



COMMONWEALTH *of* LEARNING

Blended Course Experience

at Jaramogi Oginga
Odinga University of
Science and Technology





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of Science and Technology

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Jaramogi Oginga Odinga University of Science and Technology



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Executive Summary

This is the report of a survey conducted at Jaramogi Oginga Odinga University of Science and Technology (JOUST) to evaluate the implementation of technology-enabled learning. The research was conducted among students and lecturers on courses that were offered in a blended mode. The courses were developed and facilitated by 20 lecturers who had been trained as champions for the implementation of blended learning. Each of the 20 champions was required to set up their blended courses on the eJOUST platform, which had been customised from Moodle. The blended courses were taught throughout the September–December 2019 semester, and the survey was undertaken in January, after the students had completed their blended courses.

The survey was conducted through questionnaires administered to both students and lecturers who had participated in the blended learning. The student questionnaire consisted principally of Likert-scale questions and was administered online. The lecturer questionnaire was mostly comprised of open-ended questions; it was sent to the champions via email, and after completing it, they emailed it back.

A simple random, purposive sampling technique was used. Anonymous, self-administered questionnaires were distributed to 341 students participating in blended courses and 17 lecturers who were teaching these courses.

A total of 311 usable responses were received, resulting in a response rate of 91.2%, which was considered satisfactory for subsequent analysis.

SPSS 20.0 was used to analyse the quantitative data collected from the questionnaires and perform descriptive statistics, such as frequencies, percentages, mean values, standard deviation and an independent sample *t*-test.

The findings of this study are intended to assist design instructors in improving student satisfaction with a blended course design so that learners and teachers can enjoy the possibilities of new information and communication technologies; the findings can also serve as a basis for developing an effective course mechanism in a blended learning curriculum.



1. Introduction

Higher education in Kenya is in a transition phase as universities invest in IT infrastructure and adopt new educational technologies in a bid to provide quality education to both on-campus and off-campus students. The use of modern technologies to enhance the delivery of education is an increasingly common phenomenon in most higher education institutions in developing countries (Mbwette, 2011; Moyo, 2003; Nihuka, 2011). In an effort to reap the benefits that such technologies can provide in higher education, JOOUST has embarked on a deliberate initiative to complement its traditional classroom training with technology-enabled learning to improve the quality of student outcomes. This is occurring in tandem with orienting the current generation of students, who are digital natives. JOOUST has also introduced eLearning and blended learning as an alternative delivery system to increase accessibility to higher education.

JOOUST's faculty deans selected 20 faculty members from the institution's ten different faculties to champion the implementation of blended learning. Given that professional development would be key to successful implementation of the mode, the champions were taken through a five-day training course on blended learning and the use of the eJOOUST platform, which has been customised from Moodle. This was done with support from the Commonwealth of Learning (COL), who provided the facilitator and supported the course developers with their contingency expenditures. The blended mode was used to enhance the learning experience of campus-

based students during the September–December 2019 semester. The champions set up modules that incorporated both weekly face-to-face teaching and teaching supported by information and communication technologies (ICT). The facilitators were at liberty to use their preferred blended learning mode. Most used the eJOOUST platform for resources (text, video and audio) and activities (mostly quizzes, assignments and forums).

Before the introduction of blended learning, a baseline survey was conducted to establish the readiness at JOOUST to introduce this learning mode. The survey indicated that 90.28% of the students owned smartphones and 50% owned laptops. It was therefore deemed feasible to implement blended learning, as the students were able to access the mobile phone version of eJOOUST and other web-based resources from their smartphones. Students who did not use laptops would still be able to participate in all the activities that had been added to the course.

Given that most of JOOUST's on-campus students are digital citizens, they were trained for an hour in the use of eJOOUST, then left to explore the platform on their own using their devices or the few that are available within the institution. This was accompanied by sufficient user support from the institution's Centre for eLearning.

This document reports the findings of the survey that was conducted to assess the success of teaching and learning through the blended mode at JOOUST. The survey was supported by COL.

1.1 Research questions

These questions guided the study:

- What are students' and lecturers' views on a blended learning environment?
- What are the levels of digital literacy and access to technology among the students and lecturers in JOOUST?
- What are students' views on a blended learning environment with respect to course design and their learning experience?
- What are students' views on module interest with respect to attention, relevance, satisfaction and confidence?
- What were the challenges of the blended learning courses at JOOUST?
- Is there any significant difference in students' learning performance between blended courses and non-blended courses?



2. Literature Review

In higher education institutions, the blended learning mode presents vast opportunities to improve content, interactions and much more, which have an additional significant effect on problem solving, learner engagement and credible assessment (Vaughan, 2014). Supported by the rapid growth in Internet-based learning tools, blended learning is anticipated to continue expanding and to assist many with knowledge acquisition (Andersen et al., 2018).

Teachers believe that leveraging the integration of rapidly developing digital technologies to deliver content will improve students' ability to solve problems in digital spaces (Sadaf & Johnson, 2017). But an environment that supports digital literacy is only as good as users' access to the necessary technologies; hence, there is a significant relationship between digital literacy skills and the use of electronic information resources (Adeleke & Emeahara, 2016). While young people are eager to learn in digital environments so long as those digital spaces are authentic (Alvermann & Sanders, 2019), there is a rising need for additional ongoing technical training to foster digital literacy and to instil proficiency for a better understanding of programs taught using Internet technologies (Martzoukou & Elliott 2016).

Resource availability contributes immensely to the successful development of blended learning modules, the most important being human resources and information technology (Poon, 2013). The upfront availability of these resources, in addition to time and fiscal support where required, are crucial to the timely and successful development of blended learning materials, enabling students to have learning resources developed for use in their courses and to enjoy their learning experience. Smyth et al. (2012),

as well as other researchers, have indicated that blended learning as a pedagogical tool has the potential to improve student learning.

The use of blended learning has become an international issue in the educational arena, and it's worth noting that most institutions are already using it (Kristanto et al., 2017). Recognising the challenges of developing audio and/or video materials for electronic learning, and the limited time available for students and lecturers to interact, a blended mode is more suitable for JOOUST.

Cabero et al. (2010) explain that "blended learning is a formative action in which online and attending training are combined" (p. 5). They make use of a schematic representation from Mason and Rennie (2006) to explain what blended learning is along the continuum of online and offline learning.

According to Jackson et al. (2010), one aspect lecturers find particularly challenging is the shift from conveyor of information to mentor, coordinator and facilitator of learning in the online environment. The lecturer is now defined by the learners' needs. Further challenges include monitoring interactions between students, guiding discussions and providing interactive online learning activities. Lecturers are now facilitators, while students become more independent in their learning activities.

According to Hsu and Hsieh (2011), students may master content in a blended learning course in a more meaningful manner to reach their course outcomes, as blended learning expedites metacognitive development. They feel that online courses enhance learning by providing an interactive and rich learning environment. However, the same can also be said about face-to-face teaching environments.

3. Methodology

3.1 Research design

This study is based on an experiment in which learners and teachers participated in using face-to-face sessions and online sessions in a blended learning design. The Moodle learning management system (LMS) was used, and learners' characteristics/background as well as their courses' blended learning design features were measured in relation to learning effectiveness. Hence, this was a planned evaluation research design, as described by Guskey (2000), since the intended outcome was to achieve blended learning implementation at JOOUST. The plan under which the various variables were tested involved face-to-face study at the beginning of a 14-week semester, followed by online teaching and learning in the second half of the semester. The last part of the semester then used the face-to-face mode again to review work done during the online sessions and to conduct final examinations.

For the purpose of this study, 17 courses were redesigned and developed in a blended course format (i.e., part online, part face-to-face) according to Kerres's and De Witt's (2003) 3C-model of didactic components in a blended learning arrangement. This model includes three components that need to be taken into account:

- a content component that makes learning materials available to the learner
- a communication component that offers interpersonal exchange among learners or between learners and tutors
- a constructive component, which facilitates and guides individuals to actively work on learning tasks (or assignments) with different degrees of complexity (from

multiple-choice to projects or problem-based learning).

