Blended Learning Experiences at Nakuru Training Institute

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Executive Summary

This report presents the results of a survey conducted at Nakuru Training Institute, Kenya to evaluate the blended learning experiences of students and instructors in courses developed during a technology-enabled learning project and offered in the blended mode.

The research looked at the effectiveness of blended learning in terms of student learning performance and perceptions of blended learning. It also assessed differences between student performance in blended course units and traditional course units. The study was carried out among 144 students and nine instructors of blended-learning classes. The courses were created and facilitated by instructors who had received blended learning implementation training from the Commonwealth of Learning.

Mixed findings emerged from comparing the students' grades in blended and non-blended learning courses: in three of the courses, there was a positive difference in grades, while in the other three, there was a negative difference. Because the blended learning experience gave students the freedom to learn when, where and at a speed that worked for them, learners' opinions of the blended learning environment were generally favourable.

Introduction

Different methods have been employed in education over time. In an effort to raise the calibre of teaching and learning, curriculum developers and designers have tried to create innovative course designs that match developments in the market. Following the closure of all educational facilities due to the Covid-19 pandemic, blended learning was introduced for the first time in Kenyan technical and vocational education and training (TVET) institutions in 2020. To maintain learning continuity, Kenya's Ministry of Education suggested blended learning in academic institutions. Most TVET institutions adopted the use of technology in teaching and learning to ensure learning continued, even when schools were closed, adopting blended learning practices to train learners for competencies required in the work environment.

Blended learning practice involves combining traditional classroom instruction with online learning for the same students taking the same course on the same subject (Cleveland-Innes, 2018). This practice has been touted to have various benefits, such as providing opportunities to collaborate at a distance, increased interaction, increased flexibility and enhanced learning. TVET should be oriented toward providing all youths and adults with relevant knowledge, skills, and competencies for work and life, according to the United Nations Educational, Scientific and Cultural Organization's 2015 Recommendation on TVET (UNESCO, 2015). UNESCO encourages that this be done through a comprehensive lifelong learning framework. TVET institutions in Kenya are guided by an open, distance and e-learning (ODEL) TVETS 05:2019 standard and guideline to implement blended learning (TVETA, 2020).

In 2021, Nakuru Training Institute, Kenya (NTIK) deliberately resolved to implement technology-enabled learning (TEL) to provide for blended learning. TEL entails the "use of technology to support students' learning" (Kirkwood & Price, 2016). Prior to 2021, NTIK was using a traditional face-to-face model of learning, except for in the international programs offered by Cisco Networking Academy. NTIK has been in the process of implementing TEL since November 2021, with full support from the Commonwealth of Learning (COL). In 2021, a baseline survey was carried out to establish NTIK's readiness for TEL implementation. On institutional preparedness, NTIK scored 103, which indicated developing preparedness, as referenced in the TEL implementation handbook (Kirkwood & Price, 2016). Over 88% of learners owned smartphones, whereas 64.2% of the learners had access to computers provided by NTIK. This indicated the basic requirements to commence blended learning.

In the first phase of TEL implementation, NTIK increased its Internet bandwidth capacity and added Wi-Fi hotspots for learners to give them access to online learning resources. The instructors were trained on TEL policy development, and after the training, they collaboratively developed a NTIK TEL Implementation Policy that was approved by the NTIK Board of Management. A Moodle-based learning management system (LMS) was developed, and instructors were trained on developing blended courses using Moodle, integrating open educational resources (OER) and conducting online assessments. A digital repository was also set up to curate learning and teaching materials for access by NTIK students and instructors. A total of 21 blended courses were developed in the LMS, which saw a cumulative enrolment of 144 learners participating in the courses during the July–November 2022 semester.

After the successful implementation of Phase 1, NTIK conducted a survey on blended learning experiences at NTIK, targeting the students. Instructors were interviewed on their experiences of blended learning practice. The survey was supported by COL. This document reports the findings of this blended learning survey.

Research Questions

The study was guided by the following questions:

1. What are the levels of digital literacy and access to technology amongst the students in NTIK?
2. What are students' views on blended learning regarding course design, their learning experience and personal factors?
3. What are students' views on module interest with regard to attention, relevance, satisfaction and confidence?
4. What are the students' attitudes towards thinking and learning in the blended mode?
5. What impact does a training and mentoring programme have on the teachers' experience of designing and teaching in a blended learning environment?

Literature Review

A variety of innovations are being used in teaching and learning environments, and blended learning is one of them (Kintu et al., 2017). Blended learning is not always the result of technology integration (Cleveland-Innes, 2018), so making the right decisions and overcoming the difficulties associated with technology use are necessary for developing an effective blended learning environment. Picciano (2006) characterized blended learning as a teaching strategy that blends online and in-person learning activities in a "planned, pedagogically valuable" approach, with some in-person time being substituted by online activities.

There are several explanations for why blended learning is gaining popularity. These include the benefits of flexibility, as learners can learn from anywhere, anytime, without the constraints of time barriers, as well as increased interaction and enhanced engagement, which allow learners to achieve higher levels of learning (Cleveland-Innes, 2018). Güzer and Caner (2014) evaluated the research on blended learning, observing that it has been perceived as "useful, enjoyable, supportive, flexible and [a] motivator for learners" (p. 4602) and that the future would see more devices such as smartphones, tablets and touch screens in use in the learning environment. According to the evidence currently available, many students value both the depth of interactions that can be had in a face-to-face setting and the flexibility, convenience, and decreased opportunity costs that come with online learning (Graham, 2013).

For the successful implementation of blended learning, a few considerations must be taken into account. Innovation and creativity are paramount for transforming learners' experiences (Graham, 2013), which should be personalisable and accessible (Baldwin-Evans, 2006) and use the "best designs integrating a range of learning opportunities" (Cleveland-Innes, 2018). The correct technical infrastructure should be installed and adequately supported and maintained in the institution (Kirkwood & Price, 2016). Orientation for students and adequate training and mentoring for instructors are critical ingredients for successful blended learning practice, because instructors and students must adapt when moving from a context where only classroom instruction was used to one that includes a significant online component (Swenson et al., 2009). In a study conducted by Ngatia & Kamonjo (2022) at the University of Kabianga, on lecturers' views of online teaching capacity-building programmes and pre-online teaching training experiences, findings indicated that teaching staff had a moderately positive view of online teaching capacity-building programmes and were interested in further training. Importantly, the majority of the lecturers in this study had no prior online teaching experience. They felt that training needed to be well structured for it to be effective and adequate in equipping them with online teaching skills and knowledge.

The level of student engagement in learning situations determines the quality of learning (Dixson et

al., 2019). Learning will be more effective when teachers use strategies that encourage high levels of student engagement, so it is important to get students engaged, maintain the engagement and re-engage students continuously throughout the course (Jeffrey et al., 2014). This can only be done when the online portions of blended learning maintain the three key elements of learning. These elements, as described in the Community of Inquiry (CoI) framework, are teaching presence, cognitive presence and social presence.

Teaching presence is created by the teacher and course developer during course development and maintained during the course. Teaching presence, which is about designing learning and building understanding among participants, has three categories: direct instruction, instructional design and facilitation of discourse. Direct instruction refers to the teacher's responsibility to post questions, engage students in discussion, deliver assessments, provide feedback and clarify new or previously presented material. Instructional design is how a teacher develop the curriculum, teaching methods, assignments, deadlines and guidelines for communication among students and with the teacher. Facilitating discourse refers to enabling and encouraging the construction of personal meaning as well as collaboratively shaping and confirming mutual understanding with the learner (Garrison, 2016). Training is needed on how a teacher can maintain teaching presence in online learning.

