Cases on Active Blended Learning in Higher Education

Brenda Cecilia Padilla Rodriguez
Universidad Autonoma de Nuevo Leon, Mexico

Alejandro Armellini
University of Portsmouth, UK

A volume in the Advances in Educational Technologies and Instructional Design (AETID) Book Series

Published in the United States of America by
IGI Global
Information Science Reference (an imprint of IGI Global)
701 E. Chocolate Avenue
Hershey PA, USA 17033
Tel: 717-533-8845
Fax: 717-533-8661
E-mail: cust@igi-global.com
Web site: http://www.igi-global.com

Copyright © 2021 by IGI Global. All rights reserved. No part of this publication may be reproduced, stored or distributed in any form or by any means, electronic or mechanical, including photocopying, without written permission from the publisher. Product or company names used in this set are for identification purposes only. Inclusion of the names of the products or companies does not indicate a claim of ownership by IGI Global of the trademark or registered trademark.

Library of Congress Cataloging-in-Publication Data

Names: Padilla Rodriguez, Brenda Cecilia, DATE- editor. | Armellini, Alejandro, DATE- editor.
Title: Cases on active blended learning in higher education / Brenda Cecilia Padilla Rodriguez and Alejandro Armellini, editors.
Description: Hershey, PA : Information Science Reference, 2021. | Includes bibliographical references and index. | Summary: "This book will explore strategies and methods to implement active blended learning in higher education, providing an insight into teaching practice by describing the experiences and reflections of academics from around the world"-- Provided by publisher.
Identifiers: LCCN 2020052139 (print) | LCCN 2020052140 (ebook) | ISBN 9781799878568 (hardcover) | ISBN 9781799878575 (paperback) | ISBN 9781799878582 (ebook)
Subjects: LCSH: Education, Higher--Computer-assisted instruction--Case studies. | Internet in higher education--Case studies. | Blended learning--Case studies.
Classification: LCC LB2395.7 .C398 2021 (print) | LCC LB2395.7 (ebook) | DDC 378.1/7344678--dc23
LC record available at https://lccn.loc.gov/2020052139
LC ebook record available at https://lccn.loc.gov/2020052140

This book is published in the IGI Global book series Advances in Educational Technologies and Instructional Design (AETID) (ISSN: 2326-8905; eISSN: 2326-8913)

British Cataloguing in Publication Data
A Cataloguing in Publication record for this book is available from the British Library.

All work contributed to this book is new, previously-unpublished material. The views expressed in this book are those of the authors, but not necessarily of the publisher.

For electronic access to this publication, please contact: eresources@igi-global.com.

Chapter 13
Increasing the Visibility of Graduate Students' Employability Skills:
An ePortfolio Solution Addressing the Skills Gap

Lourdes Guàrdia
Universitat Oberta de Catalunya, Spain

Marcelo Fabián Maina
Universitat Oberta de Catalunya, Spain

Federica Mancini
https://orcid.org/0000-0003-1029-1131
Universitat Oberta de Catalunya, Spain

EXECUTIVE SUMMARY

This chapter highlights the contributions of the EPICA project in reducing the skills gap of graduate students in sub-Saharan Africa. It presents the solution designed and implemented to improve the quality of employability skills development and visibility to prospective employers. The first part of this chapter provides an overview of the skills gap between higher education institutions and the workplace in sub-Saharan Africa. It includes the description of the specific eAssessment pedagogical framework and methodology supported by the EPICA ePortfolio as a transition tool designed to address this gap. The second part of the chapter outlines the challenges that could hinder the solution's implementation and the full exploitation of its benefits. Solutions and recommendations are also discussed with the aim to increase the impact in the EPICA stakeholder community and encourage the implementation of the proposed solution in other universities, especially those adopting blended and online learning models.

DOI: 10.4018/978-1-7998-7856-8.ch013

Copyright © 2021, IGI Global. Copying or distributing in print or electronic forms without written permission of IGI Global is prohibited.

INTRODUCTION

In the 'Agenda 2063', the African Union Commission (AUC) makes a call to action to "Catalyse education and skills revolution and actively promote science, technology, research and innovation, to build knowledge, human capital, capabilities and skills to drive innovations for the African century" (AUC, 2015, p. 14). Nevertheless, a significant mismatch still exists between the skills of young African workers and the skills that employers demand for today's global workforce. To address this situation, higher education institutions and the education curricula in Africa must evolve to provide the right education and training for jobs in today's labour pool.

Likewise, in the new 'Skills Agenda for Europe', the European Commission (EC, 2016) invites social partners, industry and other stakeholders to work together to pursue very similar priorities to those of the AUC. These include the improvement of the quality and relevance of skills development, the visibility and comparability of skills, and the skills intelligence and information for making better career choices. The EC also emphasises the potential of Information, Communications and Technologies (ICT) to encourage innovation in teaching and learning approaches.

In response to this challenge, EPICA, a new strategic partnership between Europe and Africa, was launched in January 2018 by an international consortium composed of four EU organisations (International Council for Open and Distance Education [ICDE], MyDocumenta, Open University of Catalonia [UOC], and Integrated Communications, Worldwide Events [ICWE]) and four East African institutions (Maseno University [MU], Africa Virtual University [AVU], Makerere University [MK] and Open University of Tanzania [OUT]). The project, co-funded by the H2020 Research and Innovation Programme of the European Union, brings together the aforementioned businesses, organisations and universities to design an innovative, scalable ePortfolio to improve the visibility of employability skills.

With the goal to reduce the skill-gap in mind, EPICA aimed to (1) support universities in implementing new active and blended pedagogical methodologies to face the growing demand of better-skilled workers, (2) help students by increasing visibility and awareness of the skills and competencies acquired in and out the academic institution, and (3) assist companies in identifying the most reliable and suitable candidates for a given vacancy. To achieve this goal, a solution which entails a specific methodology for employability skills visibility, assessment and micro-credentialing supported by a competency-based ePortfolio as a transition tool was designed and implemented in four of the partner universities: MU (Kenya), MK (Uganda), OUT (Tanzania) and UOC (Spain). The latter, renowned for both its extensive experience in online and competence-based education as well as the integration of ePortfolios in academic curricula, led the EPICA ePortfolio's co-design process and tested the solution's adequacy and potential transferability to other contexts outside of Africa.

The EPICA competency-based ePortfolio and specific methodology enhancing its effective use incorporated the Active Blended Learning (ABL) principles focusing on student engagement in a) reflective practices on digital and non-digital artefacts which prove the acquisition or development of their employability skills, be it in academic or non-academic settings, b) the digital presentation and communication of said acquisition and development to academics and prospective employers, c) meaningful learner-centred interactions with content, peers, teachers and employers and, d) the systematic improvement of employability skills such as digital competence, oral and written communication, learning to learn, self-regulation and reflective thinking.

Following an introductory overview of the skills gap in East Africa, this chapter presents the solution designed under the EPICA project and the main features implemented in the ePortfolio after an in-depth

dialogue with the local stakeholders. Challenges to the solution's implementation are described in the corresponding section. These include the integration of a blended approach enhanced by the ePortfolio into academic institutions based on conventional education systems, the readiness of the teaching staff in adopting new educational practices, connectivity and the scarcity of services and programmes connecting students and employers. The issues addressed by the project highlight that the institutions must rethink their educational strategies by considering the use of ICT and blended learning models. Moreover, a transformation of learning and assessment practices, as well as the ecosystem of relations established beyond the institutional boundaries with the public and private sector, is required. The final section of the chapter provides solutions and recommendations for educational leaders and policymakers as well as ideas for further research on this topic.

BACKGROUND

An Exploratory Study on the Skills Gap in East Africa

In order to understand the possible mismatches between the skills valued by the labour market and those developed within the higher education curriculum in Eastern Africa, a mixed-method exploratory study was carried out during the project's first year. Firstly, a literature review was conducted. It revealed that innovative firms are concerned with the practical experience and skills provided by the education and training systems (Sanchez Puerta et al., 2018). Results further showed that employers are dissatisfied with the skills and competencies of graduates (Martin et al., 2017) with many industries currently lacking highly skilled positions for them (WEF, 2017).

The demand for higher education is much greater than the existing offer of quality academic courses. Moreover, programmes do not always translate into new curricula targeting the development of employability skills. The literature suggests that both the lack of focus on the practical application of skills as well as the tendency to use traditional teaching methodology over more beneficial active educational approaches (Oluwatobi et al., 2017) are the main causes behind the skills gap, thus highlighting crucial shortcomings in higher education.

