



BLENDED LEARNING MANAGEMENT ROADMAP

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Blended Learning Management Roadmap

By

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List of acronyms and abbreviations

ACBF	African Capacity Building Foundation
AERC	African Economic Research Consortium
AWS	Amazon Web Services
BL	Blended learning
BLM	Blended learning management system
CAT	Continuous assessment test
CMAAE	Collaborative Master of Science Programme in Agricultural and Applied Economics
CMAP	Collaborative Master's Degree Programme
CPP	Collaborative PhD Programme
IT	Information technology
JFE	Joint Facility for Electives
SFSE	Shared Facility for Special Electives
KMA	Knowledge Management Administrator
LMS	Learning management system
MOOC	Massive open online course
MOU	Memorandum of Understanding
NBA	Neil Butcher & Associates
SFSE	Shared Facility for Specialization and Electives
SSA	Sub-Saharan Africa
TLS	Transport layer security

Preface

The origins of the African Economic Research Consortium's BLMS can be traced back to the JFE and SFSE, which were held annually in person at centralized venues in Nairobi, Kenya, and at the University of Pretoria, South Africa, for all students enrolled in the eight CPP degree-awarding universities, seven CMAP Category B universities and eight CMAAE-accredited network universities. The JFE and SFSE have produced wonderful results and was praised for contributions towards future collaborations and Pan-Africanism. However, its unit costs has been quite inhibiting. The Covid-19 global pandemic was the turning point. The decision for a virtual learning platform was to prevent learning or training shutdowns. This was accompanied with sustainable unit cost consideration that is now seen as manageable. The AERC switched to fully online delivery of all its elective courses. Consequently, the CMAAE, CMAP and CPP elective courses were virtually delivered to students in 2020 and 2021. Given the desire to maintain a face-to-face component, it would be optimal to have a hybrid learning module.

The AERC eLearning platform is an interactive and upgraded Moodle-based LMS, supported by the eLibrary and Zoom platforms to ensure that users have an optimal learning experience. This enables both students and lecturers to interact through chats, discussion forums and wikis, and to access learning materials with ease.

The AERC is focussed on making blended learning a success. This roadmap is underpinned by ideas enshrined in the AERC's Mission and Vision as outlined in its 2020–2025 Strategic Plan. Blended learning is in line with the theme of ensuring sustainability, quality and wider reach; that is, AERC training and research activities will be more inclusive and at lower unit costs. It is, therefore, imperative for all stakeholders to work together and ensure that the roadmap is fully realized. The AERC is committed to fully implementing the roadmap by allocating the necessary resources and supporting all the activities required to realize this vision.

Prof. Njuguna Ndung'u
Executive Director
African Economic Research Consortium (AERC)

1. Introduction

1.1 AERC Training Programmes

The AERC's training programmes are designed to augment the pool of economic researchers and policy professionals in SSA by supporting postgraduate studies in economics and agricultural economics through enhancing the capacity of departments of economics and agricultural economics in local public universities. There are three programmes related to this: the CMAP in Economics, the CMAAE and the CPP for SSA. The CMAP, CMAAE and CPP graduate programmes aim to build the capacity of mid-level economic managers and policy analysts, and aim to produce first-class students who may also be interested in developing careers in academia or policy making. In these programmes, the role of the AERC is to develop the appropriate curricula to target public universities with academic infrastructure and scholarships to students. This strategy has over the years helped those universities to give quality graduate degree programmes.

The CMAP, which was launched in 1993, spans 26 departments of economics at public universities in 21 countries across SSA. The participating universities are classified into three categories: Category A, Category B and Category C. Students in Category A universities enrol for MA studies in either Category B or Category C universities. Category B comprises seven universities that are deemed to have adequate capacity to offer core courses (Macroeconomics, Microeconomics and Quantitative Methods) and supervise students. Students in Category B universities are jointly offered elective courses at the JFE for a period of three months (between July and September), taught by African scholars and leading international experts.

The CPP was launched in 2002 with the primary aim of enhancing teaching and research capacity in institutions in Africa, enhancing the quality and relevance of research in Africa, and gradually building up and retaining African scholars in Africa, thus eventually reducing brain drain from the continent. To implement the programme, the continent is subdivided into four regions: Southern Africa, Eastern Africa, Anglophone West Africa and Francophone Africa. A total of eight universities, two universities in each region, admit students from across all AERC network universities. The participating universities are categorized into two: host degree-awarding universities (DAU) and non-host degree-awarding universities. Currently there is one host degree-awarding university per region.

The CMAAE was launched in 2005 and covers 17 Departments of Agricultural Economics in 13 Eastern, Central and Southern African countries. The programme aims to produce MSc Agricultural and Applied Economics graduates with the knowledge and skills to transform the agro-food sectors and rural economies of the region in an environmentally sustainable fashion, thereby contributing to addressing the persistent problems of food and nutrition insecurity and poverty in SSA. The universities are classified into two categories: Category A (non-accredited) and Category B (accredited). Students in Category A universities enrol for CMAAE studies in any of the eight Category B universities that are accredited to offer core courses and supervise thesis research. The students in Category B universities jointly undertake elective courses at the SFSE for a period of four months upon completion of their core courses.

In addition to the Collaborative Masters and PhD programmes, the AERC offers Masters and PhD Bridging Programmes. The aim of these programmes is to address the limited competitiveness of potential students from underrepresented countries and groups (for example, women and people from post-conflict and fragile states) for admission to and taking part in the AERC training programmes. As part of the programme, participants undertake eight-week (two-month) intensive skill enhancement courses on quantitative methods, microeconomics and macroeconomics, which are a prerequisite for the Collaborative Masters and PhD Programmes. Students who successfully complete the bridging programme are expected to form the pool of students to be enrolled into the AERC's CMAP, CMAAE and CPP.