Cognitive presence is the extent to which the participants in any particular configuration of a CoI are able to construct meaning through sustained communication (Garrison et al., 2000). Communication occurs with the other learners, the teacher and the course material. Cognitive presence is maintained by engaging learners with course content and resources such as OER. UNESCO defines OER as "teaching, learning or research materials that are in the public domain or released with intellectual property licenses that facilitate the free use, adaptation and distribution of resources." Sandanayake (2019) suggested that utilising and adapting OER is a very affordable investment in high-quality teaching and learning. This was collaborated by Martinez (n.d.), who outlined the benefits for student experience as well as enhanced digital literacy, recognition and efficiency. With traditional teaching methods such as face-to-face instruction, teachers generally devote their time to creating learning materials, going over lecture notes, anticipating questions and creating responses, and getting ready for exams. The learner's present relationship with technology in a TEL environment renders this approach ineffective (Sandanayake, 2019). Teachers need training and mentorship in OER, including how to find them and use them in blended teaching.

Third is the social presence, which is the ability of participants in a CoI to project themselves socially and emotionally, with their full personality as "real people," through the medium of communication being used (Garrison et al., 2000). The medium can be in-person or can use technology, either synchronously or asynchronously. Teachers need training and mentorship in how to ensure they maintain social presence in blended teaching, especially during online secessions.

How well the teaching, social and cognitive presences are maintained in a course determines students' views on and interest in the course or module with regard to attention, relevance, satisfaction and confidence. It also impacts students' views on blended learning with respect to course design, their learning experience and personal factors. In addition, it influences their attitudes towards thinking and learning in a blended mode. A programme for training and mentoring teachers has an impact on teachers' experience of designing and teaching in a blended learning environment. This is because training not only give teachers knowledge about the three presences of a CoI but also helps them build the necessary skills and right attitude for developing the three presences in a blended course.

This report presents findings on the TEL project outcomes at NTIK, including the impact of instructor training and mentoring on their experiences of designing for and teaching in a blended learning environment. It further reports on levels of digital literacy and access to technology

amongst the students in NTIK, as well as students' views on blended learning with respect to course design, their learning experience and personal factors, and their attitudes towards thinking and learning in a blended mode. We analyse students' interest in the relevant course or module with regard to attention, relevance, satisfaction and confidence, and compare student achievements in face-to-face and blended learning courses at NTIK.

Methodology

The research design for this study employed an online survey that combined quantitative and qualitative research methods. The survey involved both learners and instructors. NTIK instructors who had been trained and mentored in policy development and online blended course development and learning in the 2022 academic year were involved in this study. These instructors developed online courses on the NTIK Moodle, enrolled learners and taught these courses in a blended mode. In addition, learners at NTIK who had the experience of blended learning in the 2022 academic year took part in the study.

Population and sample size

The population of this study was 124 students enrolled in the 20 courses developed and offered at NTIK during the July–November 2022 semester. A total of 114 students formed the study sample. An optimum sample "fulfills the requirements of efficiency, representativeness, reliability and flexibility" (Kothari, 2004). The breakdowns of the population and sample by course/module are shown in Table 1.

Table 1: Sample size

Course/module	Population	Sample	Percent
Nail Technology	28	23	20.2
Barbering	28	26	22.8
Business Law and Ethics	6	1	0.9
Plumbing Grade 2	5	2	1.8
Plumbing Grade 3	3	3	2.6
Tailoring Grade 3	12	2	1.8
Dressmaking Grade 3	12	6	5.3
Operating System	4	3	2.6
Visual Basic Programming	5	1	0.9
Data Communication and Networking	3	1	0.9
Computer Applications 2	6	4	3.5
Pastry Making and Decorations	12	0	0
Total	**124**	**114**	**100.0**

Data collection instruments

Data were collected using instructors' and students' online questionnaires and student achievement forms.

i.   The student questionnaire had seven sections. The first gathered demographic data, and the second section elicited blended learning module information. The other four sections were measured on a five-point Likert scale, with one signifying strongly disagree and five signifying strongly agree. This questionnaire was developed by COL and customised to the NTIK context.

ii. The student achievement forms had columns for students' names and academic scores when taught through the face-to-face mode and the blended mode. These data were extracted from the NTIK LMS and institutional records.

iii.   The online interview questionnaire for instructors, which was developed at NTIK, was open ended and used to collect data from instructors on their blended learning experiences.

Reliability of the Research Tools

The internal consistency of the research instrument was checked using Cronbach's alpha coefficient. The data were interpreted thus: > 0.9 = excellent, > 0.8 = good, > 0.7 = acceptable, > 0.6 = questionable, > 0.5 = poor and < 0.5 = unacceptable (George & Mallery, 2003). Table 2 provides the reliability scores for each section of the research instrument.

Table 2: Reliability analysis

	Number of items	Cronbach's alpha	Cronbach's alpha value descriptor
Digital literacy and access to technology	3	0.995	excellent
Course design	9	0.997	excellent
Learning experience	7	0.996	excellent
Personal factors	3	0.945	excellent
Attention	8	0.983	excellent
Relevance	9	0.987	excellent
Satisfaction	9	0.989	excellent
Confidence	8	0.981	excellent
Attitudes	20	0.995	excellent

Data analysis

The survey findings were examined to provide descriptive information. The authors also coded and analysed the open-ended question, where respondents were required to share additional comments or suggestions about the blended course in which they had participated. The Statistical Package for Social Sciences (SPSS) software was used to analyse the quantitative data collected and to perform descriptive statistics, which included percentages, frequencies, means and standard deviations.

Results and Discussion

Demographic Statistics for the Participants

The majority of the respondents (54.4%) were below 20 years of age; 64% were female, compared with 13.2% male; 22.8% did not indicate a gender. These demographics are provided in Table 3.

Table 3: Demographic statistics for the participants

Measure	Category	Number	Percentage
Gender	No response	26	22.8
	Female	73	64.0
	Male	15	13.2
	Total	**114**	**100.0**
Age (Years)	Below 20	62	54.4
	21–25	48	42.1
	30 and above	4	3.5
	Total	**114**	**100.0**

Respondents

Out of the 114 responses, 56 were full responses, equating to 49.12%, and 42 were incomplete responses, accounting for 40.2%. Only the full responses were used for data analysis. NTIK observed that the full responses were a fair and representative sample of the total population and should

produce a miniature cross-section; the researchers omitted responses that were totally blank across all variables. As NTIK is a TVET institution that provides job-specific skills training, it enrols students whose entry level ranges from those who dropped out of primary school to primary school graduates and secondary school levels of education. As such, the incomplete responses could have been due to a combination of language challenges, lack of understanding of the questions asked, and insufficient digital skills for navigating and filling in an online questionnaire.

Digital Literacy and Access to Technology

Students enrolled in blended learning were asked to rate how much they agreed with various statements regarding their technological access and digital skills. Table 4 summarises their responses.