Based on the literature review, an empirical research study was conducted to explore the perceptions and opinions of employers, civil servants and the academic community regarding graduates' employability skills. Firstly, a survey was distributed among local stakeholders during the Open Day events organised in April 2018 by three of the African piloting universities. The questionnaire explored the graduates' skills gap using the taxonomy elaborated by the 'Skill Up project - Good practices in connecting workplace and learning in higher education' (Ornellas et al., 2019). Following this, a qualitative analysis was conducted on the results of 12 focus groups. These groups were held to research the nuances and deeper meanings on the reasons behind the perceived skills gap from the point of view of the regional stakeholders in attendance.

The results of this study revealed the following primary causes of the skills gap: (1) the growth in higher education demand, (2) a lack of infrastructure, (3) the scarce adoption of active educational approaches, (4) a shortness of practical application of skills, (5) the focus on exams instead of skill acquisition and (6) the feeble connection among higher education and workplace. Improving the efficacy of education is of strategic importance for East Africa as global data show that the unemployment rate decreases given the level of education obtained. The integration of a skill-based approach to learning

through better skill development programmes (African Development Bank, 2019) together with an environment enabling the alignment between different stakeholder groups (WEF, 2019) seem to be key factors in overcoming the current situation.

The Active Blended Approach as a New Paradigm for Higher Education Institutions

The focus on local problems and barriers of the exploratory study helped to identify and propose a solution based on an active blended approach to be implemented and tested during the pilot studies.

ABL relies on the combination of active learning methodologies and blended learning settings and is defined by the Institute of Learning & Teaching in Higher Education of the University of Northampton (n.d.) as:

a pedagogical approach that combines sense-making activities with focused student interactions (with content, peers and tutors) in appropriate learning settings – in and outside the classroom. ABL focuses on engaging students in knowledge construction, reflection and critique, on the development of learner autonomy and of course, on the achievement of learning outcomes. (para. 6)

The promotion of active learning pedagogies is gaining momentum in the academic literature and policy arenas as a feasible solution for increased student achievement (Cattaneo, 2017). Active learning is used as a collective term for a group of instructional strategies (Streveler & Menekse, 2017) aimed at engaging learners in "seeking new information, organizing it in a way that is meaningful, and having the chance to explain to others" (Allen & Tanner, 2005, p. 262). Active learning strategies such as visual learning, cooperative learning, debates, drama, discussions, role-playing, case studies, group projects and peer learning/teaching (Bonwell & Eison, 1991) contribute to the improvement of students' learning and their attitudes towards learning (Khan et al., 2017) as well as to the enhancement of cognitive and self-directedness skills.

Higher education institutions should adopt active learning strategies based on learner-centred instruction and the use of technological tools for online and blended environments to improve students' skill sets (Cummings et al., 2017). A pedagogically effective combination could help faculties and students accomplish successful teaching and learning (Vonderwell & Turner, 2005). By implementing active and collaborative learning processes into higher education and encouraging the exploration of technological tools, resources, and content (Brindley et al., 2009), educators also promote an employability focus switching from 'purely academic' courses to learning experiences which foster changemaker attributes and skills (Palmer et al., 2017).

To remain at the cutting edge of transformational higher education, academic institutions should implement innovative approaches entailing the adoption of an 'Intelligent Pedagogy' to encourage the appropriate use of technology in the overall learning experience and an 'Engaging Pedagogy' focused on the enhancement of students' active role (Guàrdia & Maina, 2018). Besides the active engagement of students in generating the content, using technology, creating ePortfolios, searching for information and applying it in real-life contexts through sense-making and student-centred activities, universities should also introduce an employability focus by adopting a 'Situated Pedagogy'. The contextualisation of the learning process in terms of learners' professional goals, promoted by the 'Situated Pedagogy',

goes hand in hand with the identification of key job-related competencies and their development within the curriculum.

Research acknowledges the benefit of engaging in learning strategies and methods embracing active pedagogical approaches supported by the effective use of educational technologies. As such, the development of a vision and strategies for academic institutions to enhance the implementation of a blended model based on ePortfolio usage and the adoption of new active educational methodologies can drive the process of pedagogical transformation towards the goals set by the EPICA project.

The Solution Designed by EPICA to Address the Skills Gap

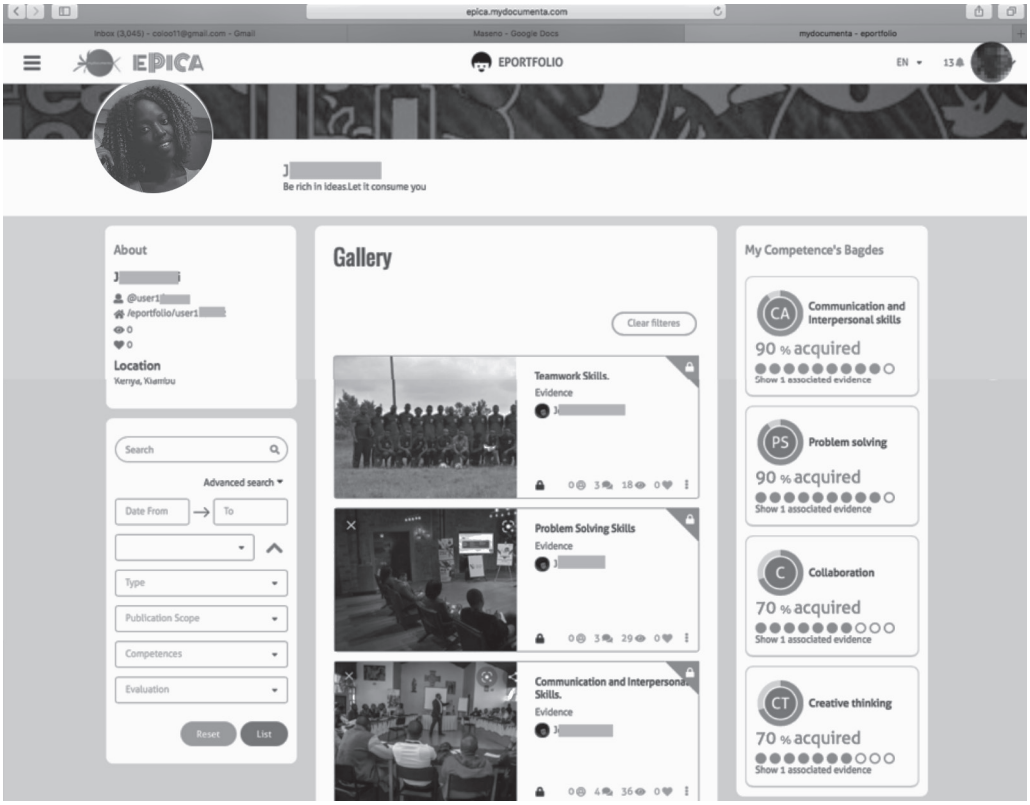
As highlighted by multiple sources (Namuddu et al., 2017; Tomar Mishra et al., 2019; Younis, 2020), the skills gap cannot be solely addressed using a business and/or technological approach. A multidimensional perspective, including innovation in teaching and learning, reaching youth in and out of universities, and the involvement of different stakeholders, must also be considered. These factors formed the basis for the adopted active blended approach, which incorporated an ePortfolio as a transition tool designed to promote employability skills visibility, assessment and micro-credentialing. To detect requirements, enablers and constraints at the local level, the design of the ePortfolio tool and methods was oriented by the results of the following data collection phases:

- the exploratory study, which included:
  - ¡ the review of international and local reports, scientific papers and books (data source 1) selected both from the African partners and a systematic online search with *ad hoc* keywords.
  - ¡ online questionnaires (data source 2) with *ad hoc* open-ended questions answered by a reduced sample of selected teachers ($N = 12$) from MU, MK and OUT who were involved in a pre-pilot training carried out in the first year of the EPICA project. The questionnaires were designed to detect training needs and requirements for the ePortfolio.
  - ¡ twelve focus groups (data source 3) with a total of 79 regional stakeholders from the scientific and educational community, the business community and the public sector. Three focus groups were held in Kenya ($N = 22$), four in Uganda ($N = 30$) and five in Tanzania ($N = 27$). In each focus group, the three stakeholder profiles were represented.
- the application of a self-diagnostic tool (data source 4) based on the *ePortfolio & Open Badges Maturity Framework* to capture the needs and maturity of the African piloting universities in the implementation of the ePortfolio at an institutional level. This diagnostic tool, translated into a web survey, was collectively answered in each of the three institutions by a group of representatives of the teaching staff, the management team, the technological team and the students ($N = 11$ [MU], 11 [MK], 10 [OUT]).
- a pedagogical and technological procedure to capture requirements (data source 5) conducted through a hybrid approach combining document analysis and scenario-based sessions. For the latter, users were provided with actor-specific use-cases to be performed with the first version of the ePortfolio. Probe questions at crucial points of the interaction with the prototype were answered via an online questionnaire on LimeSurvey. The elicitation was carried out in the second year of the project and involved a total of eight teachers and 66 students from the three East-African universities ($N = 2$ teachers, 18 students [MU]; $N = 2$ teachers, 20 students [MK]; $N = 4$ teachers, 28 students [OUT]) and 16 local employers ($N = 9$ Kenya, 3 Uganda, 4 Tanzania).