Table 1: Statistics on AERC collaborative training programmes

No	Programme	Year established	Coverage	Alumni
1.	Collaborative Master's Degree Programme (CMAP) in Economics	1992	26 universities in 21 SSA countries	3,319
2.	Collaborative PhD Programme in Economics (CPP)	2002	8 universities in 6 SSA countries	400, inclusive of non-CPP African PhD students supported by PhD thesis research grants
3.	Collaborative Master of Science Programme in Agricultural and Applied Economics (CMAAE)	2005	17 universities in 13 Eastern and Southern African countries	998
4.	Bridging Programme	2017	Women, post-conflict and fragile states, including other underrepresented countries in SSA	72 Masters and 29 PhD alumni

Over three decades, the AERC has continually demonstrated its ability to evolve to meet the changing needs of SSA. Since 1991, the AERC has supported academic infrastructure in public universities by providing graduate libraries, internet access and computer labs for graduate students; scholarships and institutional grants; and up-to-date curricula for master's and PhD degrees. The AERC has signed MoUs with public universities to abide by these conditions. The aim is to support public universities to present quality degree programmes that would increase the supply of policy analysts, researchers and public servants with adequate knowledge and the capability to become policy leaders, thought leaders and policy analysts.

1.2 Facilities for Electives

The JFE is an intensive three-to-four month graduate training programme for elective courses in economics that brings all the students together from the scholarship universities and offers a large menu of electives, that would otherwise not be possible for a single university. It is conducted by the AERC annually at a residential facility in Nairobi, or virtually, to serve both the CMAP and CPP in consecutive or concurrent sessions. Conversely, the SFSE is an annual convergence of CMAAE students from the eight accredited universities at a centralized facility at the University of Pretoria, or virtually, to jointly undertake elective courses.

The JFE and SFSE programmes present high quality elective curriculum courses that are generally beyond the capacity or existing demand of the individual participating universities. The curriculum for each of the JFE and SFSE elective fields are regularly reviewed and updated by teams of international experts or subject specialists to ensure that they remain current and in line with global standards. The essence of the JFE and SFSE is to ensure that the Masters and PhD programmes' high standards are maintained, and also to bring students and faculty together in a mutually-enriching environment that not only opens up lifelong networking opportunities, but also facilitates the pooling of human and other resources in a cost-effective and efficient manner. As the executing agency, the AERC is responsible for all resource mobilization, and logistical and contractual arrangements for the JFE and SFSE, for and on behalf of the network of collaborating universities in SSA. The depth of coverage, quality of the learning materials and delivery by highly skilled, internationally recruited faculty, differentiates the CMAP, CMAAE and CPP offering from all others in the region and elsewhere in the world. The diversity of lecturers, the conducive learning environment and the supportive networking between students, faculty members and the AERC Secretariat result in a uniquely powerful learning experience.

To date, the number of students who have participated in the JFE and SFSE are: 2,700 CMAP, 478 CPP and 1,310 CMAAE. Over 1,000 of these alumni are engaged in relevant research and policy-making institutions in SSA, while many of them have been retained by academia, mainly in the AERC network universities. Moreover, between thirty and fifty per cent of JFE faculty in any given year are CMAP and/or CPP alumni, a real indication that the AERC graduate programmes have come of age.

1.3 Challenges and Opportunities for the Facilities for Electives

From inception, the JFE and SFSE were strictly residential programmes, relying on face-to-face delivery of lectures at centralized venues – JFE on a campus in Nairobi, Kenya, and SFSE at the University of Pretoria, South Africa. By 2011, the student enrolment for the CMAP JFE had risen to a high of 144. However, due to budgetary constraints and the logistical challenges of accommodating an ever-increasing student enrolment into the JFE, a new CMAP architecture was introduced in 2012, where four universities (Addis Ababa, Dar es Salaam, Ghana and Nairobi) were graduated to Category C to offer a full range of core and elective courses without sending their students to the JFE. A significant decline was registered in full-time students enrolling in Category C universities, primarily due to a decrease in AERC scholarship support. There was also a decline in the quality of teaching electives as well as number of electives offered, thereby negating the gains that had been made.

From 2012, participation in the CMAP JFE by Category B universities stood at an average of 60 students annually, significantly below the level of enrolment in the preceding years. Furthermore, due to the decline in funding support for training programmes, the AERC capped the number of students it sponsored to attend the JFE/SFSE to 10 per CMAP Category B and CMAAE-accredited universities. Student participation in the CMAP JFE and CMAAE SFSE gradually declined, averaging 60 and 80 students annually, respectively. Universities with enrolments beyond the threshold that the AERC was able to finance and without alternative sources of funding were forced to offer a limited number of elective courses to students who failed to attend the JFE/SFSE, which did not guarantee standardization of teaching and quality of delivery across participating universities.

As for the CPP, the dwindling funding support for the programme resulted in a significant decline in enrolment of students at the respective degree-awarding universities as well as at the JFE, hence limiting the number of elective courses offered at the JFE as well as increasing the per unit cost of implementing the programme.