In designing the blended courses, instructors examined formal and informal data gathered from students who had previously taken the courses. They then specified the desired outcomes of each course in terms of goals and objectives. A course's content, practice items and assessment instruments were determined based on its basic goals and objectives.

The online components were delivered using eJOOUST, the institution's asynchronous course management system. These online components promoted student-centred learning in a way that provided significant autonomy for students in terms of the time, place and frequency of their study activities (Sparrow et al., 2000). The online portion of the blended course focused on content delivery, course management and extension of in-class discussions to the Web. Specifically, eJOOUST included course descriptions, course schedules, documents (course content), announcements, forums, quizzes, links and student papers. An outline of the course content was placed on eJOOUST, indicating to students when content would be released.

Students were expected to log onto the courses individually from home, from work or within the university precincts — whichever was most convenient for them — and to read that week's course materials, download resources, and follow instructions to complete tasks. Assignments emphasised practical application and authentic tasks, all complemented by textbook readings. Each blended course was structured to include bi-weekly online assignments focused on active-learning exercises. Weekly quizzes and self-evaluation questions were provided online.

3.2 Sample size

A total of 2,695 students were enrolled in 17 courses offered during the September–December 2019 semester. Some students enrolled in multiple courses. The sample size was determined using the table provided by

Krejcie and Morgan (1970), which recommended a sample size of 338 for a population of 2,695. A total of 341 students responded to the survey, distributed as shown in Table 1. The number of respondents exceeded the preferred sample size because the survey was online and anybody with the link could participate.

Table 1. Sample size

Course/module	Population	Respondents
ABA 403 - Advanced Financial Accounting 1	81	16
ABA 404 - Management Accounting 1	103	28
AEE 3321 - Extension Methods and Approaches	9	2
BTM 3311 - Management Accounting For Decision Making	67	4
DIR 103 - International Political Economy	10	3
HCD 3411 - Community Capacity Building and Empowerment	71	4
IIT 3114 - HTML Programming and Internet Tools	140	26
PES 3413 - Disaster Preparedness and Response	48	14
SCH 3121 - Physical Chemistry 3	81	2
SCS 1111 - Introduction to Computer Organisation and Application	20	8
SCS 203 - System Analysis and Design	52	23
SCS 207 - Web Design and Publishing	67	63
SCS 3111 - Computer Applications and Organisation	972	235
SCS 409 - IT and Society	936	61
SMA 100 - Basic Mathematics	9	2
SMA 403 - Topology 1	20	6
TET 3316 - Biomass Energy	9	2
Total	2,695	341

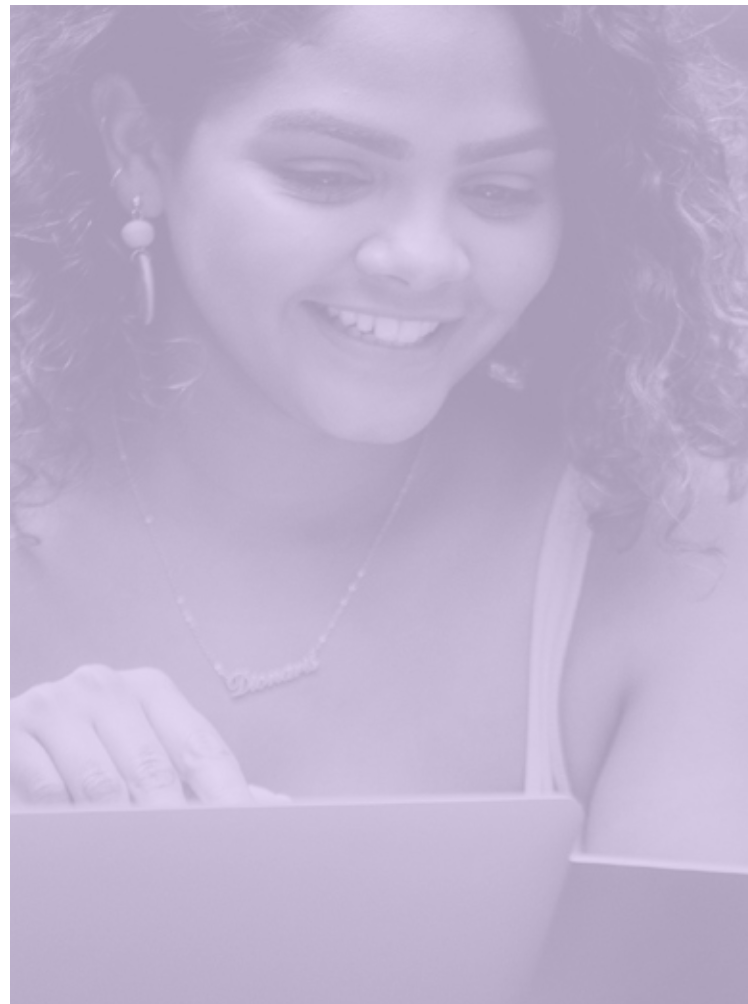
3.3 The survey instruments

The student survey instrument was administered to students who had undertaken courses through blended learning during the September–December 2019 semester. The Blended Learning Course Experience Survey (BLCES) described by Bhagat (2019) was used, with minor modifications to fit the JOOUST context (see Appendix 1). The questionnaire comprised five sections. The first gathered general student information. The second was on digital literacy and access to technology, the third covered students' blended learning experience, and the fourth sought to determine why the module was of interest to the student. The second, third and fourth sections were all presented to the student through a five-point Likert scale. The fifth section had one open-ended question that captured the students' comments or suggestions. All the respondents completed the survey online.

The overall Cronbach's α for the BLCES was 0.92. As part of the ethical consent process, participants were informed that participation was voluntary, and they were provided with an explanation of the purpose of the work and what the results would be used for. Every attempt has been made to ensure individuals will not be identifiable in reports or publications. The survey link was created by COL and distributed by the Centre for eLearning at JOOUST.

The faculty questionnaire (see Appendix 2) comprised open-ended questions that captured information on the lecturers' skills in the use of technology, their knowledge and use of open educational resources (OER), their general awareness of blended learning within their faculty, the nature of the support received from the institution and the Centre for eLearning, and the barriers they encountered in the use of blended learning. This questionnaire was also used as an interview tool to elicit information from the participating teachers.

Data on the students who completed the 17 blended courses were collected from JOOUST's Examination Department. The scores for the same courses in the previous year were also collected to compare student achievements in blended and non-blended courses.



3.4 Data analysis

The survey results were analysed for descriptive purposes. The open-ended interview responses were transcribed and then reviewed, analysed and coded by the authors. During the coding process, the authors met on multiple occasions, discussed discrepancies in their analysis and came to a mutual consensus on the appropriate codes assigned to all data. Saldaña (2009) defines coding as “a word or phrase that symbolically assigns a summative, salient, essence-capturing, and/or evocative attribute for a portion of language-based or visual data” (p. 3). The coding process requires extracting and arranging data in a systematic way to categorise and make meaning of content. Codes, when clustered together by similarity and regularity, form

patterns in the data, from which categories emerge. Descriptive coding was used in the analysis, which is coding that summarises the basic topic of a passage into a word or phrase (Saldaña, 2009). The initial line-by-line coding of the data allowed descriptive codes to be identified and reworked as the analysis progressed.

SPSS 20.0 was used to analyse the quantitative data collected from the questionnaires. This software package is widely accepted and employed by researchers in different disciplines, so it was used to screen the data of this research study in terms of coding data, treating missing data, testing, and determining data normality (i.e., using kurtosis and skewness statistics).

SPSS was also applied to perform descriptive statistics such as frequencies, percentages, mean values and standard deviations. These analyses were performed for each variable separately and to summarise the demographic profiles of the respondents in order to gain preliminary information and get a feel for the data.

Aggregated data from blended and non-blended courses were used. An independent sample *t*-test was also applied to compare prior knowledge with respect to computer literacy in the non-blended and blended groups.