- a review of successful initiatives (data source 6) led in other academic contexts regarding skill visibility, showcase ePortfolios, employability skills assessment and micro-credentialing.

With end-users' requirements at hand, new features were implemented in the first version of the ePortfolio to support the adoption of emerging active blended pedagogical approaches based on a learner-centred perspective and on the acquisition and showcasing of skills (see Figure 1). The technological development, therefore, responded to the requirements to enhance the assessment and feedback, develop competence, organise the content, communicate, collaborate and share files, display students' progress, gather and select information, enhance (self-)reflection and self-regulation, reward students, and enhance the accessibility of employers and the interaction with them.

Figure 1. EPICA ePortfolio



The specific methodology designed for employability skills assessment and micro-credentialing after the review of successful initiatives (data source 6) required students to connect employability skills with the curriculum by selecting and integrating relevant evidence-based curricular, co-curricular, extracurricular, work, and professional experiences in the ePortfolio. The identification of opportunities demonstrating the contexts and situations where students have developed their skills promotes an articulation approach by means of reflective practices. This articulation is understood as the ability to identify and communicate the development of skills to specific target groups. The role of the teacher was to guide

the students in selecting relevant evidence in support of generic and/or specific employability skills, provide formative feedback and assess the ability to demonstrate said skills. The effective showcase of these skills is acknowledged by a badge issued by the academics responsible for providing recognition.

The process, therefore, starts in higher education institutions and culminates in the workplace with an employer's appraisal. Students were given the opportunity to showcase their employability skills for the workplace by articulating them in relation to specific job requirements via a video testimony. In turn, this facilitated employers' recognition of aptitude and attitude in prospective candidates and helped speed-up the recruitment process.

The methodological approach supported by the competency-based ePortfolio is apt for higher education institutions that support blended and online learning models. Teachers' interventions can be face to face or online. Authenticity is fostered by clearly indicating the relevance of students' activities for employability purposes and by providing support materials as examples and models of what students, teachers and employers are expected to do (Palmer et al*.,* 2017). Sense-making is supported by the EPICA ePortfolio with *ad hoc* features that purposefully link pieces of evidence with employability skills. The request to record and upload a video testimony within the ePortfolio enhances the connection of personal capabilities to job requirements and consequently emphasises the relevance of this task for students.

Additionally, meaningful learner-centred interactions with teachers and employers guide students in the identification and articulation of professional transferable skills in line with core ABL principles. These interactions are supported by the ePortfolio whose features enable both formative and summative assessment as well as communication and collaboration with the classroom members and other external stakeholders (Mcallister & Hauville, 2017). Meaningful interactions with the content are also encouraged through concrete doing or producing activities facilitated by examples of scripts and guidelines included in the support materials targeted at the pilots' participants.

The evidence-based curricular, co-curricular, extracurricular, work and professional experiences can be uploaded in different formats to the ePortfolio, while text boxes below them facilitate their presentation and contextualisation. Also, evidence can be organised by themes, assignment, competence and achievements (e.g., badges) facilitating their classification into the students' educational journey (Lepore, 2016; Smith, 2018).

Through the ePortfolio, students engage in reflective practices to find evidence which demonstrate their acquisition or development of employability skills. This is closely linked to the articulation of said acquisition and development. The systematic implementation of a reflective component allows students to purposefully link experience and transversal skills and improve reflective thinking and communication skills. Evidence selection and reflective writing practices for their presentation also foster independent learning and encourage students to own and direct their learning (Hoekstra & Crocker, 2015; UNSW, n.d.).

Reflective practices, self-analysis and critiquing are enhanced by the ePortfolio's communication tools (multimedia messaging and private enquiry), formative feedback both in and beyond the institutional boundaries (Tang & Lam, 2014; UNSW, n.d.) and the option to display students' progress in skills development. Following the 'Tips for engagement' of Palmer et al. (2017), self-reflection and critique are also fostered by embedding the support materials within the ePortfolio assignment activities that teachers are required to create.

The use of reflective writing practices systematically supports students in the identification/articulation of their skills. The effective use of the ePortfolio increases students' progressive autonomy (White et al., 2015) while the 'Student Guide' and the 'Process Simulation' embedded within the assignment

activity (Palmer et al., 2017) contribute to learners' empowerment. Additionally, multimedia messaging and private enquiry features enable them to seek support and create independent support mechanisms.

The emphasis of the designed solution on employability as an alternative to a 'purely academic' focus is another key element aligned with ABL principles:

1. Competency-based assessments of learning outcomes (Hinton et al., 2017; Tammets & Laanpere, 2014; Gordon & Campbell, 2013) aim to make employability skills visible to potential employers or future customers.
2. Learning and achievements are made visible to employers (Smith, 2018) in the ePortfolio through micro-credentials, which reward students for their effort and hence stimulate their motivation (Mcallister & Hauville, 2017).
3. Students are required to articulate their skill acquisition and development in both a written reflective narrative and a video testimony. This task is a clear driver for students' written and oral communication skills.
4. Students/candidates also have the option to select and showcase the most appropriate skill evidence for an employer or job application (Afanasyeva, 2018; Smith, 2018), which encourages self-reflection on their professional persona and digital footprint.

Overall, the aim of these elements is to equip learners for the future, fostering changemaker attributes and developing relevant employability skills such as digital competence through ePortfolio use, oral and written communication, learning to learn skills and reflective thinking over time.

Figure 2 illustrates the process, supported by the ePortfolio, aimed at engaging students in making employability skills visible while progressively enhancing independent learning practices and digital fluency through meaningful interactions, knowledge construction, reflection and critique:

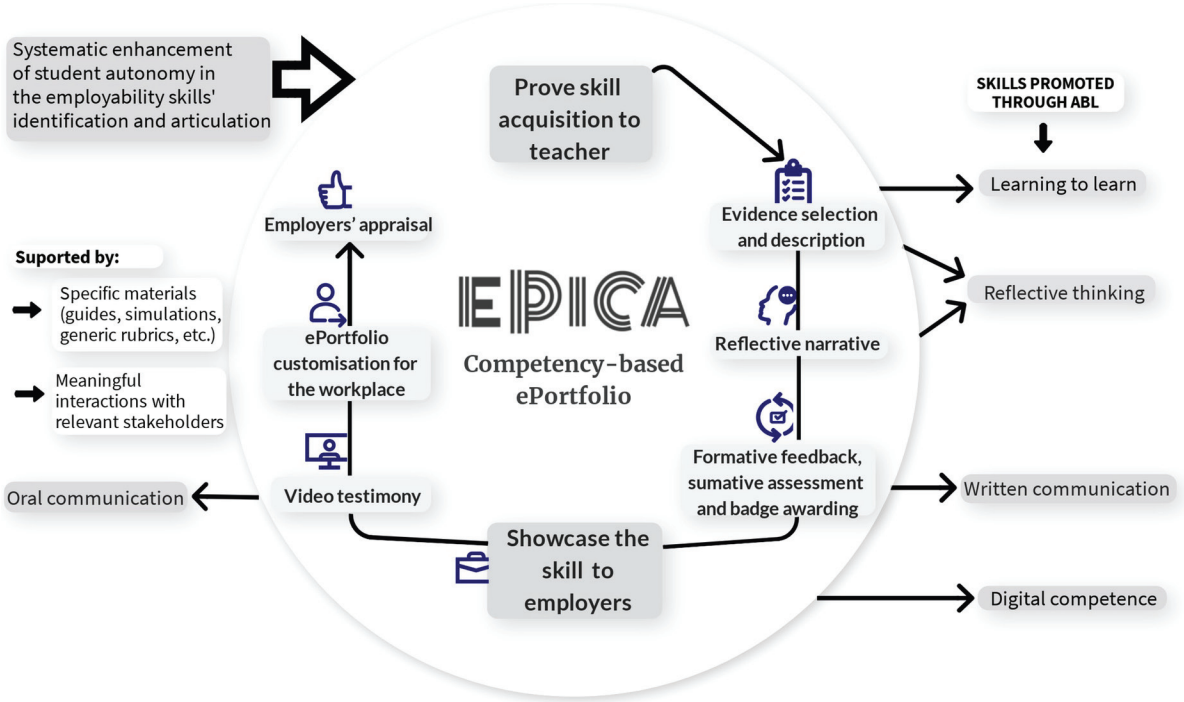
The larger pilot case studies in MU, MK, the OUT, and UOC took place during the 2020 academic year. The effectiveness and validity of the innovative model elaborated by the EPICA project were assessed during and after the pilot in order to provide future optimised guidelines for its local implementation.