Consequently, this resulted in the exploration of e-learning as a more cost-effective alternative for delivering elective courses to students. The anticipated gains of implementing e-learning were considered to include: (1) enhancing efficiency and reducing unit cost in the delivery of elective courses at the JFE/SFSE without compromising quality; (2) making participation in the JFE/SFSE more affordable to self-sponsored students and organizations wishing to support their staff to enrol into the programme; and (3) harmonizing course content across the AERC network universities and maintaining the quality of the programmes.

2. Desired blended learning management system

2.1 Brief History of Blended Learning at the AERC

Several evaluations and appraisals of the AERC's Strategic Plans and programmatic activities recommended the need to implement an e-learning/blended-learning training delivery mechanism as a more cost-effective alternative for delivering elective courses to students and broadening their reach across SSA. For example, the ACBF appraisal report for CMAAE II (2012) stipulated a number of Phase I lessons, including the need to explore and exploit available information and communications technology opportunities for web-based learning. This was a result of the high and unsustainable costs incurred in implementing the SFSE/JFE.

In 2015, the AERC brought on board NBA to develop a roadmap for e-learning. After several meetings and consultations with the CMAAE network universities, it was resolved that a blended approach with components of face-to-face and online delivery of elective courses was the way forward. Consequently, the first phase of implementing BL commenced in 2017–2018 with the development and piloting of blended-learning modules for seven CMAAE elective courses. In 2018–2019, seven additional modules were developed for CMAAE elective courses.

Following the unprecedented Coronavirus Disease (COVID-19) pandemic, most countries in SSA implemented partial or total lockdowns and banned or severely restricted domestic and/or international travel, physical gatherings and people interacting in person. With international travel and related restrictions, it was now clear that the CMAP-CPP JFE and CMAAE SFSE would be delivered online via a virtual communication platform and not at physical, centralized venues as had been the practice. The AERC used the experience of the CMAAE BL pilot to launch its fully online delivery of the SFSE and JFE in 2020 and 2021.

Teams of international experts drawn from the AERC's network and other reputable institutions around the world were gathered to jointly update course outlines to global standards, and to develop online teaching materials for all CMAP and CPP elective courses. The virtual learning was delivered in 2020 and 2021 through live or synchronous lectures via the Zoom platform and the AERC's LMS, complemented

by the AERC online library, eLibrary, where textbooks, reference journal articles and lecture materials/notes were easily accessible, and lecture recordings were made available to students for asynchronous access to lessons. Final examinations were administered and invigilated at the respective home universities of the students.

A process is underway to produce online teaching materials for all core courses, including the bridge programme, to ensure that they are delivered virtually to broaden the reach and standardize the quality of economics and agricultural economics teaching on the continent.

2.2 AERC Vision for Blended Learning

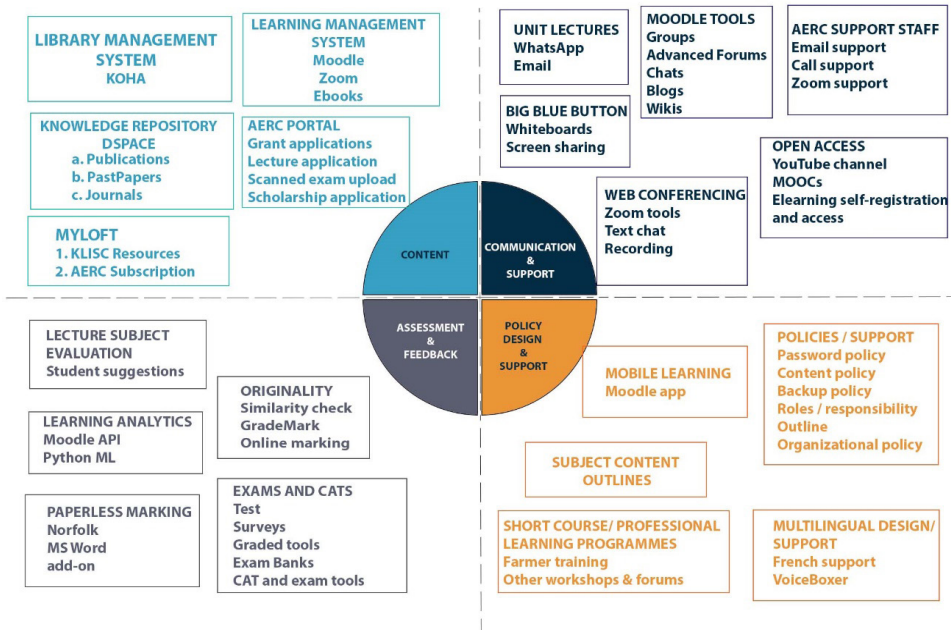
Blended learning is a pedagogical approach combining online and face-to-face learning, incorporating a range of learning materials, resources, types of assessments and in-class activities to enhance the learning process. Blended learning is not about replicating face-to-face time online; the aim is to improve the student experience supported by carefully selected online tools. These tools include an eLibrary, LMS and e-resources (subscription-based ebooks and ejournals).

To improve the current blended learning, the AERC will provide additional subscriptions to the American Economic Association and Elsevier's ScienceDirect journal and ebook databases to supplement the more than 50 existing journals and related e-resource subscriptions from the Kenya Libraries and Information Services Consortium (KLISC). The upgrade also involves the integration of the eLibrary with the AERC LMS to facilitate more straightforward navigation across the two platforms and ease of access to the available resources. Users are expected to benefit immensely from these enhancements to the AERC eLibrary.

Other systems will also be improved, such as Zoom, by adding VoiceBoxer for translation as more French-speaking students and lecturers are expected to join. The communication within the LMS will be improved by adding forums, chats, advanced course notifications to email students when lecturers upload content and the BigBlueButton for web-conferencing.

