaboration between learners and lecturer.

In conclusion, Facebook was used because it is the most popular social media platform, students were already motivated to use it, makes it easy to combine teaching and learning with social interaction which makes learning interesting, facilitates students' engagement with one another and instant access to lecturers, brings interaction and collaboration with content, peers, and teachers into the classroom and forms communities of practice, which facilitates development of Higher Order Cognitive Skills.

# 4 APPROPRIATE FRAMEWORKS TO DEFINE EDUCATIONAL GOAL

## 4.1 Bloom's Digital Taxonomy

Bloom's Digital Taxonomy (BDT) addresses new objectives, processes and actions presented by emergence of ICTs into the classroom and their impact on students' lives. BDT introduced new digital verbs that aid collaboration, which are elements to facilitate higher order thinking and learning. Collaboration is a 21st century skill integral

to the learning process and has an increasing influence on learning. Collaborating and sharing are higher order thinking skills, which are facilitated by digital media and increase learning influence. Social networking is a key element of collaborating and networking because it forms links between people and helps to develop networks.

## 4.2 Anderson's Interactions Framework

Anderson (2008) states that for learning to be effective, there has to be interaction between students, teachers and content. Therefore, the tool identified needed to afford these interactions. The task of facilitating students' application of OS knowledge emphasized teacher –content, teacher-student, student- student and student –content interactions using technology to enhance effective learning.

# 5 METHODOLOGY

## 5.1 e-Learning Design Methodology Framework

Bowers Affordance analysis framework was used to match requirements of this task with affordances of the tool (Bower, 2008). Affordances refer to the perceived and actual properties of the thing. Bower (2008) classified affordances of e-learning technologies to include Media, spatial, temporal, navigation, emphasis, synthesis, access control, technical, usability, aesthetics and reliability affordances. Facebook has the affordances required to facilitate achievement of the learning and teaching objectives. Affordance analysis was used as follows:

### 1. Identify the Educational Goals

The intentions of the learning design were facilitating students' application of operating system (OS) knowledge to record and upload a video installing a virtual machine (VM) and OS onto a Facebook group; to promote content access, collaborative and cooperative learning.

### 2. Postulate the Suitable Tasks to Satisfy the Educational Goals

*a) Understand the key concepts*

Students needed to research on 'how to install

Virtual box software and UNIX OS and download an ISO image of Ubuntu 14.04 OS'. Students were required to explain in video - what file systems they chose for the OS to use, justify their choice and explain use of swap space.

### b) Apply knowledge acquired to install the Virtual Machine and OS and Record and Upload Video

Students needed to use knowledge from research to practically install VM and OS onto VM while video recording themselves and upload the video on the Facebook group.

## 3. Determine the Affordance Requirements of the Tasks

### a) Understand the key concepts

In order for students to research about installation of the VM and OS, read-ability, write-ability, search-ability, view-ability, listen-ability, access-ability, browse-ability, data-manipulation-ability, link-ability, download-ability were necessary for reviewing, searching, downloading, adjusting and relating information.

### b) Apply knowledge acquired to install Virtual Machine and OS and Record and Upload video

In order for students to install the VM and OS they needed to set up the software and create Video installing the OS on VM. Therefore, Record-ability, watch-ability, move-ability, combine-ability, listen-ability, view-ability, video-produce-ability, focus-ability, resize-ability, playback-ability share-ability, and permission-ability were necessary for recording, playing back, editing, putting together the video and posting it on the group.

## 4. Determine affordances from Facebook

The technology considered for this task was Facebook because it has affordances of 'uploadability', 'downloadability', 'commentability', 'sharability' and 'likability' to enable this task to be accomplished.

### a) Understand the key concepts

The tool needed to afford read-ability, write-ability, search-ability, view-ability, listen-ability, access-ability, data-manipulation-ability, link-ability and browse-ability by allowing students to research and 'download-ability' for OS and Virtual box software, which were necessary for reviewing, searching, downloading, adjusting and relating information.

### b) Apply knowledge acquired to install Virtual Machine and OS and Record and Upload video

A tool was needed to enable students' record themselves installing the OS and VM and upload the video on Facebook group. The technology needed to afford Record-ability, video-produce-ability, combine-ability, watch-ability, move-ability, resize-ability, focus-ability, listen-ability, view-ability, playback-ability, share-ability, and permission-ability necessary for recording, playing back, editing, putting together the video and posting it on the group.