CHALLENGES WITH THE IMPLEMENTATION OF THE ACTIVE BLENDED SOLUTION

The design process of the specific eAssessment pedagogical framework and methodology supported by the EPICA ePortfolio as a transition tool faced a number of challenges to its effective implementation at different levels. Solutions were provided to these challenges. The research and analysis carried out to collect data on the East-African context, both through the literature review (data source 1) and the involvement of local stakeholders (data sources 2, 3, 4 and 5) shed light on the educational and technological needs of the higher education institutions partaking in the pilots. This information confirmed the existence of deeper structural problems within the higher education system that could hinder the effective implementation of the proposed solution beyond the project.

Some of the issues affecting the piloting partner institutions were tackled during the project, while others were reported primarily for the benefit of policymakers, educational leaders and academics, beyond the scope of the project.

Figure 2. Process supported by the EPICA ePortfolio



Pedagogical and Technological Needs Addressed for the Implementation in the Piloting Institutions

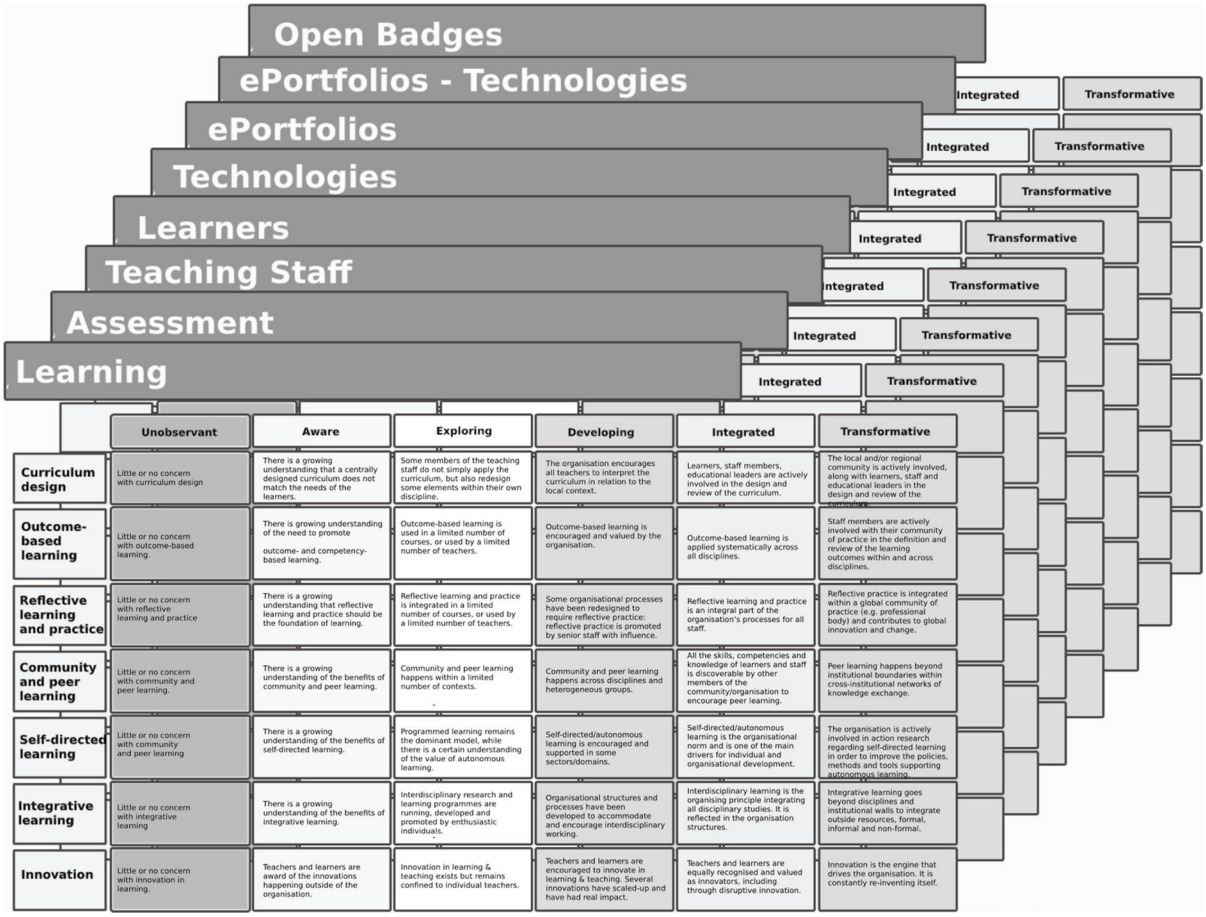
Institution's Maturity in the Adoption of the Competency-based ePortfolio

In order to detect the maturity of the three African piloting universities in relation to aspects crucial for the implementation and use of the active blended model and the new EPICA competency-based ePortfolio, a self-diagnostic tool (data source 4) based on the *ePortfolio & Open Badges Maturity Framework* conceptual model (Balaban et al., 2019) was used. The tool entails a set of rubrics targeted at institutions to investigate their practices, policies and needs in relation to the promotion of an integrated approach to ePortfolios (see Figure 3). It relies on four main components: learning and assessment practices, teaching staff and learners, technologies' exploitation, and ePortfolios & Open Badges exploitation. These components are divided into 8 sub-components and each of them into a set of indicators.

The results of its application revealed shortcomings in the level of maturity of the academic partner institutions in relation to the 'Learning and assessment practices' component. Specifically, the integration of reflective learning and practice, community and peer learning and innovation across the institutions, as well as the mechanism to seek and provide feedback, were underdeveloped.

A maturity divide between the African piloting universities was most notable in the components related to the human and technical readiness: teaching staff and learners and technologies. Specifically, maturity levels in the first component (teaching staff and learners) varied, indicating the need of one of the universities with a traditional background to improve the technoliteracy of the teaching staff, its en-

Figure 3. Sub-components used in the survey



	Unobservant	Aware	Exploring	Developing	Integrated	Transformative
Curriculum design	Little or no concern with curriculum design	There is a growing understanding that a centrally designed curriculum does not match the needs of the learners.	Some members of the teaching staff do not simply apply the curriculum, but also redesign some elements within their own discipline.	The organisation encourages all teachers to interpret the curriculum in relation to the local context.	Learners, staff members, educational leaders are actively involved in the design and review of the curriculum.	The local and/or regional community is actively involved, along with learners, staff and educational leaders in the design and review of the curriculum.
Outcome-based learning	Little or no concern with outcome-based learning.	There is growing understanding of the need to promote outcome- and competency-based learning.	Outcome-based learning is used in a limited number of courses, or used by a limited number of teachers.	Outcome-based learning is encouraged and valued by the organisation.	Outcome-based learning is applied systematically across all disciplines.	Staff members are actively involved with their community of practice in the definition and review of the learning outcomes within and across disciplines.
Reflective learning and practice	Little or no concern with reflective learning and practice	There is a growing understanding that reflective learning and practice should be the foundation of learning.	Reflective learning and practice is integrated in a limited number of courses, or used by a limited number of teachers.	Some organisational processes have been redesigned to require reflective practice: reflective practice is promoted by senior staff with influence.	Reflective learning and practice is an integral part of the organisation's processes for all staff.	Reflective practice is integrated within a global community of practice (e.g. professional body) and contributes to global innovation and change.
Community and peer learning	Little or no concern with community and peer learning.	There is a growing understanding of the benefits of community and peer learning.	Community and peer learning happens within a limited number of contexts.	Community and peer learning happens across disciplines and heterogeneous groups.	All the skills, competencies and knowledge of learners and staff is discoverable by other members of the community/organisation to encourage peer learning.	Peer learning happens beyond institutional boundaries within cross-institutional networks of knowledge exchange.
Self-directed learning	Little or no concern with community and peer learning	There is a growing understanding of the benefits of self-directed learning.	Programmed learning remains the dominant model, while there is a certain understanding of the value of autonomous learning.	Self-directed/autonomous learning is encouraged and supported in some sectors/domains.	Self-directed/autonomous learning is the organisational norm and is one of the main drivers for individual and organisational development.	The organisation is actively involved in action research regarding self-directed learning in order to improve the policies, methods and tools supporting autonomous learning.
Integrative learning	Little or no concern with integrative learning	There is a growing understanding of the benefits of integrative learning.	Interdisciplinary research and learning programmes are running, developed and promoted by enthusiastic individuals.	Organisational structures and processes have been developed to accommodate and encourage interdisciplinary working.	Interdisciplinary learning is the organising principle integrating all disciplinary studies. It is reflected in the organisation structures.	Integrative learning goes beyond disciplines and institutional walls to integrate outside resources, formal, informal and non-formal.
Innovation	Little or no concern with innovation in learning.	Teachers and learners are award of the innovations happening outside of the organisation.	Innovation in learning & teaching exists but remains confined to individual teachers.	Teachers and learners are encouraged to innovate in learning & teaching. Several innovations have scaled-up and have had real impact.	Teachers and learners are equally recognised and valued as innovators, including through disruptive innovation.	Innovation is the engine that drives the organisation. It is constantly re-inventing itself.

gagement in digital content creation, and the integration of teachers' continuing professional development practices. As for the second component (technologies), the use of digital technologies for innovation, copyright and licencing and digital learning environments required further advancements. Connectivity also stood out in all universities as an area for improvement. In reference to the level of maturity in the use of ePortfolio - Technologies and Open Badges, the three East-African universities seemed to be in an initial phase of transformation. While there were no distinct barriers to the implementation of ePortfolios, these institutions did not have the required mechanisms/strategies to support their development.