Mobile capability will also be added by improving and enhancing the eLearning app. This will be done with security in mind by limiting the number of devices a student can use to log simultaneously by adding and enabling the Unique Login plug-in. The desired AERC BLM is captured in Figure 1, which provides a high-level overview of the systems and services.

Figure 1: AERC blended learning systems and services



Blended learning management systems can be categorized according to four major system and service focus areas, as shown in Figure 1:

- a) **Content** – the AERC has various software programmes that help manage content. These include an LMS, knowledge repository, MyLOFT, and the AERC Training Management System and Library Management System.
- b) **Communication and Support** – the AERC will improve communication within the LMS and offline communication.
- c) **Policy Design and Support** – policies that enhance use of the BLM system will be reviewed regularly to ensure they are relevant and enhance effective learning.
- d) **Assessment and Feedback** – various technology solutions and services will be used to enhance feedback from students and all stakeholders. Technology such as the Norfolk add-on for paperless marking, and increased use of Turnitin for plagiarism checks will be encouraged. Machine learning models will be used as the engine for analytics in the LMS by the third year of implementation.

2.3 Justification for E-learning

2.3.1 Integration of Library and LMS

Blended learning transforms the AERC's capacity-building model by developing new training delivery models through digital learning. This includes the possibility of integrating the eLibrary and LMS into one application. This will mean that access to journals, ebooks and revision papers as well as lecture notes will have one point of access.

Digital learning provides an opportunity for students to access quality learning while in their host countries. The AERC's learning materials are developed by a team of experts who update and develop course materials that many African universities would not be able to access. The output of the e-learning management system can be used to create open access courses, e.g., MOOCs, and upload them to open access platforms such as YouTube.

Blended learning improves the efficiency and inclusion of facilities for electives to meet the changing needs of universities and their students, especially in the wake of the COVID-19 pandemic. Students undertake their elective courses online through the learning management platform in their host institutions and home countries, followed by face-to-face physical interaction and examinations in a shared/joint facility.

2.3.2 Role of Knowledge Management Administrator and Substituting Consultants

As shown in Tables 2 and 3, the previous model heavily relied on external consultants to perform most configuration and backend tasks for e-learning, elibrary and publications management while the frontend was managed by a temporary librarian. For the new economical and sustainable model, the AERC Secretariate recruited a KMA, who has taken over both the role of the consultants and the temporary librarian, as shown in Table 4.

Table 2: Neil Butcher & Associates assignments

No	Document no	Posting date	Description	Original amount (US Dollar)
1.	PAY-03145	6/8/2018	RFP/2017/18/1503/042 – Blended learning consultancy	3,850.00
2.	PAY-05274	4/2/2019	RFP/2017/18/1503/042 – Blended learning consultancy	3,850.00
3.	PAY-07990	7/6/2020	Blended learning content update and hosting 2019	5,250.00
4.	AERCNYD3891	8/1/2020	Neil Butcher & Associates	7,968.00
5.	PPIV-06222	6/30/2021	BLENDED LEARNING SFSE 2021	15,000.00
6.	PAY-10401	7/9/2021	NEILBUTCHERFINAL05072021	6,640.00
7.	PAY-11055	10/12/2021	Invoice PI-06696	9,000.00
	Total (US\$)			51,558.00

Table 3: Silda Enterprise assignments

No	Document no	Posting date	Description	Original amount (KShs)
1.	PAY-04977	2/15/2019	50% advance – customization and training, library services	570,000.00
2.	PAY-05286	6/3/2019	Configuration and customization of and training for the digital library system	1,201,500.00
3.	PPIV-03493	4/1/2020	Internet used to upload AERC publications	1,500.00
4.	PAY-08832	12/1/2020	eLibrary maintenance – May 2020 to April 2021	360,000.00
5.	PAY-09759	4/15/2021	Annual Amazon hosting and AWS backups	600,000.00
6.	PAY-09758	4/15/2021	I0116 eLibrary upgrade	1,500,000.00
7.	PAY-10409	7/12/2021	Annual library management – May 2021 to April 2022	360,000.00
	Total (KShs)			3,999,000.00

Table 4: Silda Enterprise and Neil Butcher & Associates’ duties

Silda Enterprise main duties	NBA main duties	Roles taken on by KMA
Configuration and customization of and training for the digital library system	Content update and hosting	All
eLibrary maintenance	Blended learning consultancy	All
Backend management of eLibrary	Backend management of Moodle software	All
Dspace technical upgrades	Moodle upgrades	All

The Roadmap budget projection of the three years has been included in the appendix section.

2.3.3 Sustainability

The LMS enables the AERC to provide an avenue for researchers and policy analysts to equip them with the requisite skills to provide research-based policy advice to inform national policymaking and strengthen critical institutions. Due to the low cost of delivery, blended learning provides an opportunity to give more scholarships to students in underrepresented countries while managing costs and ensuring sustainability.

2.3.4 Expanding Influence

Blended learning will foster economic policy research and knowledge uptake by expanding scholarships and reaching out to more universities. More researchers and lecturers undertaking retooling and research methodology technical workshops will be able to access content and course materials under the blended or online course offerings.

2.4 The Approach

The operational modalities of CMAP, CMAAE and CPP will be reviewed with the aim of implementing a more appropriate and sustainable structure that is efficient and inclusive. Blended learning will be fully scaled up for all CMAP, CPP and CMAAE elective courses, with the already developed e-learning materials being updated regularly and new materials developed by course experts and posted on the AERC BLMS. Specialized workshops will be conducted for users, including module developers, instructors and students. The CPP consists of 11 JFE elective courses while CMAP and CMAAE comprises 12 JFE and 21 SFSE elective courses, respectively. The average number of elective courses taught annually at the CPP JFE, CMAP JFE and CMAAE SFSE is 5, 7 and 14, respectively, subject to suitably qualified instructors being available.