## 5. e-Learning Task Design

The task required students to create a video recording installing a VM and OS and post it for peers and lecturers to comment and interact thereby learning from peers and lecturers online as a supplement to classroom. The process of integrating available and required affordances, that is, selecting the appropriate tool to match tasks was as follows:

### a) Understand the key concepts

Facebook is a tool, which enables students to research and understand key concepts. It provides affordances for reviewing, searching, downloading, adjusting and relating information.

### b) Apply knowledge acquired to install Virtual Machine and Operating System and Record and Upload video

Students installed the OS and VM on their machines and used their phone or computer cameras to record the video. Facebook provides affordances for recording editing, putting together the video. Facebook provides affordances necessary for playing back the video and posting it on the group. The researcher chose Facebook which students are already motivated to use to account for motivation and student ability.

Facebook affords social networking, seeking peer support, community building, student activism, general communication, sharing information and maintaining group and personal communication on public spaces. Facebook also affords students with a shared connection and collaboration with students, lecturers and communities of practice, Interaction and engagement with students, teachers and content and Chatting, liking, posting, uploading and downloading video, text and audio file.

# 6 DATA COLLECTION AND ANALYSIS

### a) Questionnaire to Determine Students' Attitudes and Perceptions on Facebook Use

A validated questionnaire was used to determine attitudes and perceptions of students on the use of Facebook to accomplish the video upload assignment. The results are presented in section 10.

### b) Data Analysis

The qualitative data collected was analyzed by reading individual responses as summarized in 10.1. The quantitative data collected was analyzed using MS Excel to total up the number of responses on each question as presented in table 2.

# 7 RESULTS

The researchers created a Group page in Facebook for students taking OS course unit. Through the group students had discussions, commented on posts, posted videos, links, uploaded and shared created videos. The task required students to create a video, using mobile phones or cameras, installing OS and uploading it to the group to enable peers interact, critique it and learn from one another in the process. They learnt by doing, by creating the video, from peers, lecturers, and content uploaded by peers and lecturers which promoted use of educational technologies for learning and teaching. It was important to use Facebook because it affords students the ability to communicate, interact, and collaborate which enabled them to put knowledge into practice in a new context.

BDT helped understand that students needed to attain higher levels of thinking skills to enable them acquire practical skills. Therefore, it was necessary to create learning activities that make students put knowledge into practice to develop hands on skills. BDT was applied to train students holistically to attain knowledge, skills and attitudes, which addressed all levels of three domains. Students were trained from lowest to highest levels of the BDT by teaching them theory about installing an operating system and virtualization in an introduction lecture, which enabled them to gain skills at lower levels of Remembering and Understanding. At 'Applying' level digital activities were carried out by students during video creation and upload on Facebook. Activities that enabled 'applying' include demonstration by video, collaboration by students interacting and sharing ideas, playing and editing.

Digital additions include commenting and reflecting, reviewing, posting, moderating, collaborating and networking, testing (alpha and beta) and validating. The activities that promoted this level include chat rooms, discussions, collaborating tools, camera, searching, presentation, recorders, posting, collaborating and networking. Students attained 'Evaluating' level by commenting, posting, testing, and experimenting during the task. The creating level involves designing, constructing, planning producing, inventing, devising and making the video which students acquired during video creation, editing and upload on Facebook.

The students put together their ideas from research on VM and OS installation, and created and posted the video on Facebook. Facebook was used as a tool for collaborating and sharing or publishing the video, therefore, HOCS were achieved in the task. Students did the assignment practically, which enabled them gain skills at higher levels of Analysis, Applying, Evaluating and Creating. This helped students to practically install the OS onto VM thereby applying knowledge into practice. Ensuring that students produced video as a final product enabled them to gain 'creating' skills, at the highest level of taxonomy, therefore practical skills were attained to address industry needs of putting knowledge into practice. Therefore, before students created the video, they had to remember, understand, apply, analyze and evaluate it. Collaborating, commenting, posting, networking, chatting, texting, reviewing, questioning, replying which are collaboration spectrum of BDT at all levels of cognitive domain happened. For effective learning, students required skills of interaction and engagement provided by the platform because it affords collaboration and communication needed for uploading and presenting video recording, sharing ideas, and commenting on peers' videos to enhance the learning process.