Although in the African partner institutions early signs of individual/pilot initiatives were noticed, there was evidence that educational practices, staff's requirements and technologies supporting the integration of ePortfolios and Open Badges were insufficient. Thus, the full exploitation of the proposed methodology and technology beyond the EPICA pilots would require improvements in the aforementioned components. Considering that the partner institutions involved in the pilot case studies were committed to driving cultural shifts toward innovation, new technological trends and student engagement, the take-up of the solution could be even more challenging to consolidate in many other universities of the East African region. This means that the lack of minimum requirements in the components included in the Framework could prevent many local institutions from undertaking a process of internal educational and

technological transformation, which is necessary for the implementation and usage of the competency-based ePortfolio.

Maturity of the Staff toward an Outcome- and Competence-Based Approach

In order to obtain an in-depth understanding of the teaching staff readiness in the selected universities, specific questions (data source 2) were presented to the teachers involved in the pre-pilot training in relation to 1) the teaching and assessment practices carried out in their courses, 2) their level of knowledge of competence-based education, 3) the perceived level of their digital literacy, 4) the exploitation of technologies in their classroom for educational purposes, and 5) the use of ePortfolios in their courses.

Results showed that the perceived level of personal digital competence was medium/high. Teachers felt comfortable using technology, and it did not represent a barrier to the implementation of the ePortfolio in their courses. The level of integration of the technology within the courses was also positive. Technology appeared to be implemented frequently in the local educational system. However, the perceived level of knowledge about competences was medium/low. Most teachers demonstrated a basic knowledge of competences and associated elements. Despite the positive results regarding the exploitation of technologies, the adoption of a pedagogical approach supporting their implementation and use was rare. Some teachers used a competency-based design and assessment approach occasionally, while others had never used it.

This gap required the design of specific actions to cover the staff's training needs and ensure the effective uptake of the solution. Also, given that the sample consisted of an academic group particularly open to educational innovation and new pedagogical trends (the participation in the project is an indicator), the effective implementation of the solution could be further hindered in other East-African academic institutions less inclined to use innovative approaches.

Learners' Digital Fluency and Connectivity

In addition to the shortcomings related to the use of active learning pedagogies, skill-based approaches and ePortfolios, a substantial ICT skills gap in students emerged during the scenario-based sessions designed to elicit requirements (data source 5). Thirteen students (N=66) expressed that they lacked basic digital skills to perform the test and properly set up the ePortfolio. The data are even more alarming due to the majority of those who expressed this opinion are women.

The perceived lack of digital competence among youths partaking in the pilots could be another barrier to the effective adoption of the ePortfolio. According to Palmer et al. (2017), a fluent, purposeful and thoughtful use of technologies for learning is needed to participate in Active Blended Learning activities. It is plausible that the absence of digital fluency and of a positive, experimental attitude towards technology for learning could put teachers and future graduates at a disadvantage. This constraint is compounded by the fact that in the East African region, the rising centrality of the digital world has also led to the emergence of new divides and to the widening of older gaps, in particular for girls, women and youths living in rural areas (ITU, 2017b).

To face this risk, many national curricula have incorporated digital skills and promoted them through practical programmes. However, the quality and effectiveness of this provision remain inconsistent (ITU, 2017b). For this purpose, in line with the Vision 2030, Kenya has developed *The Digital Economy Blueprint* (2019), a conceptual framework to improve Kenya's and Africa's economic growth and seize

the socio-economic opportunities brought by digital technologies. The blueprint identifies five pillars. Among them is the pillar 'Digital Skills and Values', which addresses literacy and know-how to use technologies in a participative and creative way.

Kenya, Tanzania and Uganda are also signatory to the United Nations' Sustainable Development Goals (SDGs) in which digital literacy is one of the monitoring indicators. The alignment of their education sector, and specifically of their curriculum, with these goals plays a major role in their achievement by 2030 (Kabita & Ji, 2017).

Private companies across Africa are also committed to accelerating digital inclusion. Mobile operators, for example, are trying to achieve this goal through the GSMA Connected Women Commitment Initiative. This initiative relies on the participation of four partners in Tanzania engaged in reducing the gender gap in mobile access and usage by 2020 (Okeleke, 2019). Likewise, since 2011 the International Telecommunication Union (ITU) is backing the organisation of the International Girls in ICT Day. This event is regularly celebrated in Tanzania thanks to a partnership between the Universal Communication Access Funds (UCSAF) and the organisation She Codes for Change.

These initiatives require public-private collaboration among different stakeholders (government, development organisations, private sector players, civil society organisations and the mobile industry) to overcome access and usage barriers to technology adoption and the exclusion from their socioeconomic benefits (Okeleke, 2019). The solution to the need to improve digital skills also calls for the collaboration of the government in the digitisation of relevant content and applications in local languages and the participation of development organisations and private investors in the improvement of digital literacy among users.

Connectivity problems could also hinder the exploitation of the ePortfolio. Thirty percent of 74 respondents considered poor internet connection as an additional factor preventing students from participating in the sessions within the time and modalities set by the protocol (data source 5). The October 2018 Regional Economic Outlook for sub-Saharan Africa (IMF, 2018) identifies connectivity as a key policy area to promote job creation and take advantage of technical changes. With this goal in mind, the region has been investing in ICT infrastructure, including most recently, internet and mobile-cellular signal coverage (Alper & Miktus, 2019). Nonetheless, the global digital divide and a substantial lag in connectivity, infrastructure, internet usage and knowledge are still considerable in the majority of sub-Saharan Africa. Ongoing efforts to make broadband access more affordable, accessible and universal through the reform of the policy and local frameworks also need to be accompanied by the development of digital skills and the availability of devices at the household level to fully exploit the technological advancement benefits.

Challenges in the Take-Up of the Solution beyond the Pilot Case Studies

Need for a Large-Scale Pedagogic Transformation

Concerns regarding the skills gap in the East-African context and the need of taking up skill-based curricula periodically reviewed on the basis of market requirements have to be addressed with a large-scale pedagogic transformation involving policies and local stakeholders. The literature review (data source 1) and the focus groups (data source 3) carried out in Kenya, Uganda and Tanzania revealed the need to undertake a modernisation of the educational system to address the current shortcomings as, for example, the growing demand of training described by several studies (Africa-America Institute, 2015; Elletson

& Burgess, 2015; WEF, 2017a). Facilities and equipment that could support graduates in developing the right skills are overloaded because of the high number of students. According to the participants in the focus groups, the massification of education has a negative impact on skills' development. The challenges in the adoption of new active skill-based education practices generated by overcrowded classrooms have also been highlighted by Aksit et al. (2016).

Another issue identified in the exploratory study is the focus of the educational system on applying exams and certifying qualifications rather than on developing skills. Since primary school, students are taught to be grade oriented. Their education is not based on skills but on the results achieved at the end of the course. This constraint reported by the literature (Bhorat et al., 2017; British Council, 2015; McCowan, 2015) was also mentioned in the focus groups. Stakeholders indicated that East-African students lack practical skills. Graduates acquire theoretical knowledge, which cannot be easily applied in professional practice. Programmes were described as too theoretical, while practical training was often considered absent. The need to enhance curriculum design was perceived and pointed out in several groups from the three countries. The lack of cooperation in designing educational programmes and learning activities was identified as the root cause of dysfunctionalities in the curriculum.

Stakeholders also emphasised the lack of standards in universities. The preparation for official exams is not centralised. It is thus difficult to establish if all universities are issuing certifications properly. Academics claimed that curriculum design is left to the teacher alone, without any further supervision about whether it meets international standards.