The first phase of implementing BL commenced in 2017 with the development and piloting of blended-learning modules for seven CMAAE elective courses. In 2018, seven additional modules were developed for CMAAE elective courses. In the wake of the COVID-19 pandemic, the AERC used the experience of the CMAAE BL model to develop new modules for 8 CMAP and 9 CPP elective courses that were delivered virtually for the 2020 and 2021 JFE. All the CMAAE, CMAP and CPP modules were uploaded to the AERC LMS and delivered through live or synchronous lectures via the Zoom platform and AERC's LMS, complemented by the AERC online library (eLibrary) where textbooks, reference journal articles and lecture materials/notes were easily accessible, and lecture recordings were made available for asynchronous access to lessons by students.

In a quest to standardize the teaching of all courses offered under the collaborative training programme, the AERC has embarked on the development of modules for all core courses (Microeconomics, Macroeconomics and Quantitative Methods) taught at the respective degree-awarding universities as well as for the Masters and PhD Bridge Programmes.

The advantages of implementing blended learning include: (1) enhancing efficiency and reducing unit cost in the delivery of elective courses at the JFE/SFSE without compromising quality; (2) making participation at JFE/SFSE more affordable to self-sponsored students and organizations wishing to support their staff to enrol in the programmes; (3) providing a platform for sharing a standardized set of course materials through the eLibrary, facilitating offsite access to reference materials, journals and ebooks by CMAP, CMAAE, CPP and Bridge Programme students, lecturers and AERC researchers; and (4) using savings that could be used to increase the number of scholarships awarded, especially to underrepresented countries and groups.

The quality assurance of collaborative courses will involve two- to three-year review cycles of the curriculum, pedagogy and teaching standards, and supporting the financial and administrative infrastructure for effective delivery of economics training at collaborating universities.

Significant improvements will follow the enhanced quality of eLearning and practical learning management system. The AERC will subscribe to more economics-related top journals and purchase more ebooks to support online learning.

2.5 Roadmap Roles and Responsibilities for AERC Blended Learning Management System

2.5.1 Roles and Responsibilities

Table 5 shows the roles and responsibilities of the officers in the implementation of the blended learning approach of the Training Department of the AERC.

Table 5: Roles and responsibilities

Critical blended learning supporting activity	AERC lead staff
Conduct subject specialist workshops to review and develop curricula for CMAP, CMAAE and CPP elective and core courses, and Masters and PhD Bridge Programmes, to keep abreast of new developments in economics and ensure adequate applied and policy content	Lead Manager and Manager Training Programme
Conduct BL training, and develop and implement e-learning modules for CMAP, CPP and CMAAE elective courses	KMA
Conducting joint facility and shared facility for elective courses for CMAP, CMAAE and CPP to signal comprehensiveness, efficiency and quality	Lead Manager, Manager and JFE/SFSE Admin
Conduct annual reviews of CMAP, CMAAE and CPP universities to ensure the quality of teaching of core and elective courses, and to ensure they are aligned with the best global standards	Director, Lead Manager and Manager Training Programme
Conduct annual reviews of CMAP, CMAAE and CPP to ensure they are aligned to the quality standards that will be developed. These reviews will lead to a programme of incremental improvement that is feasible and relevant in the specific institutional context	Director, Lead Manager and Manager Training Programme
Conduct a feasibility study on joint delivery of electives to assess the extent to which there can be a collaborative approach to delivery between universities in specific regions	Director, Lead Manager and Manager Training Programme
Expand the Bridge Programmes through partnering with the international community and governments of underrepresented countries to undertake targeted joint, country-specific, capacity-building initiatives for policy analysis, mentorship and short-term skills upgrading	Director, Lead Manager
Support universities in the network and underrepresented countries to strengthen capacity to ensure quality graduate training of economists through blended learning at JFE/SFSE retooling workshops and faculty exchange programmes	Lead Manager and Manager
Store backups and provide disaster recovery systems for all e-learning systems	KMA
Support staff security awareness and training	KMA
Preparing advertisements/calls for various applications	JFE/SFSE Admin

Post JFE advertisements in INOMICS and follow up their posting on the main website	KMA
Subscribe to Zoom and other plug-ins for payment and payment monitoring	KMA, Lead Programme Admin
Perform various plug-in integrations and system maintenance	KMA
Resolve technical issues, respond to information requests and general maintenance of e-platforms	KMA
Encourage students and lecturers to register for and use the learning platform	KMA
Monitor Zoom classes and offer technical support to lecturers and students	KMA
User registration at the start of the semester and equivalent registration for all AERC LMSs	KMA
Lecturer orientation on the AERC eLibrary, LMS & Zoom	KMA, JFE/SFSE Admin
Simulation and pilot testing of some online lectures before official start dates	KMA, JFE/SFSE Admin
Ebook purchasing, budget allocation and processing	Lead Program Admin, JFE/SFSE Admin, KMA

2.6 Learning Management System Policy

This policy will guide how materials are prepared for blended learning to ensure quality, sustainability and expanded influence.

2.6.1 Course Design Policies

Definition

With blended learning, a portion of lectures or examinations will be conducted online; there will be both physical contacts between the lecturer and students and virtual components.