Table 4: Digital literacy and access to technology

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean
My digital literacy (use of MS Office, browse the Web and navigate through the Virtual Learning Environment) skills are excellent.	0 (0.0%)	1 (1.8%)	0 (0.0%)	38 (67.9%)	17 (30.4%)	4.27
My access to and use of digital tools (laptop, smartphone) are excellent.	0 (0.0%)	0 (0.0%)	1 (1.8%)	33 (58.9%)	22 (39.3%)	4.38
My ability to access and use the Nakuru Training Institute's e-learning platform was excellent.	0 (0.0%)	0 (0.0%)	0 (0.0%)	41 (73.2%)	15 (26.8%)	4.27

The large majority of the respondents (98.3%) indicated that their digital literacy skills were excellent, and 99.2% stated their access to and use of digital tools were excellent. This indicated that they could comfortably use smartphones or tablets to access the blended learning content provided by NTIK in the LMS. This confirms that the students are "digital natives," meaning they grew up with the presence of digital technology or in the information age thus are comfortable with and fluent in technology. These findings are consistent with those of Kibabii University (Nambiro & Ikoha, 2022), Jaramogi Oginga Odinga University of Science and Technology (JOOUST; Abeka & Dwada, 2021), Fiji National University (Prasad, 2022) and the National University of Samoa (Mow, 2019). The learners' ability to access and use NTIK's e-learning platform was checked, and all the respondents indicated that their ability was excellent. On a scale of one to five, the means for every criterion under "digital literacy" were all above three, indicating that students' access to technology and digital literacy were above average. Similar findings were reported in four universities; Kibabii University (Nambiro & Ikoha, 2022), JOOUST (Abeka & Dwada, 2021), Fiji National University (Prasad, 2022) and the National University of Samoa (Mow, 2019)

Blended Learning Module Experience

The learners were asked to respond to statements relating to their experience in using the blended learning module, particularly their views on course design, their learning experiences and personal factors. Results are shown in Tables 5, 6 and 7.

Course Design

Table 5 shows learners' views on course design. A 96.5% majority of the students stated that the description of module objectives, learning activities and assignments in the online module was excellent. This was corroborated by the 94.6% who indicated that the expression of expectations for performance in the module was excellent. These results are in agreement with those from Fiji National University, which showed the majority of the respondents (90.2%) agreed the course design was excellent in terms of the description of course objectives, learning activities and assignments, and the expression of expectations (Prasad, 2022). Similar findings, where the majority of students indicated that objectives, learning activities and assignments were excellent, were received at Kibabii University, where (94.1%) agreed the description of the course objectives, learning activities and assignments in their online course was excellent (Nambiro & Ikoha, 2022). JOOUST reported similar findings (Abeka & Dwada, 2021).

Table 5: Learners' views on course design

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean
Description of module objectives, learning activities and assignments in the online module was excellent.	0 0.0%	0 0.0%	2 3.6%	38 67.9%	16 28.6%	4.25
Expression of expectations for performance (e.g., online forums and assignments) in the module was excellent.	0 0.0%	1 1.8%	2 3.6%	42 75.0%	11 19.6%	4.12
The instructor's overall organisation of the course was great.	0 0.0%	2 3.6%	0 0.0%	39 69.6%	15 26.8%	4.20
Continuity between face-to-face class and online learning was good.	0 0.0%	1 1.8%	1 1.8%	38 67.9%	16 28.6%	4.23
The pace of the module was user friendly.	0 0.0%	3 5.4%	2 3.6%	39 69.6%	12 21.4%	4.07
The instructor's interest in your learning was good.	1 1.8%	0 0.0%	2 3.6%	32 57.1%	21 37.5%	4.29
The instructor's feedback on your performance in assignments and participation in the forums was very helpful.	1 1.8%	0 0.0%	0 0.0%	37 66.1%	18 32.1%	4.27
The instructor-provided orientation on using the online resources, activities and Nakuru Training Institute's e-learning platform was very helpful.	0 0.0%	1 1.8%	2 3.6%	38 67.9%	15 26.8%	4.20
Overall, the course experience was excellent.	0 0.0%	1 1.8%	3 5.4%	38 67.9%	14 25.0%	4.16

In relation to instructors' overall organisation of the course, 96.4% agreed that NTIK's instructors' organisation was excellent. These results are comparable to those from Fiji National University, where 90.2% of the students agreed that course organisation was excellent. However, an insignificant percentage of students indicated disagreement with instructors' interest in their learning, and one other respondent disagreed with the statement that the instructor's feedback on their performance in assignments and participation in the forums was very helpful. Similarly, at

Kibabii University, 95.5% of the respondents agreed that their lecturer's overall organisation of the course was great (Nambiro & Ikoha, 2022).

Regarding the pace of the module, 91% of the learners stated it was user friendly, while 5.4% disagreed. With respect to course orientation, 94.7% indicated that their instructors for the blended courses provided orientation on the use of the online resources and that NTIK's e-learning platform was very helpful; only 1.8% of the students stated that the course did not provide orientation. For each of the statements in this category, 24.7% of the respondents did not give a response. All parameters relating to course design had a mean above three on a scale of one to five, thus indicating the students rated the course design highly. This is similar to observations by Nambiro and Ikoha (2022) and Abeka and Dwada, (2021).

Learning Experience

Students enrolled in blended learning courses were asked to rate how much they agreed with various statements regarding their learning experience. The findings presented in Table 6 show that when asked about the benefits of blended learning for improving digital literacy, performance, and time-management skills, learners' responses were largely favourable.

A large majority of the students (94.7%) agreed that the multimedia resources on the NTIK e-learning platform enriched their learning experience. Only 1.8% felt otherwise. Similar findings were reported at Kibabii University, where 93.1% of the respondents agreed that multimedia resources on the university's LMS enriched their learning experience (Nambiro & Ikoha 2022). Similar findings were reported at JOOUST, where 74.28% of the students indicated that they agreed and 18.01% strongly agreed that the e-learning platform enriched their learning experience (Abeka & Dwada 2021). From the three institutions, we can say that e-learning enriches the learning experience.

Table 6: Learning experience

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean
Multimedia resources on Nakuru Training Institute's e-learning platform enriched my learning experience.	0	1	2	38	15	4.20
	0.0%	1.8%	3.6%	67.9%	26.8%	
Communicating online with students and the instructor improved my learning.	0	2	2	39	13	4.13
	0.0%	3.6%	3.6%	69.6%	23.2%	
Blended learning improved my time-management skills.	0	3	0	33	20	4.25
	0.0%	5.4%	0.0%	58.9%	35.7%	
Blended learning improved my digital literacy.	0	1	0	38	17	4.27
	0.0%	1.8%	0.0%	67.9%	30.4%	
Blended learning improved my performance in mid-semester tests and end-of-semester exams.	0	2	2	38	14	4.14
	0.0%	3.6%	3.6%	67.9%	25.0%	
Blended learning enabled me to learn at any time, any pace, from anywhere, using any device.	0	3	1	35	17	4.18
	0.0%	5.4%	1.8%	62.5%	30.4%	
Use of Moodle Classic mobile app for viewing/reading learning resources; interacting with faculty and peers in forums; and submitting assignments were satisfactory.	0	3	1	38	14	4.13
	0.0%	5.4%	1.8%	67.9%	25.0%	

At NTIK, learners reported that blended learning improved learners' time-management skills, as indicated by 94.6% of the respondents, with only 5.4% disagreeing. This is similar to findings at Kibabii University, where a very high percentage of students (94.5%) agreed with the statement (Nambiro & Ikoha 2022). At JOOUST, 69.45% of the students affirmed that blended learning had improved their time-management skills, whereas 1.93% were of the opposite opinion (Abeka & Dwada 2021). From the three institutions, we can conclude that blended learning improves learners' time-management skills.