4. Results and discussion

4.1 Quantitative data

Most of the quantitative data in this study relate to student responses about specific courses in schools that have adopted blended learning and therefore are useful for the staff at the university. Quantitative data relevant for this paper are provided in table format and indicate the numbers of student responses in each instance.

4.2 Student survey

Students were asked to comment on various issues related to blended learning at JOOUST, such as how they view blended learning, their level of digital literacy and access to technology,

their blended learning experience, and why a particular module was of interest to them.

4.2.1 Students' views on blended learning

Table 2 shows that the mean obtained from the questionnaire corresponds to students' views on blended learning. The scores are categorised as follows: "1.0–1.9: very low," "2.0–2.9: low," "3.0–3.4: medium," "3.5–3.9: high," "4.0–5.0: very high." Though the average score is in the medium range, it is quite close to high level. Notably, when the students' evaluations of the process are taken into consideration, the highest mean corresponds to the face-to-face aspect of this application.

Table 2. Students' views on the blended learning environment

	Mean	Standard deviation	Variance	Skewness	Kurtosis	Interpretation
Online environment	3.80	0.85	2.425	-.861	-.564	High
Face-to-face environment	4.01	0.87	2.135	-.694	-.590	Very high
Content	3.84	0.79	2.413	-.278	-.598	High
Blended learning method	3.75	0.81	2.125	-.764	-.546	High
Online environment	3.90	0.88	2.747	-.692	-.581	High
Evaluation	3.90	0.76	2.633	-.278	-.587	High
General	3.68	0.81	2.525	-.761	-.564	High

This situation can be explained in various ways. For one thing, the face-to-face aspect of the application is similar to students' familiar study habits. Furthermore, it is possible that students received answers to their questions during this process. In addition, face-to-face interactions between students and with instructors are quite

significant for students. Their responses to the question "Has face-to-face interaction met your expectations?" also support this interpretation. The following are some of the students' responses:

"I am pleased that the courses are carried out in this way. I believe that they made me acquire

lifelong learning. I attempt to learn on my own rather than expecting all information from others. Face-to-face sessions are great advantages. We learn by discussing the topics that we had not understood by studying by ourselves."

"Face-to-face interaction met my expectations. I had the opportunity to ask the course instructor the points that I did not understand on the web and to receive their responses."

"We discussed on the questions whose answers we had not been able to find at all or the topics which we had difficulty in understanding. It was helpful for me."

"It was nice that the course was not carried out only via the web. Because, though we studied on the web and answered the study sheets, we had minimum number of difficulties about conflict of concepts. We compensated the deficiencies in the face-to-face courses."

"During face-to-face environment, we understood the topics which we had not been able to understand on the web. It met my expectations very much"

"Face-to-face interaction reinforced the information we received in the web environment and ensured a higher level of learning."

Furthermore, it met my expectations since the course instructors provided us with guiding information."

4.2.2 Digital literacy and access to technology

Respondents were asked to state whether they agreed or disagreed with statements regarding their digital literacy and access to technology. Table 3 shows their responses. The majority of respondents (284) agreed they were digitally literate in that they could comfortably use MS Office, browse the Web and navigate it with ease. Only five respondents could not use MS Office or navigate the Web. In terms of access to and use of digital tools such as laptops and smartphones, 244 indicated they were excellent at using these tools, whereas 21 disagreed and therefore did not consider themselves excellent in this respect. With respect to the eJOUST LMS, 191 respondents said that their ability to access and use it was excellent; only seven indicated they did not have the knowledge to access and use eJOUST. These results indicate that the students' digital literacy and access to technology were high.

Table 3. Digital literacy and access to technology

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
My digital literacy (use of MS Office, browse the Web and navigate through the Web) is excellent.	108	176	22	5	0
My access to and use of digital tools (laptop, smartphone) are excellent.	104	140	46	20	1
My ability to access and use eJOUST was excellent.	131	160	13	7	0

4.2.3 Blended learning module experience

This section presented the respondents with two sets of questions on course design and their learning experience.

Table 4. Course design

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean
Description of module objectives, learning activities and assignments in the online module was excellent.	72 (23.15%)	217 (69.77%)	10 (3.22%)	11 (3.54%)	1 (0.32%)	4.12
Expression of expectations for performance (e.g., online forums and assignments) in the module was excellent.	54 (17.36%)	224 (72.03%)	19 (6.11%)	12 (3.86%)	2 (0.64%)	4.02
The lecturer's overall organisation of the course was great.	73 (23.47%)	213 (68.49%)	17 (5.47%)	6 (1.93%)	2 (0.64%)	4.12
Continuity between face-to-face class and online learning was good.	57 (18.32%)	235 (75.56%)	13 (4.18%)	4 (1.29%)	2 (0.64%)	4.10
The pace of the module was user friendly.	79 (25.40%)	213 (68.49%)	11 (3.54%)	6 (1.93%)	2 (0.64%)	4.16
The lecturer's interest in your learning was good.	74 (23.79%)	219 (70.42%)	13 (4.18%)	3 (0.96%)	2 (0.64%)	4.16
The lecturer's feedback on your performance in assignments and participation in the forums was very helpful.	67 (21.54%)	214 (68.82%)	20 (6.43%)	6 (1.93%)	4 (1.29%)	4.16
The lecturer-provided orientation on use of the online resources, activities and eJOOUST was very helpful.	87 (27.97%)	203 (65.27%)	10 (3.22%)	7 (2.25%)	4 (1.29%)	4.17
Overall, the course experience was excellent.	76 (24.44%)	218 (70.10%)	12 (3.86%)	4 (1.29%)	1 (0.32%)	4.12

The results on the course design, presented in Table 4, show that all the course design items had a weighted mean score over 4, indicating

learners agreed that the course design, description of module objectives, learning activities and assignments in the online module

were well done, with 217 (69.77%) participants agreeing and 72 (23.15%) strongly agreeing. Meanwhile, only one (0.32%) participant strongly disagreed, 11 (3.54%) disagreed, and ten (3.22%) neither agreed nor disagreed.

Respondents were further asked to comment whether their experience of the performance expectations for the module was excellent. The weighted mean score of 4.02 signifies that the blended courses were well designed and developed, and the expression of performance expectations (e.g., in online forums and assignments) in the module was well captured, as 72.03% of students agreed and 17.36% students strongly agreed. Only two students (0.64%) strongly disagreed and 3.86% disagreed, while 6.11% of participants were undecided. These findings are in agreement with those of Bhagat (2019), who found that the majority of students believed the blended course design was well implemented and the lecturer's overall organisation of the course was great.

In terms of continuity between face-to-face classes and online learning, a weighted mean of

84.9 students felt that the continuity was good and that it offered some flexibility in study as well as the room for face-to-face consultation with lecturers. The pace of the module was user friendly, as over 68.49% agreed with that statement, and only 1.93% disagreed.

Students were oriented on how to use the eJOOUST LMS, and 65.27% felt that the lecturer-provided orientation on the use of the online resources, activities and eJOOUST was very helpful; only 2.25% felt otherwise. On average, 86.3 affirmed that their lecturers provided orientation, so it can be concluded that students' active participation with eJOOUST, especially in online forum discussions, quizzes and assignments, was the result of their thorough orientation.

Overall, Table 4 shows the course experience was excellent, as 218 (70.10%) participants agreed and 76 (24.44%) strongly agreed with this statement; in comparison, 12 (3.86%) neither agreed nor disagreed, one (0.32%) strongly disagreed, and the remaining four (1.29%) disagreed.