Facebook has facilities which introduced agents that increased interaction, it is not dependent on institution's infrastructure and empowers both educator and student. Students also have face-to-face interactions with lecturers and peers as emphasized by Anderson's (2008) interaction framework for effective learning. Students interacted and 'followed' their mentors and society leaders who influenced learning. Facebook promotes innovative and transformative learning. Students were involved

in choosing the cover photo for the group to personalize the 'BIT II CSC 2200 Operating Systems class' page and feel at 'class'. The peers, lecturer and systems administrator followed students' discussions to monitor progress.

### a) Facebook Usage Findings

Students were actively engaged, appreciated and enjoyed use of Facebook as a communication and interaction platform basing on participation. Students were very excited and interactive. They created a video and posted it on the group to supplement and complement collaborative activities introduced in classroom. Students learnt at all levels of cognitive domain of BDT (Churches, 2001) because the task enabled them to carry out different activities.

### Post-Assignment Questionnaire Responses

### a) Quantitative Findings

A validated students' questionnaire used to determine 'perceptions and attitudes about use of Facebook for the assignment' basing on a likert scale ranging from Strongly Disagree, Disagree, Neutral, Agree and Strongly Agree, was filled by 48 students after uploading video. The results of the number of individual responses per question are shown in Table 2 as follows (Where S= strongly disagree; D= disagree; N= neither agree nor disagree; A= agree; SA= strongly agree; FB= Facebook) 523 responses positively (Strongly Agree and Agree) rated Facebook as a convenient platform for classroom discussions and allowed them to interact with classmates. Students noted that Facebook should be used as a learning tool, since it had changed their view of the course, was well integrated into assignment, was more effective and preferred than MUELE, had an overall positive experience, made students feel more connected, enhanced their OS understanding, enabled lecturer-student interaction, enhanced experience of participation, allowed finding and sharing of resources, provided collaborative opportunities, encouraged learner-centered activities and allowed flexibility in learning. However, 123 responses were neutral, while 89 either disagreed or Strongly disagreed with the statements. Therefore, the overall effect of Facebook on students learning process and experience was positive because it enabled putting knowledge into practice, sharing, collaboration, interaction, flexibility and learner – centered activities, among others. In addition, the

questionnaire had open-ended questions to capture students' views regarding their experience, challenges and recommendations using Facebook for the assignment.

Table 1: Total of individual responses per question.

| Question / Response | S | D | N | A | SA |
|---|---|---|---|---|---|
| 1. Facebook for classroom discussions is very convenient | 3 | 4 | 3 | 19 | 18 |
| 2. Facebook allows me to interact with classmates | 0 | 3 | 4 | 20 | 18 |
| 3. Facebook should be used as a learning tool | 1 | 5 | 6 | 28 | 10 |
| 4. Facebook changed my overall view of the course | 1 | 8 | 17 | 14 | 6 |
| 5. Facebook was well integrated into the assignment | 3 | 3 | 6 | 26 | 6 |
| 6. Facebook was more effective than MUELE | 1 | 2 | 7 | 15 | 20 |
| 7. I preferred using Facebook over MUELE | 3 | 2 | 8 | 15 | 19 |
| 8. Overall experience using Facebook was very positive | 2 | 5 | 3 | 22 | 15 |
| 9. I felt more connected to fellow students using Facebook | 2 | 2 | 7 | 20 | 16 |
| 10. FB enhanced my understanding of OS | 3 | 8 | 11 | 17 | 8 |
| 11. FB enabled me to interact with the lecturer more | 2 | 3 | 5 | 20 | 13 |
| 12. FB enhanced my experience of participation | 1 | 3 | 9 | 22 | 13 |
| 13. FB allows me to find and share educational material | 2 | 4 | 8 | 20 | 10 |
| 14. FB provided collaborative learning opportunities | 1 | 4 | 9 | 19 | 14 |
| 15. FB encourages learner-centred activities | 2 | 2 | 12 | 22 | 7 |
| 16. FB allows me flexibility in learning | 1 | 3 | 8 | 27 | 4 |
| Total | 28 | 61 | 123 | 326 | 197 |

### b) Qualitative Findings
### i) Students' Experience using Facebook

The students noted that it was a good experience because *it made them active, learning was more effective, convenience of time and place, interaction, information distribution was easy, getting notes was faster. Facebook was easy to use, access and familiar, promoted peer and self-learning, and instant updates. It was better for mobility purposes, availability and accessibility, was not limited and enabled bonding with classmates and Online discussions, Interactions with lecturer and constant communications. The experience was educative because even without prior knowledge they clearly understood concepts, and changed overall view of learning.*

One student noted that using Facebook was not a good experience because of waiting for approval to join. However, majority of students characterized the affordances of Facebook as per Anderson (2008) and the tool bringing fun in learning.