A majority of the learners (98.3%) at NTIK stated that the blended learning experience improved their digital literacy, with only 1.8% feeling differently. This had the highest score across all measures tested, indicating a direct benefit of digital literacy besides the job-specific skills acquired from the content. Similar results were recorded at Kibabii University, with 96.4% of the respondents agreeing that blended learning improved their digital literacy (Nambiro & Ikoha 2022). These results support the widespread belief that blended learning is an effective method of instruction with key benefits (Cochrane & Bateman, 2010; Vaughan et al., 2013).

The blended learning online communication amongst students and instructors improved learning, according to 92.8% of the respondents. The interactivity, group work activities, forums and assignments provided in the NTIK LMS required learners and instructors to communicate and collaborate in learning. This finding was broadly similar to the outcome at JOOUST, where 69.77% agreed that communicating online with other students and the lecturer improved their learning, whereas 4.18% of the students disagreed (Abeka & Dwada 2021). At Kibabii University, 88.1% of respondents agreed that blended learning improved their performance in mid-semester tests and end-of-semester exams, while 5% disagreed (Nambiro & Ikoha 2022).

The flexibility of blended learning was appreciated by a majority of the respondents, with 92.9% agreeing that blended learning enabled them to learn at their own time and pace, from anywhere, using any device; only 5.4% disagreed. Similar findings were reported by Nambiro and Ikoha (2022) at Kibabii University, where 95% of respondents agreed and only 2.3% disagreed. Similarly, Abeka and Dwada (2021) reported that 70.73% of the participants at JOOUST felt that blended learning enabled them to learn at any time and any pace, from anywhere, using any device, whereas 2.57% disagreed. The results of this study are consistent with those of Fleck (2012) and Kim (2012); Kim found that learners preferred the flexibility of blended learning.

Remarkably, at NTIK, 92.8% indicated that the blended learning experience improved their performance in mid- and end-of-semester examinations. Similar results were given by learners at JOOUST, where 68.49% confirmed that blended learning improved their academic performance and only 3.22% felt otherwise (Abeka & Dwada 2021). Nambiro and Ikoha (2022) reported that 88.1% of respondents at Kibabii University agreed that blended learning improved their performance in mid-semester tests and end-of-semester exams, while 5% disagreed. From these studies, we can conclude that blended learning improves learners' academic achievement. This can be explained by the fact that learners are more engaged in blended learning, in both online and face-to-face sessions. Learners also are forced to take responsibility for their learning in the online sessions, which increase their cognitive and social presence in a course. The more learners are cognitively and socially present in a course, the higher their chance of performing better.

Personal Factors

Three measures were tested: anxiety, trouble using technologies, and time and effort requirement. Table 7 shows the findings.

Table 7: Learners' views on personal factors

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean
I feel more anxious in this course.	2	14	2	24	14	3.61
	3.6%	25.0%	3.6%	42.9%	25.0%	
I have trouble using the technologies in this course.	6	32	5	11	2	2.48
	10.7%	57.1%	8.9%	19.6%	3.6%	
This course required more time and effort.	0	8	2	26	20	4.04
	0.0%	14.3%	3.6%	46.4%	35.7%	

From the findings, 67.9% agreed they felt more anxious about the course, while 38.6% disagreed. These findings are consistent with those on course anxiety at JOOUST (46%) and Fiji National University (42.7%). At Kibabii University, 57.6% of the respondents agreed that they felt more anxious in the blended course, while 30.2% disagreed (Nambiro & Ikoha, 2022). However, very few at NTIK had trouble using technologies in the course, with 38 (67.8%) indicating they had no trouble, as opposed to 13 (23.2%) who did. These findings are somewhat similar to those at Fiji National University, where 42.7% of the students had trouble using technologies. At Kibabii University, 30.1% of the respondents agreed that they had trouble using the technologies in their blended course, with 135 (61.7%) disagreeing (Nambiro & Ikoha, 2022). At JOOUST, a very low percentage of respondents indicated experiencing trouble with using technology in blended learning, and 75.56% reported not having trouble (Abeka & Dwada, 2021).

It was also observed that a majority of 46 (82.1%) of the respondents agreed that the course required more time and effort. This can be attributed to activities in the NTIK LMS that learners were obligated to complete, either individually or collaboratively. At Kibabii University, 80.4% of respondents agreed that the blended course required more time and effort, while 15.5% disagreed.

Course Interest Survey

This section of the survey sought to determine the learners' interest in the blended course by checking four aspects: attention, relevance, satisfaction and confidence.

Attention

Various factors — such as learners' curiosity and instructors' ability to motivate learners — were checked to determine whether the modules engaged learners' attention. The results are shown in Table 8.

It can be observed that the majority of the instructors were able to encourage the participants and make them feel enthusiastic about the subject matter of the course. A majority of the respondents at NTIK (78.6%) stated the instructor knew how to make them feel enthusiastic about the subject matter of the course; only five (8.9%) disagreed. Similarly, a substantial majority of the respondents at JOOUST (89.13%) felt their lecturers knew how to make them feel enthusiastic about the subject matter of the courses they were studying (Abeka & Dwada, 2021). A very high percentage (90.9%) of students at Kibabii University agreed that the lecturer knew how to make them feel enthusiastic about the subject matter of the blended course (Nambiro & Ikoha, 2022). These findings indicate the training given to lecturers on developing online blended courses helped them provide sufficient support to the learners and maintain a teaching presence in the course.

However, a small majority of the respondents (55.3%) stated that the course had very little in it that captured their attention, while 33.9% disagreed with that statement. At Kibabii University, a smaller

percentage, 45.2%, agreed that very little in the blended course had captured their attention, while 46.1% disagreed with the statement (Nambiro & Ikoha, 2022). An even smaller portion of students at JOOUST (28.6%) indicated that very little in the blended course had captured their attention, while a majority of 66.78% stated the opposite (Abeka & Dwada, 2021).

Table 8: Learners' view on attention engagement

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean
The instructor knows how to make us feel enthusiastic about the subject matter of this course.	0	5	7	28	16	3.98
	0.0%	8.9%	12.5%	50.0%	28.6%	
This course has very little in it that captures my attention.	1	18	6	26	5	3.29
	1.8%	32.1%	10.7%	46.4%	8.9%	
The instructor creates suspense when building up to a point.	1	16	3	28	8	3.46
	1.8%	28.6%	5.4%	50.0%	14.3%	
The students in this course seem curious about the subject matter.	1	15	3	30	7	3.48
	1.8%	26.8%	5.4%	53.6%	12.5%	
The instructor does unusual or surprising things that are interesting.	1	9	6	33	7	3.64
	1.8%	16.1%	10.7%	58.9%	12.5%	
The instructor uses an interesting variety of teaching techniques.	1	0	1	40	14	4.18
	1.8%	0.0%	1.8%	71.4%	25.0%	
I often daydream while in this course.	3	25	4	16	8	3.02
	5.4%	44.6%	7.1%	28.6%	14.3%	
My curiosity is often stimulated by the questions asked or the problems given on the subject matter in this course.	2	5	11	31	7	3.64
	3.6%	8.9%	19.6%	55.4%	12.5%	

When asked about their curiosity about the subject matter, 66.1% of the respondents stated they were curious, whereas only 16 (28.6%) disagreed. These results were similar to those of Nambiro and Ikoha (2022) and Abeka and Dwada (2021), where large majorities of 70.53% and 78.45%, respectively, indicated being curious in the blended course.

It was further observed that instructors used unusual or surprising things that were interesting to learners, as indicated by 71.4%% of the respondents at NTIK. This could possibly be why half of the learners remained attentive while in the course, as indicated by 50.0% of the respondents. These findings were similar to those of Nambiro and Ikoha (2022) and Abeka and Dwada (2021), with 63.5% and 77.8% of the students at Kibabii University and JOOUST, respectively, indicating they did not often daydream during their course.