Table 5. Learning experience

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean
Multimedia resources on eJOOUST enriched my learning experience.	56 (18.01%)	231 (74.28%)	16 (5.14%)	7 (2.25%)	1 (0.32%)	4.07
Communicating online with students and the lecturer improved my learning.	52 (16.72%)	217 (69.77%)	26 (8.36%)	13 (4.18%)	3 (0.96%)	3.97
Blended learning improved my time-management skills.	70 (22.51%)	216 (69.45%)	18 (5.79%)	6 (1.93%)	1 (0.32%)	4.12
Blended learning improved my digital literacy.	91 (29.26%)	195 (62.70%)	20 (6.43%)	3 (0.96%)	2 (0.64%)	4.19

Blended learning improved my performance in the mid-semester test and end-of-semester exams.	53 (17.04%)	213 (68.49%)	33 (10.61%)	10 (3.22%)	2 (0.64%)	3.98
Blended learning enabled me to learn at any time and any pace, from anywhere, using any device.	73 (23.47%)	220 (70.73%)	8 (2.57%)	8 (2.57%)	2 (0.64%)	4.14
Use of the Moodle Classic mobile app for viewing/reading learning resources, interacting with faculty and peers in forums, and submitting assignments was satisfactory.	54 (17.36%)	220 (70.74%)	24 (7.72%)	9 (2.89%)	4 (1.29%)	4.00

From Table 5 it is clear that students had a wonderful blended learning experience during the semester, as evidenced by the high number of students who agreed or strongly agreed with the constructs in the table. All the weighted mean scores for learning experience were above or near 4.0. When asked whether the multimedia resources on eJOUST had enriched their learning experience, 231 (74.28%) students indicated that they agreed, and 56 (18.01%) strongly agreed. In comparison, 16 (5.14%) were undecided, seven (2.25%) disagreed, and a just one strongly disagreed. The weighted mean score of 4.07 shows the students felt that the multimedia resources on eJOUST enriched their learning experience.

Effective communication between students and lecturers was also investigated. The majority (69.77%) agreed that communicating online with other students and the lecturer improved their learning, whereas 4.18% of the students disagreed with that statement. The weighted mean is 3.98, indicating that communication between students and teachers improved

learning. This result is in agreement with the findings of Cabero et al. (2010).

Blended learning also improved students' time-management skills, with the weighted mean score of 4.12 indicating they agreed that the blended courses helped them manage their time better, since the courses on eJOUST provided numerous time-management tools and methods. These included: using Google calendars for scheduling activities; setting up reminders for assignments, tests and quizzes on smartphones; and using a daily planner for study activities; 69.45% of the students affirmed that blended learning had improved their time-management skills, whereas 1.93% were of the opposite opinion.

Digital literacy among students also improved through the implementation of blended learning (mean score 4.19). Notably, 62.7% of the students felt that blended learning had improved their digital literacy, whereas only 0.96% felt there had been no improvement in their digital literacy.

Students were asked to comment whether they agreed or disagreed that blended learning had improved their academic performance in the mid-semester tests and end-of-semester exams. While 68.49% confirmed that it had improved their academic performance, only 3.22% felt otherwise. This result is in agreement with the findings of a study by Al-Hasan (2013), which aimed to identify the effect of blended learning on the academic achievement of second-year private secondary school students in a biology course. Al-Hasan found statistically significant differences in favour of students who had studied through the blended eLearning mode (the experimental group), as well as statistically significant positive trends among members of the sample who responded to items in the questionnaire related to blended learning. Our findings further showed that blended learning is a very effective and efficient way to improve students' abilities.

The questionnaire also asked students about flexibility in the blended mode in terms of time, pace, place, and accessibility using any device. The majority (70.73%) felt that blended learning enabled them to learn at any time and any pace, from anywhere, using any device, whereas 2.57% disagreed with the statement. This finding is consistent with Fleck's (2012).

When asked whether their use of the Moodle Classic mobile app for viewing/reading learning resources, interacting with faculty and peers in forums, and submitting assignments was satisfactory, 70.74% of the respondents confirmed they could access teaching and learning materials through their smart devices. Only 2.89% had challenges with accessing materials through their eJOUST mobile app. This might have been because of insufficient Internet connectivity on their smartphones.

Table 6. Personal factors

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean
I feel more anxious in this course.	40 (12.86%)	106 (34.08%)	32 (10.29%)	125 (40.19%)	8 (2.57%)	3.14
I have trouble using the technologies in this course.	13 (4.18%)	20 (6.43%)	43 (13.83%)	187 (60.13%)	48 (15.43%)	2.24
This course required more time and effort.	41 (13.18%)	119 (38.26%)	23 (7.40%)	119 (38.18%)	9 (2.89%)	3.21

Table 6 presents the results when personal factors were investigated. When students were asked whether they felt more anxious in their blended course, the weighted mean was 3.14, indicating "neither agree nor disagree." However, 40.19% disagreed with the statement on anxiety. Similarly, 60.13% of the respondents disagreed that they had trouble using technologies in their blended course. The average score of 2.24 indicates that they did

not find the technologies adopted in the course challenging.

The statement about whether the course required more time and effort had a weighted mean score of 3.21, a clear indication that that the respondents neither agreed nor disagreed. This finding is in agreement with the findings from a study conducted by Smyth et al. (2012).

4.24 Module interest

Five sets of five-point Likert-scale statements were used to probe the students' interest in the module. The questions were on attention, relevance, satisfaction, confidence and attitude.

Table 7. Attention

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean
The lecturer knows how to make us feel enthusiastic about the subject matter of this course.	65 (20.9%)	215 (69.13%)	22 (7.07%)	8 (2.57%)	1 (0.32%)	4.08
This course has very little in it that captures my attention.	8 (2.58%)	73 (23.47%)	22 (7.07%)	167 (53.60%)	41 (13.18%)	2.49
The lecturer creates suspense when building up to a point.	14 (4.5%)	171 (54.98%)	50 (16.08%)	63 (20.26%)	13 (4.18%)	3.35
The students in this course seem curious about the subject matter.	21 (6.75%)	223 (71.70%)	38 (12.22%)	25 (8.04%)	4 (1.29%)	3.75
The lecturer does unusual or surprising things that are interesting.	19 (6.11%)	182 (58.52%)	66 (21.22%)	40 (12.86%)	4 (1.29%)	3.55
The lecturer uses an interesting variety of teaching techniques.	43 (13.83%)	218 (70.10%)	34 (10.93%)	15 (4.82%)	1 (0.32%)	3.92
I often daydream while in this course.	7 (2.25%)	36 (11.58%)	26 (8.36%)	165 (53.05%)	77 (24.76%)	2.14
My curiosity is often stimulated by the questions asked or the problems given on the subject matter in this course.	37 (11.90%)	221 (71.06%)	31 (9.97%)	18 (5.79%)	4 (1.29%)	3.86

Students were asked about their levels of encouragement and motivation induced by lecturers, as shown in Table 7. Here, it can be seen that 69.13% of the respondents felt their lecturers knew how to make them feel enthusiastic about the subject matter of the courses they were studying. Only 2.57% of the respondents disagreed with the statement.

The average score for this item was 4.08. This should be considered along with the next item, containing the statement "There is nothing in this course that captures my attention," which had an average score of 2.49, indicating respondents disagreed and hence the course held their attention. The average score of 3.35 on creating suspense to draw attention indicates

students neither agreed nor disagreed. Overall, the participants in this course indicated that

teachers in this study used a variety of teaching techniques to create interest (3.02 mean score).

Table 8. Relevance

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean
The things I am learning in this course will be useful to me.	120 (38.59%)	187 (60.13%)	3 (0.96%)		1 (0.32%)	4.37
The lecturer makes the subject matter of this module seem important.	93 (29.90%)	206 (66.24%)	10 (3.22%)	1 (0.32%)	1 (0.32%)	4.25
I do not see how the content of this course relates to anything I already know.	6 (1.93%)	55 (17.68%)	20 (6.43%)	169 (54.34%)	61 (19.61%)	2.28
In this course, I try to set and achieve high standards of excellence.	92 (29.58%)	213 (68.49%)	5 (1.61%)		1 (0.32%)	4.27
The content of this course relates to my expectations and goals.	76 (24.44%)	221 (71.06%)	12 (3.86%)	1 (0.32%)	1 (0.32%)	4.19
The students actively participate in this course.	48 (15.43%)	225 (72.35%)	28 (9.00%)	8 (2.57%)	2 (0.64%)	3.99
To accomplish my goals, it is important that I do well in this course.	103 (33.12%)	198 (63.67%)	9 (2.89%)		1 (0.32%)	4.29
I do not think I will benefit much from this course.	7 (2.25%)	44 (14.15%)	8 (2.57%)	155 (49.84%)	97 (31.19%)	2.06
The personal benefits of this course are clear to me.	80 (25.72%)	217 (69.77%)	12 (3.86%)	2 (0.64%)		4.21

Table 8 shows that the respondents felt the blended courses were relevant. Most of the statements had average scores of 4 or more. The two statements that had average scores below three were negatively worded, which meant respondents on average did not agree with those statements.