Poor Employability Focus

The scarcity of services and programmes connecting students and employers could negatively impact the uptake of the solution beyond the project. Stakeholders from the three East African countries claimed that academic institutions are lacking in alumni services, job boards, industry liaison and technology transfer offices. Whenever services that facilitate student-employer connections are available, they are often poorly organised. Few initiatives foster entrepreneurship, mobility and internationalisation.

Focus groups (data source 3) highlighted that industry associations do not work together with employers, HE institutions or training organisations. Participants claimed that curricula are not frequently reviewed. Other negative aspects mentioned were the lack of government support, the shortcoming of technology transfer and outdated teachers left alone in the task of updating their knowledge.

The main constraints hindering innovation in curriculums in East Africa are related to the unmet demand for training and internships, little involvement of relevant stakeholders, insufficient connections between students and employers, need for teacher professional development and curriculum update, and lack of international standards in curriculum design.

The employability focus promoted by the ePortfolio and the specific eAssessment methodology relies on some local initiatives already undertaken in East-Africa, whose strengthening may contribute to driving a transformation beyond the institutional boundaries. In the focus groups, some specific services and programmes facilitating student and employers' connections were mentioned. For instance, participants commented on the activity of the Tanzania Employment Services Agency (TaESA). In Uganda, the National Curriculum Development Centre (NCDC) is updating the curriculum involving stakeholders. Additional initiatives addressed to set strategic partnerships with public and private organisations include periodical events (e.g., ISWT - International Student Week in Tanzania), an employment portal (e.g., TAYOA Employment Portal) and the creation of a support service bureau.

During the focus groups, it was found that higher education institutions cooperate with other bodies, especially regulation authorities, to design educational programmes, curricula and learning activities. Kenya, for example, has already introduced competency-based curricula elaborated in collaboration with a new local body responsible for curriculum development. Tanzanian participants also claimed that some collaborations to co-design curricula are ongoing, following the requirement from the TCU (Tanzania Commission for Universities). Participants from Uganda and Kenya mentioned different initiatives and organisations that promote mobility and internationalisation. In Uganda, several groups referred to the IUSC (Inter Universities Student Council) and the activities carried out by the Ministries and foreign bodies. Tanzanian participants also claimed that some collaborations to co-design curricula are ongoing, following the requirement from the TCU (Tanzania Commission for Universities). They talked about the International Association for the Exchange of Students for Technical Experience (IASTE) and the IASTE-programme.

Alumni connection programmes and other government job services exist but are not very effective. An additional effort should be taken to make them more visible among their target audience. A group from Uganda revealed that the process of recruiting recent graduates is facilitated by private recruitment agencies instead of public services. These private agencies help graduates address their weaknesses before connecting them to the labour market. Stakeholders from Kenya stated that the university is still in the process of creating a database of students and graduates in order to inform them when job opportunities come up. However, the demand for internships exceeds the places available by far. The adoption of the University-Industry Linkage (UIL) approach was mentioned as a possible solution to foster a positive relationship between employers and academia. Part of this involves developing a special internship or work-study programs, as well as integrating job market requirements into the University curricula (Onyango et al., 2018).

Finally, a major problem to solve is the lack of research and data regarding the skill mismatch between labour market demands and graduates' skills (British Council, 2014; McCowan et al., 2016; WEF, 2017b). Without a clear picture of today's reality, it is difficult for policymakers to know where to invest or what policies would be most useful. Unfortunately, it is difficult to obtain reliable and timely data on the structure of employment and skills in sub-Saharan Africa (WEF, 2017b). There has been little sharing of best practices and successful initiatives across different contexts (British Council, 2014). Thus, it remains a substantial challenge to pinpoint which policies can lead to improvements.

SOLUTIONS AND RECOMMENDATIONS

The challenges with the implementation of the active blended pedagogical methodology and the competency-based ePortfolio in the East African higher education institutions require complex and long-lasting innovation processes to be undertaken within the academic institutions. Numerous changes need to be implemented, including the promotion of systemic curricular reforms for the digital age, the development of learner and learning-centred teaching approaches, the equipment of academic institutions, teachers and students with appropriate digital devices, and the investment in digital infrastructure to improve the connectivity.

The extensive information collected to date led to the identification of a set of solutions to overcome the challenges that may hinder the innovative pedagogical transformation required for the academic institutions to address the gap. These solutions include the following.

Engage Teachers in Training Programmes

A crucial step is the engagement of teachers in training programmes supporting the adoption of active pedagogies, educational technologies and ePortfolios. A*d hoc* training actions and materials can mitigate the difficulties of teaching staff and support them in their endeavours to implement an active blended approach. Strategies to achieve this may include engaging the staff in finding, selecting, reflecting on, and participating in training activities and development programmes that fit easily into their workload (Marshall, 2018). Self-paced online training delivered in modular format complies with this purpose by providing teachers with a flexible and personalised learning experience to complete in their own time and pace. The modular organisation also provides teachers with greater autonomy in the selection of the content and, in turn, a greater awareness of their strengths and weaknesses in relation to the implementation of the active blended approach supported by the ePortfolio.

Furthermore, the use of training models that incorporate technological and methodological innovations could help teachers both to improve their ICT usage level and to practice how to integrate them into the educational context in an innovative way.

Enhance Digital Fluency

The effective use of ePortfolios and the far-reaching access to learning resources and professional opportunities for students is also linked to digital fluency. According to the results, there is a growing perception of the importance of digital skills to empower people, create new learning and employment opportunities, promote social inclusion and reduce the gender gap.

The development of ICT-related training programmes, retooling of advanced digital skills trainers, internship and apprenticeship programmes in advanced digital skills, mentorship opportunities and the systematic use of online training resources are some of the key strategies that should be implemented by African governments to enhance digital fluency and stakeholders' engagement as claimed in the Digital Economy Blueprint (2019).

Foster Multi-Stakeholder Cooperation

Innovation in academic institutions requires the formulation and implementation of policies and plans for change driven by different stakeholders. A holistic approach encompassing policy implementation, funding and diverse and well-managed partnerships is crucial to unlock the potential of education and address the skills gap.

The EPICA project's commitment to involving higher education institutions and employers in a partnership of dialogue appears to be an adequate strategy for establishing a successful starting point. However, such a strategy should be systematically supported by policies and plans in order to foster closer and regular contacts between learners and employers. The positive relationship between apprenticeship and employment status may encourage universities to establish a closer collaboration with local governments to incentivise each programme to have an internship.

Research projects for industry clients, student-led entrepreneurial activities, placements and work-based learning are also an opportunity to align students' skills and those required by the economic sector. Equally, the enhancement of online access to job vacancies, networking events, mentoring services,

mobility and internationalisation programmes contribute to reducing the mismatch between demand and supply.

Strategic partnerships supported by specific funding are also key to modernise the infrastructure and provide open, affordable and secure broadband connectivity enhancing the acceleration of the progress in the educational sector and the effective implementation of active and blended pedagogical methodologies and competency-based ePortfolios.

Support Skill-Based Curricula and Keep Them Updated

The modernisation of teaching methods through specific policies and multi-stakeholder partnerships goes hand in hand with the progressive adoption of skill-based curricula which, in addition to tracking and recording learners' competencies, aims to speed up the recruitment process, while saving costs and time.

Higher education institutions' departments should also review and update their curricula every two or three years to ensure that the content reflects the requirements of the market. Regular market assessments would allow universities to identify the demands and design their educational curricula focusing on employer expectations. The co-design of programmes and curricula in cooperation with other bodies, especially regulation authorities, is strongly recommended. Universities should also act as agents of social change and lead a critical debate on how to address the market requirements rather than passively transfer them into job-related curricula.

Furthermore, skills-based curricula could be enhanced by the systematic integration of ePortfolios allowing digital micro-credentials to respond to the increasing dissatisfaction of employers with qualifications (Nikusekela & Pallangyo, 2016). The increasing demand for specific certifications that are not typically included in higher institutions' curricula could be addressed by fostering the progressive integration of badges pinpointing where skills and competences have been demonstrated. Considering that one of the main reasons for the gap, according to the local stakeholders, is the focus of higher education institutions on exams, grades and results rather than on developing the necessary skills to be competitive in the labour market, the integration of a micro-credentialing system representing the learning beyond qualifications could be advantageous.

Support Public Education to Reduce the Divide

An additional recommendation for policymakers is to continue to financially support public education, including higher education, to achieve greater inclusion of the society while ensuring education relevant to the labour market. Overall, governments have failed to provide sufficient resources for the desired expansion, which has forced universities to engage in commercial behaviours, which is considered particularly dangerous as it limits the access to education to a privileged minority.

FUTURE RESEARCH DIRECTIONS

A future research direction relates to the need of capturing relevant skills for employment and entrepreneurship in the East African region. The proposed solution was designed to showcase relevant skills to prospective employers/clients and to facilitate the recruitment process. However, the alignment of the

skills included in the curriculum with the requirements of both the society and the local economy is a matter that still needs to be addressed.