Relevance

Relevance is a critical factor for module interest, as it indicates utility value and builds relatedness (Briggs, 2014). The survey analysed the courses' relevance to the learners, and the results are shown in Table 9.

An overwhelming majority (98.2%) of the respondents indicated that what they learned in the course would be useful to them, with only 1.8% disagreeing. These findings were similar to those of Nambiro and Ikoha (2022) and Abeka and Dwada (2021), with 96.9% and 98.72% at Kibabii University and JOOUST, respectively, agreeing about their courses' usefulness.

Table 9: Learners' views on course content relevance

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean
The things I am learning in this course will be useful to me.	0	0	1	30	25	4.43
	0.0%	0.0%	1.8%	53.6%	44.6%	
The instructor makes the subject matter of this module seem important.	0	1	0	32	23	4.38
	0.0%	1.8%	0.0%	57.1%	41.1%	
I do not see how the content of this course relates to anything I already know.	6	31	6	10	3	2.52
	10.7%	55.4%	10.7%	17.9%	5.4%	
In this course, I try to set and achieve high standards of excellence.	0	1	2	27	26	4.39
	0.0%	1.8%	3.6%	48.2%	46.4%	
The content of this course relates to my expectations and goals.	0	2	0	32	22	4.32
	0.0%	3.6%	0.0%	57.1%	39.3%	
The students actively participate in this course.	0	1	1	31	23	4.36
	0.0%	1.8%	1.8%	55.4%	41.1%	
To accomplish my goals, it is important that I do well in this course.	0	0	0	28	28	4.50
	0.0%	0.0%	0.0%	50.0%	50.0%	
I do not think I will benefit much from this course.	18	23	2	9	4	2.25
	32.1%	41.1%	3.6%	16.1%	7.1%	
The personal benefits of this course are clear to me.	0	0	0	38	18	4.32
	0.0%	0.0%	0.0%	67.9%	32.1%	

In addition, 98.2% of the respondents indicated that their instructor's engagement made the module seem important. This finding was similar to those for JOOUST and Kibabii University, where 96.14% and 97.8% of the students, respectively, stated their instructor's engagement made the module seem important (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

Respondents were asked whether they tried to set and achieve high standards of excellence in the course. A large majority (94.6%) agreed with the statement, while only one disagreed. This was a strong indication of their interest in the course and their desire to do well. The content of the courses related to learners' expectations and goals, and learners actively participated in their courses. Similar findings were reported by Nambiro and Ikoha (2022) and Abeka and Dwada (2021), with overwhelming majorities (97.8% and 95.50%, respectively) of students stating that they tried to set and achieve high standards of excellence in their courses.

All the students (100%) stated that they would need to do well in their course to accomplish their goals, and that the personal benefits of the course were clear to them. This is a strong indication of the courses' relevance to the participants. Similar findings were reported by Nambiro and Ikoha (2022) and Abeka and Dwada (2021), with greater than 90% at both institutions. Further confirmed was provided by 73.2% of the students at NTIK stating that they would benefit substantially from the course. The study observed that the training materials were related to the world and experiences of the learner, with personal benefits being clear to the majority. Piaget (1972) affirmed that learning takes place when new information is assimilated by the individual, and the procedure is completed when the individual makes connections with and modifications to existing knowledge, in a process called accommodation (Piaget, 1972).

Satisfaction

Table 10 displays the satisfaction ratings in response to integrating a blended learning environment

at NTIK. The overwhelming majority (92.8%) of the participants felt that the course gave them a lot of satisfaction, and 91.0% indicated feeling satisfied with what they were getting from the course. These are good indicators of NTIK's course design quality, and the findings are similar to those at JOOUST and Kibabii University, where 93.57% and 94.1%, respectively, agreed that the blended course gave them a lot of satisfaction (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

A 71.4% majority did not feel disappointed with the course, with only 17.9% indicating disappointment. These findings are similar to those at JOOUST and Kibabii University, where 67.1% and 79.52%, respectively, indicated not being disappointed by their blended course (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

Concerning evaluation, 78.6% of the participants agreed being pleased with the instructors' evaluations of their work compared to how well they thought they had done. This is similar to what was reported at Kibabii University and JOOUST, where 89.5% and 91.74%, respectively, of the respondents agreed being pleased with the lecturer's evaluations of their work compared to their self-evaluations.

At NTIK, 78.6% of respondents stated that they received enough recognition for their work in the course through grades, comments or other feedback mechanisms, with only 2.2% disagreeing. For Kibabii University and JOOUST, findings were very similar, at 78.6% and 87.78% respectively.

Regarding enjoyment, 98.2% of the respondents at NTIK indicated enjoying the blended course. This finding agrees with those for Kibabii University and JOOUST, at 94.5% and 95.82%, respectively. This is an important outcome, as immediate feedback helps to correct misconceptions in student learning as soon as the student makes a mistake, whereas delayed or zero feedback can reinforce students' misconceptions if they make the same mistake several times without being corrected (Kehrer et al., 2013).

Table 10: Learners' satisfaction with the blended learning

	Strongly disagree	Disagree	Neutral	Agree	Strongly agree	Mean
I have to work very hard to succeed in this course.	0	1	1	28	26	4.41
	0.0%	1.8%	1.8%	50.0%	46.4%	
I feel that this course gives me a lot of satisfaction.	0	2	2	33	19	4.23
	0.0%	3.6%	3.6%	58.9%	33.9%	
I feel that the grades or other recognition I receive are fair compared to other students.	1	9	3	33	10	3.75
	1.8%	16.1%	5.4%	58.9%	17.9%	
I enjoy working for this course.	0	0	1	26	29	4.50
	0.0%	0.0%	1.8%	46.4%	51.8%	
I am pleased with the instructor's evaluations of my work compared to how well I think I have done.	0	3	7	35	11	3.96
	0.0%	5.4%	12.5%	62.5%	19.6%	
I feel satisfied with what I am getting from this course.	0	3	2	32	19	4.20
	0.0%	5.4%	3.6%	57.1%	33.9%	
I feel rather disappointed with this course.	12	28	6	8	2	2.29
	21.4%	50.0%	10.7%	14.3%	3.6%	
I feel that I get enough recognition of my work in this course by means of grades, comments or other feedback.	1	7	4	28	16	3.91
	1.8%	12.5%	7.1%	50.0%	28.6%	
The amount of work I have to do is appropriate for this type of course.	0	2	4	35	15	4.13
	0.0%	3.6%	7.1%	62.5%	26.8%	

Confidence

Table 11 presents results on the measure of learners' confidence in blended learning. A total of 95.4% of the respondents were confident that they would do well in the blended course offered at NTIK, while only 3.6% were neutral. Similar findings were reported at Kibabii University and JOOUST, where 96.8% and 96.78%, respectively, felt confident they would do well.

However, just over half of the respondents at NTIK (51.8%) stated that they had to be lucky to get good grades in the course, with 39.3% disagreeing while 8.9% were neutral. This finding is consistent with those of Kibabii University and JOOUST, where 57.9% and 34.72%, respectively, felt that one had to be lucky to get good grades in the blended course.

All the students (100%) at NTIK indicated that their success depended on their efforts. This was a critical observation, as blended learning, particularly in the TVET system, is implemented within the confines of the student/learner-centred approach (Deissinger & Hellwig, 2005). In this method, students work at their own pace to demonstrate mastery in the competencies necessary for their chosen field of study, appreciating that their success depends on them. Consistent findings were reported for Kibabii University, where 92.7% of the students indicated that they needed to work hard to succeed in the course.