General expectations

- Quality of face-to-face contact should be maintained in an online course. Criteria for success should be as rigorous as face-to-face contact in online courses.
- Online classes will take the same time as face-to-face classes.
- Anti-plagiarism Moodle Proctoring software and unique log-ins will be configured in the LMS. Lecturers and the AERC Secretariat will work hard to ensure that there is no cheating when students attend online classes.

Course materials

- Lectures will have well-defined learning outcomes.
- Lectures will have well-aligned course learning activities and assessments to ensure the learning outcomes.

- Instruction will take place via a virtual class and assessments that best suit the virtual environment will be designed, such as online quizzes, small online group discussions, online peer review, collaborative wikis and blogs.
- Instruction will innovatively accommodate different learning styles by using various media such as text, video, hyperlinks and self-read to PowerPoints.

Communication

- Lecturers will constantly communicate with their students using a WhatsApp group and email.
- The AERC Secretariat will ensure constant communication with lecturers and students via email.

Roles and responsibility

- A team of experts will develop the curriculum that the AERC and the network members will vet, which will be reviewed every two to three years.
- Lecturers and the AERC Secretariat will have full rights to upload content.

2.6.2 Course Retention Policy

Definition

This defines how long courses developed in the LMS will be retained on the site.

Purpose and scope

This policy covers courses in the LMS managed by the AERC Secretariat.

General expectations

- To retain course materials and archives for a period that lecturers, students and the AERC Secretariat find valuable and adequate.
- To optimize the performance of the LMS.
- To ensure that storage space is efficiently utilized to minimize the financial and technical impact of constantly increasing disk storage.

Policy statement

Ongoing courses will be considered active records until the end of the academic year in which the course is presented. The course materials will be archived for five years after the initial year. Requests to exempt a course from deletion can be made and will be reviewed by the AERC Secretariat on a case by case.

Policy review

This policy will be reviewed every year by the AERC Secretariat, and relevant communication will be sent to lecturers and the students.

2.7 Information Systems Security Policies

Information systems requiring all users to log in to download or access materials are at risk of cyber attack. In the AERC Training Department the LMS has been identified as a critical system and therefore it was encrypted with TLS.

2.7.1 Password Policy

Definition

This policy defines a framework for password creation and management inside the LMS, eLibrary and publications. This mitigates the damage of possible attacks on the online infrastructure, and ensures the confidentiality, integrity and accessibility of online materials. This policy applies to all stakeholders using the AERC's digital systems.

Purpose

The use of complex passwords helps to mitigate against attacks resulting from password guessing. Regular password changes mitigate against long-term exploitation if the passwords are exposed.

General expectation

- Self-registration will be allowed via email, provided users adhere to the length and complexity requirements for passwords.
- The KMA will regularly update and review the access rights of all stakeholders.
- Admin accounts of staff who have left the AERC will be removed from the system.

Statement policy

The minimum allowed password length and complexity would be a password of 8 characters, with at least one digit, one lowercase, one uppercase, and one non-alphanumeric character.

2.7.2 Backup policy

Definition

This outlines a set of policies and procedures for data backup and retention to facilitate the restoration of application and associated data.

Purpose and scope

- The primary purpose of backups is to provide secure storage for data assets critical to the core mandate of the AERC. The backups should help prevent data loss in case of accidental deletion or corruption of data, system failure or disaster and provide timely system restoration in the event of failure.
- The scope will include all critical data for the learning management system, eLibrary and publications.

General expectations

- Regular snapshots (full backups) of the AWS server will be kept both in the AWS and Redstor (offsite), but will be cloud to cloud.
- The KMA working with the IT Administrator will ensure this is done.
- The backup retention period will be set to minimize the risk of catastrophic loss of data at a reasonable cost.
- The AERC will set up adequate resources to enable complete regular backups.

Policy statement

The AERC Secretariat expects that information regarding all online learning systems will be backed up regularly in a secure site and in secure off-site storage, which will be checked periodically to ensure it is working correctly.

Policy review

This policy will be reviewed annually.

3. AERC roadmap to technological evolution

3.1 Technology and New Infrastructure

3.1.1 Administration of CATs and Examinations

The following plug-ins will be installed to help administer CATs and examinations in an open and credible way:

- The Unique Login plug-in – the goal of this authentication plug-in is to make sure that each user in Moodle only has one active session at a time.
- Moodle Proctoring – this is a quiz access plug-in to capture the user's picture via webcam to identify who is doing the Moodle quiz. It will capture the picture automatically every 30 seconds and store it as a PNG image. It also captures a screenshot during the quiz to verify that the student does not undertake any unusual activity during the examination.

3.1.2 Video Conferencing

BigBlueButton is an open-source web conferencing system designed for online learning. It is a tool used by instructors to help them access LMSs, engagement tools and analytics, and it requires hosting.

3.1.3 Other Technologies

Face-to-face

Moodle's Facetoface keeps track of in-person (e.g., classroom) training that requires booking. Each activity is offered in one or more identical session. These sessions can be run over multiple days. Reminder messages are sent to users and their managers a few days before the session starts. Confirmation messages are sent when users sign up for a session and when they cancel. This module may be of interest to administrators looking for a way to provide event management support for blended learning environments.

Socialwall

Moodle Socialwall transforms a Moodle course into a social learning platform. This includes a familiar post interface, timeline of posts, filtering the timeline and integration with Moodle’s activities and resources. A social learning format allows teachers to easily connect with students by adding messaging, forums and wikis.