Both generic and discipline-specific skill sets, therefore, shall be further defined based on the skill needs detected in the professional sphere. Periodic analysis and forecasts enabling policy and decision-makers to better capture trends and drivers in skill demand and supply are crucial. These regular analyses will also inform people about the core skills and qualifications needed to find employment and help them make meaningful choices about their learning and work opportunities.

Routes for skill acquisition, whether through academic, co-curricular or extracurricular activities, could be further investigated at the local and global level to provide concrete suggestions to future graduates and, thus, improve their awareness on possible skills development opportunities, be it in academia or elsewhere.

Another potential research direction is the optimisation of the specific methodology and competency-based ePortfolio on the basis of employers' needs. It remains crucial to investigate the usefulness, advantages and disadvantages of its use for gauging the knowledge and skills of people applying for a job.

Finally, future research should focus on the opportunity for the East African educational system to address cultural, geographical, demographical, and economical gaps by delivering the proposed active and blended solution as a mobile application. The exploratory study showed that m-learning is a prominent field in East Africa and that mobile phones are a key technology for providing educational opportunities in marginalised communities. This option, besides addressing some of the connectivity issues reported by the end-users, opens new research scenarios on the adaptation of the main features of the competency-based ePortfolio and the active blended methodology.

CONCLUSION

As revealed by the exploratory study, a considerable mismatch between the skills of young workers and those that employers need in the emerging East African economy is having dramatic consequences on the youth unemployment rate. This chapter presented a solution, co-designed under the EPICA project, based on an in-depth dialogue with local stakeholders, the review of relevant sources and a procedure to capture requirements involving academic partners and local employers. This solution, aimed at improving the quality, relevance, development and visibility of employability skills, embraces ABL principles. It consists of an eAssessment pedagogical framework and methodology supported by a competency-based ePortfolio as a transition tool to address the identified gap.

In the first part of the chapter, the main pedagogical, technological and employability features of the proposed solution are examined and detailed. Particular attention is drawn to the components enhancing the active blended pedagogical approach as the showcase of the students' relevant skills through the ePortfolio, end-users' engagement in feedback and meaningful learner-centred interactions, (self-) reflection and self-regulation practices, the integration of evidence-based curricular, co-curricular, extracurricular, work and professional experiences, and the systematic enhancement of skills relevant for employability purposes.

The second part of the chapter focused on the challenges that emerged in the co-design and implementation of the solution. These entailed mainly the preparation of local institutions to fully exploit the benefits of ePortfolios and the proposed blended method, and the engagement of employers and policymakers in the endeavour to mitigate the traditional separation between the academic and professional spheres.

The findings of this study point to the importance of adopting innovative approaches on teaching and learning, reaching youth in and out of traditional educational settings, and involving different stakeholders to improve the current situation with the skill mismatch. The emphasis on these aspects may enable East Africa to gradually take advantage of the growing working-age population and the increased rates of enrolments in higher education institutions, instead of perceiving this trend as an employability issue. Given the lack of funding in the area, the progressive exploitation of educational technologies, especially through mobile devices, supported by online and blended strategies, provides an affordable alternative way to address the issues encountered.

Finally, the focus shift of education systems from rote academic learning to teaching and learning environments fostering the full range of skills needed in the current and future job market requires the participation of both direct (e.g., higher education and policymakers) and indirect (e.g., local and international companies) actors. Stakeholders should work together to align learning outcomes with skills demanded by the labour market and provide students and graduates with opportunities to gain work experience.

The larger pilot case studies undertaken by the partner universities in Kenya, Uganda, and Tanzania, coordinated and tested at the UOC throughout the 2020 academic year, determined the effectiveness and validity of the innovative model elaborated under EPICA and provided future optimised guidelines for its local implementation. However, in order to remove the barriers described in this chapter, future research and data collection on higher education programmes, curricula, learning outcomes, student enrolment, and current and future job market needs are required.

ACKNOWLEDGMENT

This research was co-funded by the European Commission's Horizon 2020 Research and Innovation Programme [grant number 780435].

REFERENCES

Afanasyeva, O. (2018). *Key elements of a successful digital career portfolio for building a strong personal image in the competitive labor market* [Bachelor's thesis, JAMK University of Applied Sciences]. https://www.theseus.fi/bitstream/handle/10024/151105/Afanasyeva_Olga.pdf?sequence=1

Africa-America Institute. (2015). *State of education in Africa report, 2015: A report card on the progress, opportunities and challenges confronting the African education sector*. Africa-America Institute. https://greatsocieties.com/AAI-2015.pdf

African Development Bank. (2019). *African Economic Outlook 2019*. Abidjan, Côte d'Ivoire: African Development Bank. https://www.afdb.org/fileadmin/uploads/afdb/Documents/Publications/2019AEO/AEO_2019-EN.pdf

African Union Commission. (2015). *Agenda 2063: The Africa We Want*. https://au.int/sites/default/files/documents/36204-doc-agenda2063_popular_version_en.pdf

Allen, D., & Tanner, K. (2005). Infusing Active Learning into the Large-enrollment Biology Class: Seven Strategies, from the Simple to Complex. *Cell Biology Education*, *4*(4), 262–268. doi:10.1187/cbe.05-08-0113 PMID:16344858

AlperC. E.MiktusM. (2019, November 1). *Bridging the Mobile Digital Divide in Sub-Saharan Africa: Costing under Demographic Change and Urbanization*. https://ssrn.com/abstract=3523121 doi:10.5089/9781513519197.001

Balaban, I., Ravet, S., & Sobodić, A. (2019). EPortfolio Maturity Framework. *The Challenges of the Digital Transformation in Education*, 473–484. doi:10.1007/978-3-030-11935-5_45

Bhorat, H., Naidoo, K., & Ewinyu, A. (2017). The tipping point: The youth bulge and the sub-Saharan African labor market. In *Increasing Employment Opportunities: Navigating Africa's complex job market*. Brookings Institute.

Bonwell, C. C., & Eison, J. A. (1991). Active Learning; Creating Excitement in the Classroom. ASHE-ERIC Higher Education Report No. 1. The George Washington University, School of Education and Human Development.

Brindley, J., Blaschke, L. M., & Walti, C. (2009). Creating Effective Collaborative Learning Groups in an Online Environment. *The International Review of Research in Open and Distributed Learning*, *10*(3). Advance online publication. doi:10.19173/irrodl.v10i3.675

British Council. (2014). *Can Higher Education solve Africa's job crisis? Understanding graduate employability in Sub-Saharan Africa. Going Global 2014.* British Council. https://www.britishcouncil.org/sites/default/files/graduate_employability_in_ssa_final-web.pdf

British Council. (2015). *Student Perceptions of Employability and Inclusive Development: South Africa.* British Council. https://www.britishcouncil.org/sites/default/files/2.5_student-perceptions-of-employability-inclusivity.pdf

Cattaneo, K. H. (2017). Telling Active Learning Pedagogies Apart: From theory to practice. *Journal of New Approaches in Educational Research*, *6*(2), 144–152. doi:10.7821/naer.2017.7.237

Cummings, C., Mason, D., Shelton, K., & Baur, K. (2017). Active Learning Strategies for Online and Blended Learning Environments. *Flipped Instruction*, 88–114. doi:10.4018/978-1-5225-1803-7.ch006

Digital Economy Blueprint. Powering Kenya's Transformation. (2019). https://www.ict.go.ke/wp-content/uploads/2019/05/Kenya-Digital-Economy-2019.pdf

European Commission. (2016). *A New Skills Agenda for Europe*. https://ec.europa.eu/transparency/regdoc/rep/1/2016/EN/1-2016-381-EN-F1-1.PDF

Gordon, J. A., & Campbell, C. M. (2013). The role of ePortfolios in supporting continuing professional development in practice. *Medical Teacher*, *35*(4), 287–294. doi:10.3109/0142159X.2013.773395 PMID:23590423

Guàrdia, L., & Maina, M. (2018). *FUTURA - Next generation pedagogy. IDEAS for Online and Blended Higher Education.* EADTU Envisioning Report 2. http://empower.eadtu.eu/images/report/The_Envisioning_Report_for_Empowering_Universities_2nd_edition_2018.pdf

Hinton, C., Towell, J., MacFarlane, A., Refling, E., McCloy, U., & Amesbury, J. (2017). *Student success ePortfolio: Student, faculty and employer perspectives on the value of ePortfolios in assessing the development of essential employability skills*. Higher Education Quality Council of Ontario. http://www.heqco.ca/SiteCollectionDocuments/Formatted_LOAC_Durham_REVISED_SEPT9.pdf

Hoekstra, A., & Crocker, J. R. (2015). Design, implementation, and evaluation of an ePortfolio approach to support faculty development in vocational education. *Studies in Educational Evaluation*, *46*, 61–73. doi:10.1016/j.stueduc.2015.03.007

Institute of Learning & Teaching in Higher Education. (n.d.). *Active Blended Learning*. https://www.northampton.ac.uk/ilt/current-projects/defining-abl/

International Monetary Fund (IMF). (2018). *Regional economic outlook. Sub-Saharan Africa: capital flows and the future of work*. International Monetary Fund.