Table 11: Learners' confidence in blended learning

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean
I feel confident that I will do well in this course.	0	0	2	25	29	4.48
	0.0%	0.0%	3.6%	44.6%	51.8%	
You have to be lucky to get good grades in this course.	3	19	5	17	12	3.29
	5.4%	33.9%	8.9%	30.4%	21.4%	
Whether or not I succeed in this course is up to me.	4	18	4	21	9	3.23
	7.1%	32.1%	7.1%	37.5%	16.1%	
The subject matter of this course is just too difficult for me.	12	27	5	7	5	2.39
	21.4%	48.2%	8.9%	12.5%	8.9%	
It is difficult to predict what grade the instructor will give my assignments.	0	11	16	23	6	3.43
	0.0%	19.6%	28.6%	41.1%	10.7%	
As I am taking this course, I believe that I can succeed if I try hard enough.	0	0	0	28	28	4.50
	0.0%	0.0%	0.0%	50.0%	50.0%	
I find the challenge level in this module to be about right: neither too easy nor too hard.	0	13	11	24	8	3.48
	0.0%	23.2%	19.6%	42.9%	14.3%	
I get enough feedback to know how well I am doing.	0	4	1	28	23	4.25
	0.0%	7.1%	1.8%	50.0%	41.1%	

Learners' Attitudes Towards Thinking and Learning

Table 12 presents the participants level of agreement with statements regarding their attitudes towards thinking and learning in the blended course.

Table 12: Learners' attitudes towards thinking and learning

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean
I like to understand where other people are "coming from," what experiences have led them to feel the way they do.	0	6	3	27	20	4.09
	0.0%	10.7%	5.4%	48.2%	35.7%	
The most important part of my education has been learning to understand people who are very different to me.	1	11	5	29	10	3.64
	1.8%	19.6%	8.9%	51.8%	17.9%	
I feel that the best way for me to achieve my own identity is to interact with a variety of other people.	0	8	1	32	15	3.96
	0.0%	14.3%	1.8%	57.1%	26.8%	
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.	1	6	2	32	15	3.96
	1.8%	10.7%	3.6%	57.1%	26.8%	
I am always interested in knowing why people say and believe the things they do.	0	6	4	32	14	3.96
	0.0%	10.7%	7.1%	57.1%	25.0%	
I try to think with people instead of against them.	1	9	3	32	11	3.77
	1.8%	16.1%	5.4%	57.1%	19.6%	
I'm more likely to try to understand someone else's opinion than to try to evaluate it.	2	7	4	29	14	3.82
	3.6%	12.5%	7.1%	51.8%	25.0%	
I tend to put myself in other people's shoes when discussing controversial issues, to see why they think the way they do.	1	5	6	30	14	3.91
	1.8%	8.9%	10.7%	53.6%	25.0%	
Through empathy, I can obtain insight into opinions that differ from mine.	1	8	8	30	9	3.68
	1.8%	14.3%	14.3%	53.6%	16.1%	
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 opinion.	2	6	11	28	9	3.64
	3.6%	10.7%	19.6%	50.0%	16.1%	
In evaluating what someone says, I focus on the quality of their argument, not on the person who's presenting it.	0	4	6	33	13	3.98
	0.0%	7.1%	10.7%	58.9%	23.2%	
I like playing devil's advocate — arguing the opposite of what someone is saying.	8	24	6	14	4	2.68
	14.3%	42.9%	10.7%	25.0%	7.1%	
I find that I can strengthen my own position through arguing with someone who disagrees with me.	6	16	5	23	6	3.13
	10.7%	28.6%	8.9%	41.1%	10.7%	
I often find myself arguing, in my head, with the authors of books	0	11	10	30	5	3.52
	0.0%	19.6%	17.9%	53.6%	8.9%	

	Strongly disagree	Disagree	Neither agree nor disagree	Agree	Strongly agree	Mean
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.	0	7	6	28	15	3.91
	0.0%	12.5%	10.7%	50.0%	26.8%	
I have certain criteria I use in evaluating arguments.	0	7	5	34	10	3.84
	0.0%	12.5%	8.9%	60.7%	17.9%	
I try to point out weaknesses in other people's thinking to help them clarify their arguments.	0	10	13	28	5	3.50
	0.0%	17.9%	23.2%	50.0%	8.9%	
One could call my way of analysing things "putting them on trial," because I am careful to consider all the evidence.	2	6	8	33	7	3.66
	3.6%	10.7%	14.3%	58.9%	12.5%	
I value the use of logic and reason over the incorporation of my own concerns when solving problems.	0	3	7	36	10	3.95
	0.0%	5.4%	12.5%	64.3%	17.9%	
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.	3	12	10	22	9	3.39
	5.4%	21.4%	17.9%	39.3%	16.1%	

NTIK students had a positive attitude towards thinking and learning through the blended mode. This is demonstrated by mean scores greater than three for 19 of the 20 the statements used to measure their attitudes towards thinking and learning in this study. These results are consistent with those from The National University of Samoa, where most students gave positive responses (Mow, 2019). Results are also consistent with those from JOOUST and Kibabii University, where students had a positive attitude towards thinking and learning through the blended mode (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022). NTIK results are also consistent with those from Fiji National University, where a significantly higher proportion of students (64.6%) agreed with the attitude statements compared to those who disagreed (31.7%) or were neutral (3.7%), indicating a positive attitude (Prasad, 2022).

A majority of 83.9% at NTIK indicated that they liked to understand where other people are "coming from" and what experiences led them to feel the way they do. Only 10.7% stated that they did not like to understand where other people were coming, from while 5.4% were undecided. These results are consistent with those noted by Abeka and Dwada (2021), Prasad (2022), Nambiro and Ikoha (2022) and Mow (2019).

A total of 69.7% of the participants at NTIK indicated that the most important part of their education had been learning to understand people who are very different from them, while 21.4% of the respondents didn't consider this important. Similar finding were reported by Abeka and Dwada (2021), Prasad (2022), Nambiro and Ikoha (2022) and Mow (2019).

A total of 83.9% of the respondents at NTIK felt that the best way for them to achieve their own identity was to interact with a variety of other people, while 14.1% of the respondents didn't feel this way. These findings are consistent with those from JOOUST and Kibabii University, where 93.89% and 90.0%, respectively, felt that the best way for them to achieve their own identity was to interact with a variety of other people (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

An aggregate of 83.9% of NTIK students stated that they enjoyed hearing the opinions of people who come from backgrounds different to theirs, as it helps them understand how the same things can be seen in such different ways. This justifies the collaborative aspects in the courses offered on the NTIK LMS, which strongly encourage collaboration and interactivity in forums and chats. Only 12.5% did not enjoying hearing other people's opinions, while 3.6% were undecided. These findings are consistent with those from JOOUST and Kibabii University, where 97.11% and 94.1%, respectively, stated that they enjoyed hearing the opinions of people who come from backgrounds different to theirs, as it helps them understand how the same things can be seen in such different ways (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

At NTIK, 82.1% of the participants indicated being interested in knowing why people say and believe the things they do, while only 10.7% had no interest. Consistent results were reported at JOOUST and Kibabii University, where 94.21% and 89.5%, respectively, agreed with the statement (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

A majority (76.7%) of the participants at NTIK indicated preferring to think with people instead of against them, with only 17.9% preferring to think against. These findings are consistent with those from JOOUST and Kibabii University where 81.2% and 89.5%, respectively, preferred thinking with people rather than against them (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