Enable French Navigation in Moodle and DSpace

French and English will be configured in the e-learning platform and e-resource repository with a button to select the language. Content will still be in English.

VoiceBoxer

VoiceBoxer is a multilingual web platform for presentations and webinars that allows one to reach an audience in any language and is fully compatible with Zoom.

3.2 Publications and E-resources

The AERC will do the following:

1. Revamp and re-categorize publications in the repository.
2. Add more journal subscriptions and purchase more ebooks.

3.3 Roadmap for Technology Upgrades

3.3.1 Stability (Year 1: 2022–2023)

Table 6: Roadmap timelines (Year 1: 2022–2023)

No	Major tasks	Dates
1.	Add SSL (secure sockets layer) to LMS	March 2022
2.	Draft roadmap for the LMS	March 2022
3.	Purchase and upload ebooks to the LMS	April 2022
4.	Link LMS with publications repository so that students can access past papers	April 2022
5.	Revamp publications repository interface	April 2022
6.	Upload and migrate publications from old website to new publication repository	April 2022
7.	Prepare tutorials for lecturers and students on how to use e-learning platforms	May 2022
8.	Configure and test premium Maker theme	May 2022
9.	Configure and test Unique Login plug-in	May 2022

10.	Configure Moodle for optimal performance	May 2022
11.	Configure, test and run simulations of Moodle Proctoring software	June 2022
12.	Test and simulate Zoom accounts in Moodle	June 2022
13.	Test and confirm all databases and backups are working correctly	June 2022
14.	Prepare all-new courses and allocate lecturers in Moodle	June 2022
15.	Create accounts in learning platforms for all students attending and lecturers participating in JFE and SFSE	June 2022
16.	Conduct lecturer orientation and training	July 2022
	System too busy for upgrades July to December 2022 when JFE and SFSE are ongoing. Pending upgrades will continue from January–May 2023.	

3.3.2 Technological Evolution (Year 2: 2023–2024)

Table 7: Roadmap timelines (Year 2: 2023–2024)

No	Major tasks	Dates
1.	Upgrade Moodle (version 3.9,3.10, 3.11,3.12)	March 2023
2.	Configure and enable live interpretation software (English to French) such as VoiceBoxer	March 2023
3.	Purchase more economics journal databases and configure them in MyLOFT	April 2023
4.	Host and configure BigBlueButton server	April 2023
5.	Revamp publications repository interface	April 2023
6.	Implement search engine optimization for journal databases and e-learning	May 2023
7.	Review and upgrade course contents and edit Zoom videos to a level these courses can participate in Open online courses such as MOOC's.	May 2023
8.	Create and prepare Learning Materials that can be uploaded in AERC YouTube platform	June 2023
9.	Implement Moodle Proctoring in the JFE/SFSE.	

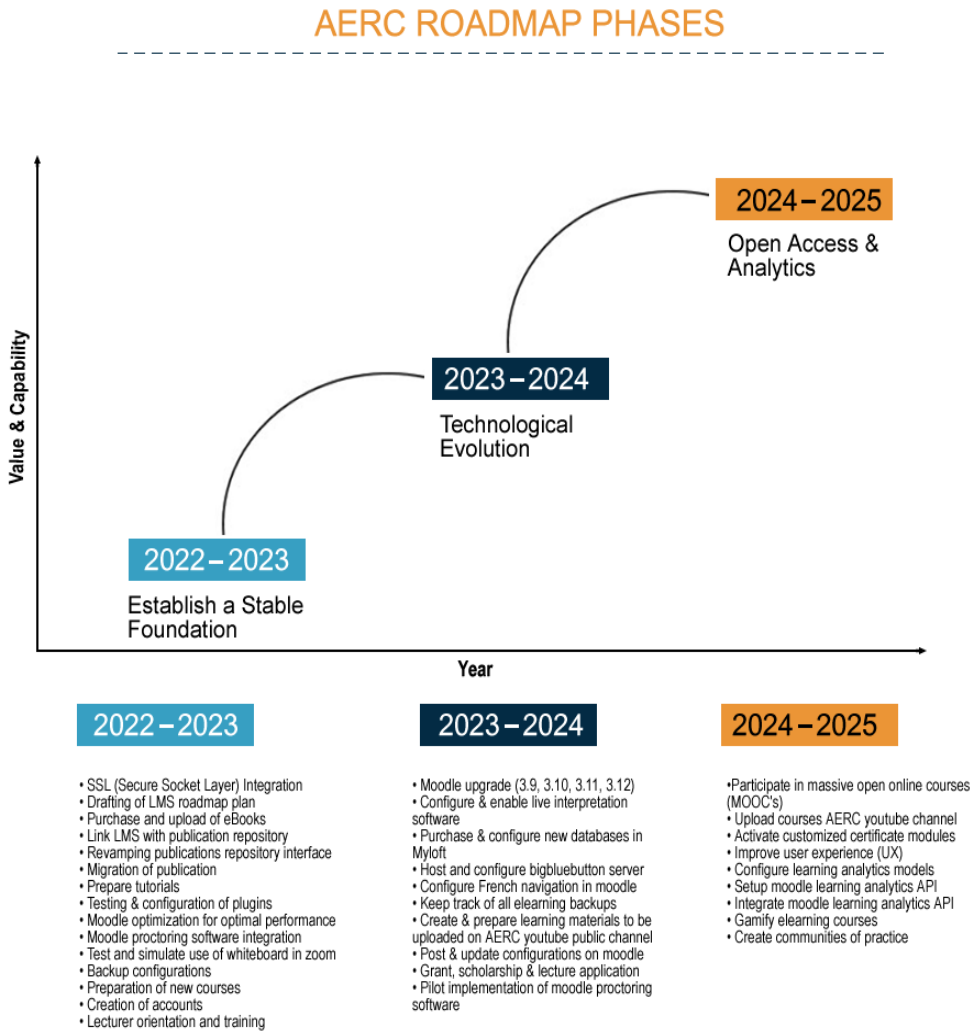
3.3.3 Open Access and Analytics Evolution (Year 3, 2024–2025)