A majority of the participants (66.24%) responded that the lecturer contributed in ways

that made the subject matter of the module/course seem important. These results indicate that the majority of students acknowledged the role lecturers play in making subject matter interesting in the blended learning environment, which is consistent with the findings of Shamad and Wekke (2019).

With respect to active participation, 72.35% of the students felt they actively participated in

the course, and only 2.57% disagreed with the statement. It is worth noting that at JOOUST, both teachers and students participate in blended learning environments through eLearning, email, and mobile learning. Students and teachers communicate on issues relevant to academic and social events. Students ask questions in class, contributing to discussions

via both online and offline platforms. Through a combination of face-to-face interactions, eLearning, mobile learning or just physical classroom sessions, students receive feedback on their queries, academic performance and reports. This approach has promoted active learning among students at JOOUST.

Table 9. Satisfaction

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean
I have to work very hard to succeed in this course.	106 (34.08%)	186 (59.81%)	17 (5.47%)	2 (0.64%)		4.27
This course gives me a lot of satisfaction.	75 (24.12%)	216 (69.45%)	15 (4.82%)	5 (1.61%)		4.16
I feel that the grades or other recognition I receive are fair compared to other students.	40 (12.86%)	214 (68.81%)	39 (12.54%)	12 (3.86%)	6 (1.93%)	3.87
I enjoy working for this course.	71 (22.83%)	227 (72.99%)	12 (3.86%)	1 (0.32%)		4.18
I am pleased with the lecturer's evaluations of my work compared to how well I think I have done.	46 (14.79%)	230 (73.95%)	23 (7.40%)	8 (2.57%)	4 (1.29%)	3.98
I feel satisfied with what I am getting from this course.	67 (21.54%)	220 (70.74%)	10 (3.22%)	13 (4.18%)	1 (0.32%)	4.09
I feel rather disappointed with this course.	6 (1.93%)	33 (10.61%)	25 (8.04%)	179 (57.56%)	68 (21.86%)	2.13
I feel that I get enough recognition of my work in this course by means of grades, comments or other feedback.	50 (16.08%)	223 (71.70%)	25 (8.04%)	10 (3.22%)	3 (0.96%)	3.99
The amount of work I have to do is appropriate for this type of course.	44 (14.15%)	249 (80.06%)	9 (2.89%)	6 (1.93%)	3 (0.96%)	4.05

Table 9 shows the results on satisfaction derived from the blended learning environment. All but one of the statements in Table 9 showed an average score above 3.9. The one with a low score

is a negatively worded statement, so the average indicated that the respondents disagreed with it. Therefore, the satisfaction level in the blended courses was high.

To establish how satisfied the students were with blended learning, they were asked to respond to several statements, such as “I have to work very hard to succeed in this course”; 59.81% of the students agreed with this statement, while 0.64% disagreed.

The lecturers’ evaluation of students’ work also contributed to enhancing students’ level

of satisfaction with blended learning, as 73.95% of the students were pleased with their lecturer’s evaluations of their work compared to how well they thought they had done, while 2.57% thought otherwise. Timely evaluation by lecturers is always important for promoting student satisfaction.

Table 10. Confidence

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean
I feel confident that I will do well in this course.	124 (39.87%)	177 (56.91%)	8 (2.57%)	2 (0.64%)		4.36
You have to be lucky to get good grades in this course.	24 (7.72%)	84 (27%)	51 (16.39%)	91 (29.26%)	61 (19.61%)	2.74
Whether or not I succeed in this course is up to me.	40 (12.86%)	147 (47.27%)	57 (18.33%)	41 (13.18%)	26 (8.36%)	3.43
The subject matter of this course is just too difficult for me.	7 (2.25%)	58 (18.65%)	41 (13.18%)	161 (51.77%)	44 (14.15%)	2.43
It is difficult to predict what grade the lecturer will give my assignments.	19 (6.11%)	131 (42.12%)	103 (33.12%)	51 (16.40%)	7 (2.25%)	3.33
As I am taking this course, I believe that I can succeed if I try hard enough.	77 (24.76%)	221 (71.06%)	9 (2.89%)	4 (1.29%)		4.19
I find the challenge level in this module to be about right: neither too easy not too hard.	39 (12.54%)	216 (69.45%)	37 (11.90%)	15 (4.82%)	4 (1.29%)	3.87
I get enough feedback to know how well I am doing.	48 (15.43%)	217 (69.77%)	31 (9.97%)	13 (4.18%)	2 (0.64%)	3.95

Table 10 presents items related to the “confidence” construct. The responses are largely positive but need special interpretation. The students showed self-confidence in their blended courses. They believed they would do well (mean 4.36) and felt that working hard

would make them successful (mean 4.19). Mean responses to the other statements were within the range of 2.5 to 3.5, indicating that the students neither agreed nor disagreed with these statements.

Table 11. Attitudes towards thinking and learning

	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree	Mean
I like to understand where other people are “coming from,” what experiences have led them to feel the way they do.	68 (21.86%)	225 (72.35%)	17 (5.47%)	1 (0.32%)		4.16
The most important part of my education has been learning to understand people who are very different to me.	55 (17.68%)	227 (72.99%)	21 (6.75%)	7 (2.25%)	1 (0.32%)	4.05
I feel that the best way for me to achieve my own identity is to interact with a variety of other people.	75 (24.12%)	217 (69.77%)	15 (4.82%)	2 (0.64%)	2 (0.64%)	4.16
I enjoy hearing the opinions of people who come from backgrounds different to mine — it helps me to understand how the same things can be seen in such different ways.	81 (26.05%)	221 (71.06%)	9 (2.89%)			4.23
I am always interested in knowing why people say and believe the things they do.	66 (21.22%)	227 (72.99%)	16 (5.15%)	1 (0.32%)	1 (0.32%)	4.14
I try to think with people instead of against them.	46 (14.79%)	194 (62.38%)	38 (12.22%)	27 (8.68%)	9 (2.89%)	3.80
I’m more likely to try to understand someone else’s opinion than to try to evaluate it.	43 (13.83%)	229 (73.63%)	26 (8.36%)	12 (3.86%)	1 (0.322%)	3.97
I tend to put myself in other people’s shoes when discussing controversial issues, to see why they think the way they do.	56 (18.01%)	222 (71.38%)	22 (7.07%)	9 (2.89%)	2 (0.64%)	4.03
Through empathy, I can obtain insight into opinions that differ from mine.	36 (11.58%)	237 (76.21%)	22 (7.07%)	15 (4.82%)	1 (0.32%)	3.94
When I encounter people whose opinions seem alien to me, I make a deliberate effort to “extend” myself into that person, to try to see how they could have those opinions.	37 (11.90%)	228 (73.31%)	27 (8.68%)	17 (5.47%)	2 (0.64%)	3.90