When asked whether they tend to put themselves in other people's shoes when discussing controversial issues, to see why they think the way they do, 78.6% of the participants at NTIK agreed. This demonstrates that the participants possess "empathic intelligence" and are active listeners (Sherman, 2009). This was further confirmed by 69.7% of the respondents indicating that through empathy, they obtain insight into opinions that differ from theirs. Similar findings were reported at JOOUST and Kibabii University, where 89.39% and 90.8%, respectively, agreed with the statement (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

Asked whether they make deliberate efforts to "extend" themselves into other persons, trying to see how they can hold opinions that seem alien to them, 66.1% of the participants at NTIK agreed; 14.3% indicated they did not, while 19.6% were undecided. These findings are consistent with those for JOOUST and Kibabii University where 85.21% and 86.7%, respectively, agreed with the statement (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

At NTIK, 82.1% of the students said they focus on the quality of another participant's argument rather than the participant presenting the argument; 7.1% said they did not, and 10.7% were undecided. This indicates improved attitudes in forum discussions and better communication. Similar findings were reported at JOOUST and Kibabii University, where 89.39% and 90.8%, respectively, agreed with the statement (Abeka & Dwada, 2021; Nambiro & Ikoha, 2022).

Learner Performance in Blended Courses

The study investigated whether there was any significant difference between students' performance in blended learning as opposed to non-blended learning courses.

NTIK compared learners' performance in courses offered through the blended mode and in face-to-face courses. The student grades of Term 3 (July–November 2022) in blended learning and non-blended learning, given to the same students by the same instructors, were compared in order to investigate differences in learning achievement between blended learning course units and other course units at NTIK. Nine of the 21 available classes were examined, and the results are discussed below.

An independent sample *t*-test was done to test the scores for the non-blended learning and blended

groups to examine the differences in course performance. The results were as shown in Table 13.

Table 13: Comparison of course performance in the non-blended and blended groups

Mode	N	Mean	Standard deviation	df	t value	p value
Blended	97	3.91	1.100	.112	.907	.366
Face-to-face	81	3.78	.725	.081		

The test results showed no significant difference in course performance in terms of mean score achieved. The values for the blended group were mean = 3.91 with a standard deviation of 1.100, compared to the non-blended groups' values of mean = 3.78 with a standard deviation of .725 (t value = –.146, p >.005). This was an indication that the students generally performed slightly better in the units taught and assessed using the LMS as compared to those taught and assessed face-to-face. This could also mean that blended learning is as good as non-blended learning in terms of academic achievement, since there was no statistically significant difference in the means of achievements in a course when taught using a non-blended or blended learning mode. This finding then suggests that blended learning is good for technical courses. The results are inconsistent with those from JOOUST, where the blended group's mean score on the achievement test was higher than the non-blended group's mean (Abeka & Dwada, 2021). The results at NTIK were also inconsistent with those from Kibabii University, which showed a significant difference in course achievement in terms of mean score obtained: the experimental (blended) group's mean score on the achievement test was higher than the control (non-blended) group's. Results from Kibabii and JOOUST indicated that the students in the blended mode of learning performed better than the students in the non-blended mode. Results from Fiji National University showed mixed results, indicating a statistically significant difference in 40% of the courses under study while the remaining 60% did not indicate a statistically significant difference (Prasad, 2022). Similarly mixed results were reported at the National University of Samoa, where the difference was statistically significant in three courses (30%) and not significant in seven courses (70%; Mow, 2019).

NTIK offered courses in a blended mode whereby students accessed online resources for learning and were also assessed online. From the analysis, some courses produced a higher mean when offered in a blended mode, while others showed a lower mean in academic achievement.

Table 14: Comparison of scores attained in blended and non-blended course units

	Blended course assessment score			Non-blended course score				
	N	Mean	SD	N	Mean	SD	t value	p value
Hairdressing – Barbering	27	4.333	.8320	25	3.520	.6532	3.899	.00
Beauty – Nail Technology	27	4.000	1.074	25	3.720	.4582	1.205	.234
Tailoring	12	3.833	1.029	8	3.750	1.164	.168	.868
Dressmaking	12	2.916	.9003	8	3.500	.755	-1.509	.149
Food & Beverage – Baking and Pastry	11	3.909	1.375	11	4.272	.4671	-.830	.416
Data Communication and Networking	3	4.000	1.732	2	5.00	.00	-.755	.495
Visual Basic Programming	5	3.600	1.140	2	5	.0	-1.641	0.162

Courses that produced a higher mean score in the blended mode included Hairdressing (Barbering), which had a mean of 4.333 in the blended mode of assessment and 3.520 in the non-blended mode. Beauty (Nail Technology) had a mean of 4.00 in the blended mode and 3.720 in the non-blended mode. Tailoring also produced a higher mean score of 3.833 in blended learning compared to

non-blended learning at 3.750. This could be attributed to the practicality of assessment in some of these courses — for example, barbering is a skill that must be assessed practically for the student to demonstrate competence. This may not be directly achieved using an assessment in the LMS, and thus the face-to-face mode of assessment was employed for the students to demonstrate competencies in barbering skills. This performance mean increase in Beauty and Hairdressing is similar to the findings in some blended courses in Fiji National University. Comparing the mean achievement scores of blended and non-blended students, that study showed a positive mean gain and a negative mean difference in 40% of the courses under study (Prasad, 2022).

However, when the authors tested for the statistical significance of the differences in mean scores of the three that registered a higher mean in blended learning at NTIK, only the mean score in Hair Dressing and Barbering was significant; whereas the differences in mean scores in the Beauty–Nail Technology and Tailoring courses were not statistically significant. The performance mean in the Tailoring and Dressmaking course was similar to the findings for some of the blended courses in Fiji National University. Prasad (2022) reported that comparison of the mean achievement scores of blended and non-blended students there showed no statistically significant difference in the means of 60% of the courses under study.

In some courses at NTIK, there was a high mean in performance in the non-blended mode compared with the blended mode: Dressmaking, Food & Beverage (Baking and Pastry), Data Communication and Networking, and Visual Basic Programming.

In Dressmaking, the students had a mean of 2.916 in the blended mode compared to a mean of 3.5 in the non-blended mode. This indicated that the students performed better in the non-blended mode. This could be attributed to the digital literacy and entry-level behaviour of students in that department, who enter with low grades but perform better in hands-on skills. Students enrolled in Food & Beverage had a mean score of 3.909 in the blended mode and 4.272 in the non-blended mode. This indicates that the students performed better in the non-blended mode. Students in Data Communication and Networking had a mean score of 4.00 in the blended mode compared to a mean of 5.000 in the non-blended mode. In Visual Basic Programming, students had a mean of 3.6 in the blended mode compared to 5.00 in the non-blended mode. This indicates that the performance was better in the non-blended mode. The results can be explained by students' ability to access the course and their level of information and communication technology (ICT) skills, or even by teachers' engagement and interaction with students during the course. Learners' interest in using and interacting with ICT, as well as their attitudes toward and perceptions of online learning, would also justify the non-blended courses having a higher mean score than the blended courses.

Overall, students in three courses performed better in the blended units, and students in four courses performed better in the non-blended units, indicating mixed results.

Course Participation Comments

The participants were asked to share any additional comments or suggestions about the blended course in which they participated. A total of 57 comments were received, over 92.98% of which were positive, with participants indicating gratitude for the blended mode and finding it "interesting" and "enjoyable." Some of the comments were as follows:

> Blended learning technology has enabled me to learn any time I feel to. With my phone. The forums was helpful...