Table 8: Roadmap timelines (Year 3: 2024–2025)

Task	Major tasks	Dates
1.	Participate in MOOCs	March 2024
2.	Upload courses in AERC YouTube public channels	April 2024
3.	Activate and configure customized certificate modules	April 2024
4.	Engage stakeholders on User experience (UX) and design change by conducting a survey.	May 2024
5.	Set up Python Machine Learning for learning analytics	May 2024

6.	Integrate Moodle Learning Analytics API	June 2024
7.	Add gamification to the e-learning platform	July 2024
8.	Set up communities of practice comprised of economics experts for online questions and forums	July 2024

Figure 2: AERC Roadmap phases



4. Conclusion

The roadmap will be implemented in three phases. The first phase will focus on creating a stable infrastructure and obtaining optimal performance from existing systems. The second year will focus on improving IT infrastructure, harmonizing the systems and improving the user experience within blended learning. The third year will focus on data analytics and machine learning to improve the predictive ability of the LMS.

A few challenges such as students access to the internet, online fatigue, copyright issues related to content creation, and resistance to change are anticipated when the roadmap is implemented. The AERC Secretariat will put measures in place to overcome that. Currently, blended learning is working well, and the roadmap will steer the AERC and our partners towards more efficient, cost-effective, and scalable long-term learning. The BLMS integrated within the eLibrary is a flagship project of the Training Department of the AERC. We hope that the system will offer all our users a great learning experience.

Appendixes

Appendix A: Budget and Lead Staff, Year 1

No	Major tasks	Budget/lead	Date
1.	Add SSL (secure sockets layer) to LMS	KMA	March 2022
2.	Draft roadmap for the LMS	Managers & KMA	March 2022
3.	Purchase and upload ebooks to the LMS	Lead Programme Admin & KMA	April 2022
4.	Link LMS with publications repository so that students can access past papers	KMA	April 2022
5.	Upload and migrate publications from old website to new publication repository	Manager Communications & KMA	April 2022
6.	Prepare tutorials for lecturers and students on how to use e-learning platforms	KMA	May 2022
7.	Configure and test of Unique Login plug-in	KMA	May 2022
8.	Configure Moodle for optimal performance	KMA	May 2022
9.	Configure, test and run simulations of Moodle Proctoring software	KMA	June 2022
10.	Test and simulate Zoom accounts in Moodle	KMA	June 2022
11.	Test and confirm all databases and backups are working correctly	KMA & IT Admin	June 2022
12.	Prepare all-new courses and allocate lecturers in Moodle	KMA	June 2022
13.	Create accounts in learning platforms for all students attending and lecturers participating in JFE and SFSE	KMA & Programme Admin	June 2022
14.	Conduct lecturer orientation and training	KMA & Programme Admin	July 2022
15.	Revamp publications repository interface	Manager Communications & KMA	August 2022
Total budget			

Appendix B: Budget and Lead Staff, Year 2

No	Major tasks	Estimated cost (US\$)/lead	Date
1.	Upgrade Moodle (version 3.9,3.10, 3.11,3.12)	KMA	March 2023

2.	Configure and enable over-the-voice interpreter (English to French) such as VoiceBoxer.	10,000 outsourced	March 2023
3.	Purchase more economics journal databases and configure them in MyLOFT	20,000 outsourced	April 2023
4.	Host and configure BigBlueButton server	10,000 dedicated server and configuration for long-term storage of videos.	April 2023
5.	Revamp and integrate publications repository with Moodle in the training management system	outsourced	April 2023
6.	Implement search engine optimization for journal databases and e-learning	KMA	May 2023
7.	Review and upgrade course contents and edit Zoom videos to a level which the courses can participate in MOOC's.	10,000 outsourced	May 2023
Total estimated budget		50,000	

Appendix C: Budget and Lead Staff, Year 3

Task	Major tasks	Estimated cost (US\$)/ lead	Date
1.	Participate in MOOCs on a few selected courses. Create Professional courses from Zoom recording by editing the video.	20,000 outsourced	March 2024
2.	Upload edited courses to AERC's YouTube public channel	outsourced	April 2024
3.	Activate and configure customized certificate modules. MOOC participants will receive a certificate	KMA	April 2024
4.	Engage stakeholders on User experience (UX) and design change by conducting a survey.	KMA	May 2024
5.	Set up Python Machine Learning for learning analytics	KMA	May 2024
6.	Integrate a Moodle Learning Analytics API in the LMS	KMA	June 2024
7.	Add gamification to the e-learning platform by reorganising the course structure and content. (self-taught courses such as retooling workshops)	20,000 outsourced	July 2024
	Set up communities of practice comprised of economics experts for online questions and forums	Outsourced	July 2024
Total budget Year 3		40,000	



Mission

To strengthen local capacity for conducting independent, rigorous inquiry into the problems facing the management of economies in sub-Saharan Africa.

The mission rests on two basic premises: that development is more likely to occur where there is sustained sound management of the economy, and that such management is more likely to happen where there is an active, well-informed group of locally based professional economists to conduct policy-relevant research.

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