In evaluating what someone says, I focus on the quality of their argument, not on the person who's presenting it.	71 (22.83%)	216 (69.45%)	18 (5.79%)	5 (1.61%)	1 (0.32%)	4.13
I like playing devil's advocate — arguing the opposite of what someone is saying.	18 (5.79%)	52 (16.72%)	29 (9.33%)	167 (53.70%)	45 (14.47%)	2.46
I find that I can strengthen my own position through arguing with someone who disagrees with me.	21 (6.75%)	148 (47.59%)	32 (10.29%)	88 (28.30%)	22 (7.07%)	3.19
I often find myself arguing, in my head, with the authors of books that I read, trying to logically figure out why they're wrong.	26 (8.36%)	144 (46.30%)	28 (9.00%)	95 (30.55%)	18 (5.79%)	3.21
It's important for me to remain as objective as possible when I analyse something.	64 (20.58%)	227 (72.99%)	13 (4.18%)	5 (1.61%)	2 (0.64%)	4.11
I have certain criteria I use in evaluating arguments.	47 (15.11%)	228 (73.31%)	28 (9.00%)	5 (1.61%)	3 (0.96%)	4.00
I try to point out weaknesses in other people's thinking to help them clarify their arguments.	26 (8.36%)	172 (55.31%)	54 (17.36%)	54 (17.36%)	5 (1.61%)	3.51
One could call my way of analysing things "putting them on trial" because I am careful to consider all the evidence.	34 (10.93%)	237 (76.21%)	30 (9.65%)	9 (2.89%)	1 (0.32%)	3.95
I value the use of logic and reason over the incorporation of my own concerns when solving problems.	55 (17.68%)	229 (73.63%)	22 (7.07%)	5 (1.61%)		4.07
I spend time figuring out what's "wrong" with things. For example, I'll look for something in a literary interpretation that isn't argued well enough.	29 (9.33%)	180 (57.88%)	33 (10.61%)	63 (20.26%)	6 (1.93%)	3.52

Table 11 show results related to the students' attitudes towards thinking and learning. The majority (72.35%) felt that they liked to understand where other people are "coming from" and what experiences have led them to feel the way they do. This position was further affirmed by a weighted mean of 86.2%. Only 0.32% disagreed and did not like to understand where other people are coming from. Basically,

the students had a positive attitude towards thinking and learning through the blended mode. This is evident by the high percentages of students supporting the constructs used to measure their attitudes towards thinking and learning. Perhaps this is what translated into good performance in their end-of-semester exams.

4.3 Performance

Was there any significant difference between students' learning performance in blended courses versus non-blended courses? To

answer this question, we compared students' performance in courses presented via the blended mode and the non-blended mode. The non-blended and blended groups' pre-test results (on prior knowledge about computer literacy) are presented in Table 12.

Table 12. Comparison of prior knowledge about computer literacy in the non-blended and blended groups

Group	N	Mean (M)	SD	df	t value	p
Non-blended	310	25.172	13.467	177	.998	0.418
Blended	341	23.071	14.322			

As shown in Table 12, the independent samples *t*-test technique was applied to the mean pre-test scores for the non-blended and blended groups to examine the differences in prior knowledge. According to the test results, there was no

significant difference in prior knowledge about the course between the non-blended and blended groups ($p = 0.418$). The non-blended and blended groups' post-test results (course achievement) are shown in Table 13.

Table 13. Comparison of course achievement in the non-blended and blended groups

Group	N	Mean (M)	SD	df	t value	p
Non-blended	310	51.164	10.003	177	6.918	0.000
Blended	341	61.491	10.242			

In Table 13, the independent samples *t*-test technique was applied to the mean post-test scores for the non-blended and blended groups to examine the differences in course achievement. According to the test results, there was a significant difference in course achievement in terms of mean score obtained; the values for the non-blended group were $M = 51.164$, $SD = 10.003$, compared with the blended groups' values of $M = 61.491$, $SD = 10.242$ (t value = 6.918, $p < 0.001$). The experimental (blended) group's mean score on the achievement test was higher than the control (non-blended) group's.

The calculated effect size (Cohen's d) is 0.27, which is considered a medium effect (Cohen, 1988). This result indicated that the students in the blended mode of learning performed better than the students in the non-blended mode. There was no statistically significant difference between the groups' computer literacy at the beginning of the course. After 14 weeks of instruction, the experimental group received higher scores than the control group on the achievement test. The difference in the mean scores of the groups was statistically significant.

Table 14. Independent sample *t*-test of the final scores for different courses

Course/Module	Non- blended	Blended	t value
	M(SD)	M(SD)	
ABA 403 - Advanced Financial Accounting 1	3.81(.31)	3.86(.54)	9.43*
ABA 404 - Management Accounting 1	3.03(.28)	3.01(.51)	7.95*
AEE 3321 - Extension Methods and Approaches	3.59(.37)	4.24(.62)	9.08*
BTM 3311 - Management Accounting For Decision Making	3.67(.57)	3.60(.47)	8.93*
DIR 103 - International Political Economy	2.10(.31)	2.35(.45)	.81
HCD 3411 - Community Capacity Building and Empowerment	2.71(.41)	2.46(.48)	5.56*
IIT 3114 - HTML Programming and Internet Tools	3.40(.45)	3.26(.56)	2.41*
PES 3413 - Disaster Preparedness and Response	3.48(.46)	3.54(.63)	2.42*
SCH 3121 - Physical Chemistry 3	2.81(.45)	2.74(.71)	4.35*
SCS 1111 - Introduction to Computer Organisation and Application	3.20(.65)	3.28(.65)	4.55*
SCS 203 - System Analysis and Design	3.52(.26)	3.63(.56)	7.76*
SCS 207 - Web Design and Publishing	2.67(.31)	3.60(.44)	6.32*
SCS 3111 - Computer Applications and Organisation	2.97(.33)	3.35(.42)	.45
SCS 409 - IT and Society	2.36(.41)	2.61(.57)	.06
SMA 100 - Basic Mathematics	3.91(.43)	3.14(.68)	.89
SMA 403 - Topology 1	3.20(.32)	3.60(.45)	4.13*
TET 3316 - Biomass Energy	3.94(.34)	3.98(.35)	1.38*

* $p < .05$; M = mean; SD = standard deviation

To calculate means, letter grades were converted to numerical values: A = 5, B = 3.45, C = 2.95, D = 2.45, E = 1.95. An independent sample *t*-test was conducted to compare the learning performance of the students in the non-blended and blended groups. Table 14 shows there was a significant difference in performance in 13 out of 17 courses: Advanced Financial Accounting 1, Management Accounting I, Extension Methods and Approaches, Management Accounting for Decision Making, International Political Economy, Disaster Preparedness and Response,

Introduction to Computer Organisation and Application, System Analysis and Design, Web Design and Publishing, Computer Applications and Organisation, IT and Society, Topology 1, and Biomass Energy. On the other hand, students in the non-blended group for the courses Management Accounting 1, Management Accounting for Decision Making, Community Capacity Building and Empowerment, HTML Programming and Internet tools, and Basic Mathematics performed better than in the blended group.

4.4 Comments and suggestions

The open-ended question elicited responses from 207 students. The respondents were to share thoughts or suggestions about the blended course in which they had participated. Content analysis of the responses suggested learners' experiences were positive, with about 52% indicating they had enjoyed the course and would want to take their other courses via the same mode. A few said they had learned new skills; three respondents commented on the orientation and support provided to students. All indicated that this was not sufficient. Examples included:

"Students should be oriented on the blended courses."

"A good orientation on the use of the platform should be done to those who has not attempted."

Four respondents commented on the online facilitation; two indicated the facilitator was distant from the students, and one suggested the module facilitator should be the one to orient the students on the use of the blended mode.

"The lecturers should try to be close to the students to know their well-being."

"The lecturers should be more clear on how to go about the course. They should also try to make the online lectures interesting and not to leave it to students alone."

Ten respondents commented on the Internet bandwidth and availability of resources within the institution. All suggested that the institution

increase the Internet bandwidth and add more computers for students. Responses included the following:

"We need to have more computers for students to use."

"Increase of internet bandwidth."

"the internet is slow."

Students freely indicated that they needed support related to online access and requested "a bit more help with problems that crop up while using the computers to be on hand" and "be more supportive especially of those students who don't have internet access at home ... as you can feel disconnected as a student." Students experience greater satisfaction and reduced social and psychological distance when they receive plentiful instruction from their tutors. These interactions may include prompt feedback and the use of humour or emoticons/emojis.