> I'm very happy of these process as it enhances one's ability to speak out their thoughts without fear of anyone. It also promote learning as one can access it from anywhere.

> They help get more experience and also new ideas. It also helps me to be able to manage time

and be more quick.

Some of the comments indicated interactivity amongst learners and instructors, including the following:

> Helps me interact with different type of people and become more educated also respect for each other.

> It was nice meeting new people from different backgrounds and participating in working together to all achieve what is best.

However, a few participants indicated dissatisfaction with the blended mode:

> All through the semester, the online learning site has been of less help. The teacher's face-to-face sessions also need to be more prepared for and serious. A lot of time has been wasted thus students become uncurious.

> I feel the blended course should have been allocated more time by having it as a lesson once or twice a week. Most of the participants were first timers on the new technology computer hence couldn't have group discussions because they needed a lot of guidance. Some could not access data in order to do the assignments anywhere else apart from the school and moving to the next activity was rather difficult because one has not finished the previous activity to access the next. Not everyone had a smartphone. Most of the participants had to wait for the instructor to create time to access the computer lab. Sometimes it was hard to access the lab because the ICT students had lessons in those computer labs.

> Some of the participants felt it's a burden because the already concentrated course work thus interrupting their course.

> I request for face-to-face learning to be maintaining than online.

Instructors' Blended Learning Practice

Instructors at NTIK were interviewed on their blended learning practice.

Internet Access

It was observed that 90% of the instructors interviewed were accessing the Internet from NTIK, while only 10% accessed it from home. This may be related to the availability of the Internet at the NTIK ICT labs and offices, and the entire campus being on Wi-Fi.

Devices Used to Access the Internet

The interviewer inquired about the devices that instructors used to access the Internet; 50% were using laptops, 50% desktop computers, and 100% smartphones for communicating with trainees and between instructors.

Training on the Use of the Moodle LMS

All (100%) instructors confirmed that they had received training on the use of the NTIK LMS and that the training was relevant to their interactivity with the trainees and the learning content. The instructors indicated having acquired skills to develop courses and assessments, support learners online and extract activity completion reports.

Benefits of Technology-Enabled Learning

Instructors were asked to indicate some conspicuous ways that the technology supported teaching and learning at NTIK. Some of the instructors' statements were:

> Technology has allowed for more interactive and immersive teaching methods such as virtual reality and augmented reality, which allow students to explore and engage with topics in new ways. Technology has also enabled online learning, which has made learning more accessible and enabled students to learn at their own pace.

> It has enabled learners to access the learning content at any place and has reduced paperwork involved in the learning, such as notes and exams.

> Technology has supported learning in my department through research and content creation.

> It has created a virtual platform for learners to access learning from their homes and when far from the institution.

Goals of Using a Blended Learning Approach in TVET Course Delivery

When instructors were asked about the goals or benefits they sought through the use of blended learning in course delivery, the following were mentioned repeatedly:

- It increases student engagement and motivation by giving students a more interactive and personalised learning experience.
- It increases student learning outcomes by combining various mediums of instruction and leveraging the strengths of each method.
- It creates a more flexible learning environment that allows students to access learning materials in a variety of formats and on their own time.
- It makes teaching theory easy.
- Instructors are able to teach more trainees from both near and far.
- It enables the student to access the materials from anywhere at any time while enjoying the benefits of face-to-face support and instruction.

Instructors' Perceptions of Blended Learning

A majority of the instructors believed that blended learning is an efficient way for students to develop knowledge and skills. They indicated that the mode enables a more individualised approach to learning, since it gives students the freedom to access information at their own speed and offers flexibility for those who might have hectic schedules or struggle to attend traditional classrooms. Moreover, blended learning gives students access to more tools, simulations, open educational resources and assistance, which can improve their comprehension of and ability to use the concepts they learn. Some notable comments from instructors include:

> Blended learning is the future of learning

> It's the best method of facilitating learning.

> It is going to revolutionize the entire education system.

Instructors' Experiences with Developing Courses on NTIK's LMS

Instructors were asked about the challenges they faced in implementing TEL in a TVET skills-based environment. Two concerns emerged as conspicuous challenges, one relating to students and the

other relating to Internet connectivity during training. Instructors observed poor student engagement with the learning content, and lack of student commitment. One instructor observed that many learners had to be reminded to log into the LMS and study online. On Internet issues, instructors indicated experiencing poor network connectivity, especially when using a smartphone, as well as Internet connectivity challenges for students.

Conclusions and Recommendations

Conclusions

This study explored the blended learning experience at NTIK. From the findings, the authors have drawn the following conclusions.

Blended learning is ideal for learners of different abilities. This is because despite NTIK being a TVET institution that provides job-specific skills training and enrols students whose entry level ranges from those who dropped out of primary school to primary school graduates and secondary school levels of education, most of the findings from NTIK were consistent with those from similarly surveyed universities.

Blended learning is good for skills development training. Therefore, TVET institutions should adopt blended learning for job-specific skills development.

The results of this study demonstrate that blended learning allows for personalised learning experiences, where students can progress at their own pace, review materials as needed and receive immediate feedback on their progress. This can help to better engage learners and improve learning outcomes.

This study further found that blended learning enhanced flexibility for both instructors and students. Instructors were able to create and deliver content tailored to students' needs and abilities, while students were able to access course materials and complete assignments according to their own pace and schedule. The blended mode, which combines traditional face-to-face teaching with online learning, is becoming increasingly important in today's educational landscape, and TVET institutions should readily embrace it to increase access to education and skills for all and promote lifelong learning.

The blended learning practice created an environment where learners became more interested in the module. This is particularly important for youths, who have many issues competing for their attention; if they lose interest in a skills course, they may fail to acquire the intended skills or to complete the course.

This study found that the blended learning practice improved students' attention and increased their curiosity about the course. The students also strongly indicated that the course was very relevant and that this made them more attentive to learning, which enhanced their skills acquisition. The levels of satisfaction and confidence with blended learning were notably high, which can be attributed to well-developed courses.

The performance analysis comparing blended and non-blended modes yielded mixed results. This could indicate that NTIK can continue implementing the blended mode of learning in all their competency-based courses without harming student performance or leading to learning loss. As the students continue to interact with technology in learning, they will acquire more skills and may do better in blended courses over time.

Instructors at NTIK had received training on designing courses for the LMS, including how to

manage content and users. This practice of training is commendable and should be a bold, deliberate integration rather than an afterthought (Jacobs & Alcock, 2017) for any TVET institution offering courses in the blended mode. COL's training and mentorship of instructors at NTIK had a positive impact on the design of the courses, the instructors' facilitation skills and ultimately the learners' satisfaction in the courses.

Recommendations

In accordance with the conclusions of this study, we recommend the following:

- It is essential to provide adequate computers for students to utilize in order to access the learning management system. The institution must technologically enable learning by ensuring that learners have access to computers or other digital devices so they can interact with the learning content. In their feedback, students observed the need to increase access to computers.
- For all new students, a proper orientation to a blended course is crucial. This would help the students understand how the system functions, what support resources are available and how to receive assistance.
- Given that some students who enrol in technical courses do not have any computer literacy skills, it is crucial that all students take digital literacy skills training as a compulsory unit. This will enhance their capacity for learning and teamwork when using the LMS. The entry-level capacity of students enrolled at NTIK is mixed and includes students who have no prior experience in using computers.
- Building capacity among instructors is also advised, as is ongoing training in both technology use and pedagogy so they can remain current.

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