### ii) Conceptual Understanding

Majority of students positively rated using Facebook as improving their conceptual understanding because *it was good, exciting, interesting, practical and interactive, and helped understand concepts, approach made students more involved, promoted multiple views of activities and connecting with peers helped them learn better, promoted Learning by doing, and built confidence. Facebook is a good platform and greatly improves teacher-student interaction, research-intensive and more participatory, promoted access to educational materials from anywhere, good lecturer-student relationship, idea generation, technical skills, knowledge sharing, Peers approached others which helped them learn more.* Although one student noted he did not learn the concepts better because explaining in person would have been a better option, the rest found the use of Facebook as further promoting their practical, research, communication and interpersonal skills, and consequently improving their conceptual understanding.

### iii) Students' Challenges using Facebook

Students noted the challenges of *time, cost and difficulty in uploading large videos, some phones could not support Facebook, poor network connections, Privacy of information shared, not all students were on Facebook, pseudo names usage, few students on platform at times, others did not want to mix social life with academic purposes, and lack of personal computers.* Most challenges were related to resource constraints, implying that limited resources are a hindrance in using social media for learning.

### iv) Students' Recommendations on using Facebook for Learning

Students made recommendations that Facebook should be used for future assignments and learning opportunities because it is simple to use, enables interaction, peer learning for understanding concepts easily. It should be customized for academic work and lecturers should use it as a learning and grading tool. In summary, students recommend the use of Facebook and its integration with other tools to enhance research, teaching, learning and assessment.

## 8 PROOF OF CONCEPT

The tool in action provides evidence of the prototype test and show that students put knowledge acquired into practice by uploading videos of installation of VM and OS on VM and show interaction between students, peers and lecturers and using Facebook to solve learning problems. Some students uploaded videos after a struggle thereby learning by doing. Uploading of videos show the educational goal was achieved since students managed to learn how to install VM and OS and recorded, uploaded or posted the video on Facebook. Facebook affords interaction relevant for effective learning by lecturers commenting on students' posts and student to student interactions and problem inquiry.

## 9 DISCUSSION

The students researched and uploaded a video recording installing a VM and installed the UNIX (Ubuntu 14.04) OS onto VM and the class Facebook group 'BIT II CSC2200 Operating Systems Class'. Since students were already familiar with Facebook, they did not hesitate using it and enjoyed the experience. From the results, it is clear that the overall experience was positive. Most students indicated increase in motivation, collaboration, and interaction and believed they learned better through this approach. Therefore, use of Facebook in teaching and learning has potential to facilitate application of knowledge to solve real world problems.

The student who observed that Facebook was not a good experience because of waiting for approval to join the group is unfortunate because the administrator was online and approved requests immediately. The student who said they did not learn concepts better because explaining in person would have been a better option emphasizes that students have various learning styles, which need to be addressed in the learning process. The Web provides several tutorials on YouTube where this student could have found explanations as required of them. The lecturer also explained in class in the general introduction to operating systems and virtualization.

# 10 CONCLUSION AND RECOMMENDATIONS

The research focused on Student's inadequacy to transfer knowledge acquired in class into practice. Further, lecturers teach practical courses in a theoretical way curtailing students' acquisition of the expected practical skills. The lecturer gave an introductory lecture about OSs, and installations. Students carried out research on how to install OS and VM, and recorded a video installing OS and uploaded it on Facebook group, and uploaded the videos and later presented them in class. From the perceptions, majority thought they learnt better with this approach and therefore, it curbs the problem.

Technology affords new ways of learning using a variety of tools and media that address different needs of digital learners and provide various skills required. Technology provides knowledge sharing opportunities where students and educators can access content and network with peers to share best practices from different institutions to develop deep learning approaches amongst students and lead to production of new knowledge and artifacts and transform institutions and society. Therefore, to increase learning motivation, desire and interest it is important to design meaningful learning tasks and use of new educational technologies should continuously be explored by institutions, educators and learners for teaching and learning in this digital era.

The current experiment enabled students to transfer knowledge acquired in class into practice and thereafter upload the video onto Facebook where they interacted with peers, content and lecturer. In future the study should be repeated with more course units and topics to assess Facebook

effectiveness, integrated as a tool for learning. Students without Facebook accounts should be accommodated, and challenges of network connectivity and shortage of computers addressed.

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