4.5 Lecturers' pedagogical practice

4.5.1 Internet access

Table 15 shows that 87% of the lecturers who were interviewed indicated they accessed the Internet from the university, while 13% indicated they accessed it from their homes. This is perhaps because the university has a stable Internet connection and the cost of Internet access is high in Kenya.

Table 15. Internet access

	Home	University
Where do you access the Internet?	87%	13%

4.5.2 Devices used to access the Internet

When asked about the type(s) of devices they use to access the Internet, the majority (87%) of the lecturers indicated using mobile phones to access Wi-Fi connections for both teaching

and learning at the university, due to the convenience of mobile phones. In comparison, 25% indicated using laptops, and only 9% used desktops, as shown in Table 16. All the respondents agreed that technology supports their teaching.

Table 16. Devices used to access the Internet

	Mobile phones	Laptop	Desktop
What type(s) of devices do you use to access the Internet?	87%	25%	9%

Some of the important highlights indicated by lecturers when asked how they use the eJOOUST Moodle LMS to teach their courses were:

“We use eJOOUST to post our assignments, notices and notes to our students.”

“I use eJOOUST for online discussion with my students through chats and discussion forum function within the eJOOUST.”

“I schedule my live online face-to-face classes with my students using the Big Blue Button Plugin.”

4.5.3 Training on the use of the eJOOUST Moodle LMS

Table 17 shows that 60% of lecturers agreed they received training on the use of the eJOOUST Moodle LMS, and the training contributed immensely to the delivery of the blended course they taught. They indicated that through the training, they acquired skills for developing a blended course for students, as well as skills and strategies for the online delivery of teaching and learning; 40% indicated they had not been trained and would like to be.

Table 17. Training on the use of the eJOOUST Moodle LMS

	Yes	No
Have you received training on the use of the eJOOUST Moodle LMS?	60%	40%

4.5.4 Goals/benefits of blended learning in course delivery

Respondents indicated that the major goals or benefits sought by lecturers through the use of blended learning in their teaching or course delivery included the following:

- Tracking and improving learners’ engagement; with blended learning,

lecturers can visualise and track each student’s progress. This process can make it easier to identify signs of a student who is struggling or who has educational strengths and act accordingly.

- Enhancing communication among lecturers and students through several applications, such as email, text messages and social media, unlike in the traditional method of delivery.

- Reducing cost; blended learning saves educators money in several ways. For instance, repurposing content decreases time and money spent on course preparation, and virtual tutoring can help to eliminate employee and venue costs.

Table 18 shows responses from lecturers when they were asked whether they had developed any blended learning course before this at their university. A large majority (92%) indicated

that they had not developed any blended course before this one, where they were trained and developed courses. Only 2% of lecturers interviewed had developed a blended learning course using the Moodle, Canvas or Blackboard LMS. They had also used PowerPoint, Articulate Storyline, blogs, wikis, podcasts, interactive boards and video conferencing tools. Six percent of the respondents were undecided on this matter.

Table 18. Development of blended learning course

	Yes	Undecided	No
Have you developed any blended learning course before at your university?	2%	6%	92%

4.5.5 Lecturers' perceptions of blended learning

Lecturers perceived blended learning to be an engaging and effective teaching approach for students from diverse backgrounds. The majority of the respondents felt that blended learning gave them flexibility in how they presented materials, and gave students flexibility in the pace and variety of the learning approaches they experienced. They also felt that this mode is very effective in that it incorporates multiple methods of instruction from an assortment of perspectives and therefore results in positive learning outcome for most students involved.

"Blended learning is an engaging and effective teaching approach for teaching and learning."

"Blended learning is flexible in how they present material and for students in the pace and variety of the learning approaches they experience."

"Blended learning is very effective in that it incorporates multiple methods of instruction from an assortment of perspectives."

4.5.6 Barriers faced in developing blended courses

Even though the majority of the lecturers had been trained in developing and implementing blended learning courses, they expressed considerable consensus about the challenges of doing so. They were asked about their own challenges as well as the challenges that learners face. The most common challenge related to learners. Nearly half (47%) said learners have trouble being self-directed enough to make good use of the technology, and 25% reported learners not being interested in using technology. The other challenges focused on their own circumstances, including not having enough knowledge about technology to take full advantage of its affordances (26%), not having enough planning time (25%), and not having the budget to implement what they would like (22%). For responses listed as "other" challenges, nearly half had to do with access issues related to Wi-Fi, hardware or software.

5. Conclusions, recommendations and further research

5.1 Conclusions

This study explored the blended learning experience among students and staff at Jaramogi Oginga Odinga University of Science and Technology. The results of the study demonstrate that the face-to-face aspect of blended learning is similar to students' typical study habits in that face-to-face interactions reinforced the information they received in the online environment and ensured a higher level of learning. This study also found that students and lecturers had excellent experiences with course design and the students' learning experience. Students' familiarity with technology increases the potential for using a blended learning design. Universities and other institutions of learning should continue to emphasise blended learning approaches through the installation of LMSs along with a strong Internet infrastructure to enable effective learning through technology, as is being done in JOOUST.

It was also found that blended learning improves students' attention and is a very relevant mode of learning for them. Students' satisfaction and confidence were also boosted by this mode of teaching and learning; however, the students' attitude towards blended learning needs considerable improvement.

It is also evident that most students felt blended learning lecturers needed more training, specifically on how to use technology in their teaching practices. Respondents mentioned both online technology and equipment used for video conferences. As blended learning has the potential to improve the effectiveness of

teaching and learning, it is important that tutors develop student-oriented blended learning pedagogies (Fleck, 2012) that include face-to-face and online instruction, rather than just focusing on the provision of technical skills (Hsu & Hsieh, 2011). Overall, students felt they received sufficient orientation to the blended learning environment in their courses and understood the requirements.

5.2 Recommendations

In line with this study's findings, we offer the following recommendations.

Enhancement of the Internet connection within the university is highly recommended, as insufficient bandwidth presents a great impediment to the smooth implementation of the blended teaching/learning mode. This is a critical issue faced by both students and lecturers, as uploading and downloading electronic resources currently takes a lot of time.

Provision of support to students is highly recommended, since the concept of blended learning was new to some students. It is important that students be briefed about blended learning course structures and what is expected of them in this mode. Regular and prompt feedback should be provided to learners through eJOOUST to encourage their engagement in the course.

Capacity building among the lecturers is also recommended, as continuous training in both technology use and pedagogy is needed. The faculty interview data revealed that some faculty members had concerns about the quality

of their course content and design. *COL's Guide to Blended Learning* (Cleveland-Innes & Wilton, 2018) could be appropriately used to strengthen the university's capacity building and leverage the opportunity to use free online open courses.

5.3 Further research

This study would benefit from higher numbers of participants. It is recommended that a similar survey be administered again, specifically to assess whether there have been improvements in pedagogy and student satisfaction. Some of the survey questions should also be reviewed and changed.

Some students may feel stressed and experience feelings of isolation if instructors provide insufficient feedback and communication,

both online and face-to-face. For this reason, a comprehensive plan needs to be developed for recruiting, advising and supporting students. This will allow them to feel connected and part of the university's learning community. Such a plan should include library support, tutoring, mentoring and career advice for both on-campus and online students.

It is imperative that tutors diligently attend training sessions on learning technologies to ensure they are bringing pedagogically sound design and practices to the blended learning environment. The university should provide encouragement and incentives for lecturers to comply with training initiatives. Lecturers need to be at the forefront of redesigning curricula and revising learning strategies.



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7. Appendices

Appendix 1: Blended Learning Student Survey Questionnaire at JOOUST

Demographic Data					
Name					
Age					
Gender					
Student registration no.					
Previous CGPA score					
Blended Learning Course Information					
Online course title (dropdown list)					
Programme of study (dropdown list)					
Year & semester of study (dropdown list)					
Campus (dropdown list)					
Name of blended learning course faculty (dropdown list)					
Digital Literacy and Access to Technology					
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
My digital literacy skills (use of MS Office, browse the Web and navigate through the eJOOUST learning management system) are excellent.					

My access to and use of digital tools (laptop, smartphone) are excellent.					
My ability to access and use the eJOOUST learning management system is excellent.					
Blended Learning Course Experience Survey					
<i>Course Design</i>					
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
The description of course objectives, learning activities and assignments in the online course was excellent.					
The expression of performance expectations for the course (e.g., in online forums, assignments and quizzes) was excellent.					
The instructor's overall organisation of the course was great.					
The continuity between face-to-face class and online learning was good.					
The pace of the course was user friendly.					
The lecturer's interest in my learning was good.					
The lecturer's feedback on my performance in assignments and quizzes and my participation in the forums was very helpful.					
The lecturer's orientation on the use of online resources, activities and the eJOOUST learning management system was very helpful.					
Overall, the course experience was excellent.					

<i>Learning Experience</i>					
Multimedia resources on the eJOOST learning management system enriched my learning experience.					
Communicating online with students and the lecturer improved my learning.					
Blended learning improved my time-management skills.					
Blended learning improved my digital literacy.					
Blended learning improved my performance in the mid-semester test and end-of-semester exam.					
Blended learning enabled me to learn at any time and any pace, from anywhere, using any device.					
Using the Moodle Classic mobile app for viewing/reading learning resources; interacting with faculty and peers in forums; and submitting assignments and quizzes were all satisfactory.					
<i>Personal Factor</i>					
I feel more anxious in this course.					
I have trouble using the technologies in this course.					
This course required more time and effort.					



Course Interest Survey					
	Strongly agree	Agree	Neither agree nor disagree	Disagree	Strongly disagree
<i>Attention</i>					
The instructor knows how to make us feel enthusiastic about the course's subject matter.					
This class has very little in it that captures my attention.					
The instructor creates suspense when building up to a point.					
The students in this class seem curious about the subject matter.					
The instructor does unusual or surprising things that are interesting.					
The instructor uses an interesting variety of teaching techniques.					
I often daydream while in this class.					
My curiosity is often stimulated by the questions asked or the problems given on the subject matter in this class.					
<i>Relevance</i>					
The things I am learning in this course will be useful to me.					
The instructor makes the subject matter of this course seem important.					
I do not see how the content of this course relates to anything I already know.					
In this class, I try to set and achieve high standards of excellence.					
The content of this course relates to my expectations and goals.					
The students actively participate in this class.					

To accomplish my goals, it is important that I do well in this course.					
I do not think I will benefit much from this course.					
The personal benefits of this course are clear to me.					
Confidence					
I feel confident that I will do well in this course.					
You have to be lucky to get good grades in this course.					
Whether or not I succeed in this course is up to me.					
The subject matter of this course is just too difficult for me.					
It is difficult to predict what grade the instructor will give my assignments.					
As I am taking this class, I believe that I can succeed if I try hard enough.					
I find the challenge level in this course to be about right: neither too easy not too hard.					
I get enough feedback to know how well I am doing.					
Satisfaction					
I have to work very hard to succeed in this course.					
I feel that this course gives me a lot of satisfaction.					
I feel that the grades or other recognition I receive are fair compared to other students.					
I enjoy working on this course.					
I am pleased with the instructor's evaluations of my work compared to how well I think I have done.					

I feel satisfied with what I am getting from this course.					
I feel rather disappointed with this course.					
I feel that I get enough recognition of my work in this course by means of grades, comments or other feedback.					
The amount of work I have to do is appropriate for this type of course.					
Attitudes Towards Thinking and Learning					
I like to understand where other people are “coming from,” what experiences have led them to feel the way they do.					
The most important part of my education has been learning to understand people who are very different to me.					
I feel that the best way for me to achieve my own identity is to interact with a variety of other people.					
I enjoy hearing the opinions of people who come from backgrounds different to mine – it helps me to understand how the same things can be seen in such different ways.					
I am always interested in knowing why people say and believe the things they do.					
I try to think with people instead of against them.					
I’m more likely to try to understand someone else’s opinion than to try to evaluate it.					
I tend to put myself in other people’s shoes when discussing controversial issues, to see why they think the way they do.					
Through empathy, I can obtain insight into opinions that differ from mine.					

When I encounter people whose opinions seem alien to me, I make a deliberate effort to “extend” myself into that person, to try to see how they could have those opinions.					
In evaluating what someone says, I focus on the quality of their argument, not on the person who’s presenting it.					
I like playing devil’s advocate – arguing the opposite of what someone is saying.					
I find that I can strengthen my own position through arguing with someone who disagrees with me.					
I often find myself arguing, in my head, with the authors of books that I read, trying to logically figure out why they’re wrong.					
It’s important for me to remain as objective as possible when I analyse something.					
I have certain criteria I use in evaluating arguments.					
I try to point out weaknesses in other people’s thinking to help them clarify their arguments.					
One could call my way of analysing things “putting them on trial” because I am careful to consider all the evidence.					
I value the use of logic and reason over the incorporation of my own concerns when solving problems.					
I spend time figuring out what’s “wrong” with things. For example, I’ll look for something in a literary interpretation that isn’t argued well enough.					

Please share any additional comments or suggestions about this course.

Appendix 2: Faculty Interview Questions

What is your name? _____

What is your discipline? _____

What is your rank/title? _____

What is the highest degree you possess? _____

How many years of teaching experience do you have? _____

How would you describe your technology skills? _____

Where do you access the Internet? _____

What type(s) of devices do you use to access the Internet? _____

Are you comfortable with using any ICT tool in your teaching? _____

Do you think technology supports your teaching? If yes/no, why? _____

How did you use the eJOUST Moodle LMS to teach your course? Please describe some important highlights (both positive and negative) of your experience. _____

Have you received training on the use of the Moodle LMS? Yes/No _____

If yes:

How did the training contribute to the delivery of the blended course you taught? _____

For all:

What goals or benefits are you seeking through the use of blended learning in your teaching or course delivery? _____

What are your views about the use of blended learning? How is it relevant as a pedagogical practice? _____

Have you developed any blended learning course before this at your university? _____

If no:

Any specific reasons? _____

If yes:

What tools, platforms, software, etc. did you use to develop the blended course? _____

For all:

What is the significance of blended learning in your teaching profession? _____

What is your view/perception of blended learning? _____

What barriers do you face in the development of blended courses? _____

Did you use any OER during your blended course? _____

Did you have a knowledge of copyright with respect to educational materials before the development of this blended course? If yes/no, please explain. _____

Do you think this blended course has changed the way you teach? _____

To what extent has the blended learning approach changed your teaching practice? _____

How has your blended approach impacted your students' learning experiences? _____

Did your students like this approach? If yes/no, why? _____

Are there policies/regulations supporting blended learning at JOOUST? _____

How is blended learning supported by JOPUST? _____

As an academic, you have multiple roles, such as teaching, research, administration and social responsibility. Which role is the most important for you, and why? _____

To what extent are your colleagues aware of blended learning? _____

Does your discipline align with the blended learning approach? _____

How does the culture in your department and/or institution influence your decisions around blended learning use and development? _____

To what extent are you concerned about the time it takes to develop a blended course? _____

Do you feel it is part of your role to contribute blended courses?

Does your institute/department provide necessary support for the development of blended courses?

Do you think collaboration is important for the development of blended learning courses?

If yes/no, why? _____

What is the Centre for eLearning's contribution in promoting blended learning at JOOUST? _____

To what extent are you concerned about the way others may reuse your course? _____

To what extent are you concerned about the quality of your course? _____

What are the challenges for blended courses at JOOUST? _____

Can you think of any other obstacles to the development and implementation of blended courses at JOOUST? _____

Can you think of any mechanism(s) that might encourage other instructors to use the blended learning approach? _____

Do you feel you now have enough skills to develop and use the blended learning approach?

Would you like to motivate your colleagues to adopt blended learning? If yes/no, why and how?

Do you have anything else you would like to share about blended learning?

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