International Telecommunication Union. (2017). *Measuring the Information Society Report 2017*. International Telecommunication Union. https://www.itu.int/en/ITU-D/Statistics/Documents/facts/ICTFacts-Figures2017.pdf

Kabita, N. D., & Ji, L. (2017). *The why, what and how of competency-based curriculum reforms: the Kenyan experience* (Vol. 11). IBE-UNESCO. https://unesdoc.unesco.org/images/0025/002504/250431e.pdf

Khan, A., Egbue, O., Palkie, B., Madden, J. (2017). Active Learning: Engaging Students to Maximize Learning in an Online Course. *The Electronic Journal of e-Learning*, *15*(2), 107-115.

Lepore, M. (2016). *The 7 Elements of a Great Portfolio Website*. https://skillcrush.com/2014/05/06/essentials-great-web-portfolio /

Marshall, S. J. (2018). Student time choices and success. *Higher Education Research & Development*, *37*(6), 1216–1230. doi:10.1080/07294360.2018.1462304

Martin, R. L., Krause, R., Namutuwa, M. T., Mahler, E., & Domröse, H. (2017). Education for employability: A response to industry demands. In T. Halvorsen, H. Ibsen, H.-C. Evans, & S. Penderis (Eds.), *Knowledge for Justice: Critical Perspectives from Southern African-Nordic Research Partnerships* (pp. 175–185). African Minds.

McAllister, L., & Hauville, K. (2016). Striving for Sustainability: ePortfolio Pedagogy in Australian Higher Education. *ePortfolios in Australian Universities*, 13–32. doi:10.1007/978-981-10-1732-2_2

McCowan, T. (2015). *Students in the driving seat: young people's voices on higher education in Africa*. British Council. https://www.britishcouncil.org/sites/default/files/2.5_students-in-the-driving-seat_report_overview.pdf

McCowan, T., Walker, M., Fongwa, S., Oanda, I., Sifuna, D., Adedeji, S. O., Oyebade, S., Ananga, E. D., Adzahlie-Mensah, V., & Tamanja, E. (2016). *Universities, employability and inclusive development: Repositioning Higher Education in Ghana, Kenya, Nigeria and South Africa*. British Council. https://www.ict.go.ke/wp-content/uploads/2019/05/Kenya-Digital-Economy-2019.pdf

Namuddu, K., Jain, N., & Adamson, B. (2017). Systemic curricular change. In S. Jayaram, W. Munge, B. Adamson, D. Sorrell, & N. Jain (Eds.), *Bridging the skills gap: Innovations in Africa and Asia* (pp. 55–75). Springer. doi:10.1007/978-3-319-49485-2_4

Nikusekela, N., & Pallangyo, E. (2016). Analysis of supply side factors influencing employability of fresh higher learning graduates in Tanzania. *Global Journal of Human-Social Science Research*, *16*(1), 20–27.

Okeleke, K. (2019). *Digital transformation in Tanzania: The role of mobile technology and impact on development goals*. GSMA.

Oluwatobi, A., Ayedun, C., Ajibola, O., Iroham, O., & Akinjare, O. (2017). Employers perspective of the employability skills-gap in real estate education in Nigeria. *EDULEARN17 Proceedings*. 10.21125/edulearn.2017.2319

Onyango, C. M., Kunyanga, C. N., Karanja, D. N., & Wahome, R. G. (2018). Employer perceptions and attitudes towards agricultural university training in Kenya. *International Journal for Innovation Education and Research*, *6*(1), 175–185. doi:10.31686/ijier.vol6.iss1.932

Ornellas, A., Falkner, K., & Edman Stålbrandt, E. (2019). Enhancing graduates' employability skills through authentic learning approaches. *Higher Education. Skills and Work-Based Learning*, *9*(1), 107–120. doi:10.1108/HESWBL-04-2018-0049

Palmer, E., Lomer, S., & Bashliyska, I. (2017). *Overcoming barriers to student engagement with Active Blended Learning: Interim report.* University of Northampton. https://www.research.manchester.ac.uk/portal/files/55968517/ABL_Interim_Report.pdf

Sánchez Puerta, M. L., Johansson de Silva, S., & Rizvi, A. (2018). *Kenya: Capturing Skills Requirements and Assessing Skills Gaps in the Modern Economy* (Working Paper No. 17). World Bank. https://openknowledge.worldbank.org/handle/10986/30169

Smith, D. (2018). Evidencing your lifelong learning with e-Portfolio. *The Biochemist*, *40*(5), 22–24. doi:10.1042/BIO04005022

Streveler, R. A., & Menekse, M. (2017). Taking a Closer Look at Active Learning. *Journal of Engineering Education*, *106*(2), 186–190. doi:10.1002/jee.20160

Tammets, K., & Laanpere, M. (2014). The Potential of e-portfolio in Transition from Estonian Higher Education to Working Life. *Advances in Web-Based Learning – ICWL 2014*, 77–86. doi:10.1007/978-3-319-09635-3_8

Tang, E., & Lam, C. (2014). Building an effective online learning community (OLC) in blog-based teaching portfolios. *The Internet and Higher Education*, *20*, 79–85. doi:10.1016/j.iheduc.2012.12.002

University of Michigan Center for Research on Learning and Teaching. (n.d.). *Active learning*. www.crlt.umich.edu/tstrategies/tsal

UNSW. (n.d.). *Assessing with ePortfolios*. https://teaching.unsw.edu.au/assessing-eportfolios

Vonderwell, S., & Turner, S. (2005). Active Learning and Preservice Teachers' Experiences in an Online Course: A Case Study. *Journal of Technology and Teacher Education*, *13*(1), 65–84. https://www.learntechlib.org/primary/p/18892/

White, S., Hepple, E., Tangen, D., Comelli, M., Alwi, A., & Abu Hassan Shaari, Z. (2015). An introduction to education research methods: Exploring the learning journey of pre-service teachers in a transnational programme. *Asia-Pacific Journal of Teacher Education*, *44*(1), 35–48. doi:10.1080/1359866X.2015.1021294

World Economic Forum. (2017a). *The Africa Competitiveness Report 2017*. World Economic Forum. http://www3.weforum.org/docs/WEF_ACR_2017.pdf

World Economic Forum. (2017b). *The future of jobs and skills in Africa: preparing the region for the Fourth Industrial Revolution*. World Economic Forum. http://www3.weforum.org/docs/WEF_EGW_FOJ_Africa.pdf

World Economic Forum. (2019). *Strategies for the new economy: skills as the currency of the labour market*. World Economic Forum. http://www3.weforum.org/docs/WEF_2019_Strategies_for_the_New_Economy_Skills.pdf

Younis, Z. (2020). Multiple tools for innovative interdependent learning techniques in higher education to foster employability skills. *Sustainable Development and Social Responsibility*, *2*, 133–141. doi:10.1007/978-3-030-32902-0_17

ADDITIONAL READING

Allan, C. N., Campbell, C., & Crough, J. (2019). *Blended learning designs in STEM higher education: putting learning first*. Springer. doi:10.1007/978-981-13-6982-7

Assan, J., & Nalutaaya, V. (2018). Africa's Youth Unemployment Challenge and the Pursuit of Soft Skills Development by University Students. *Review of European Studies*, *10*(3), 58. doi:10.5539/res.v10n3p58

Blackmore, P., Bulaitis, Z. H., Jackman, A. H., & Tan, E. (2016). *Employability in higher education: A review of practice and strategies around the world*. Pearson. https://www.pearson.com/content/dam/one-dot-com/one-dot-com/uk/documents/about/news-and-policy/employability-models-synthesis.pdf

Cedefop, E. T. F. UNESCO & UIL. (2019). *Global inventory of regional and national qualifications frameworks 2019*. https://www.cedefop.europa.eu/files/2224_en_0.pdf

Dziuban, C., Graham, C. R., Moskal, P. D., Norberg, A., & Sicilia, N. (2018). Blended learning: The new normal and emerging technologies. *International Journal of Educational Technology in Higher Education*, *15*(1), 3. Advance online publication. doi:10.118641239-017-0087-5

Ferrell, G., & Gray, L. (2016). *Enhancing student employability through technology-supported assessment and feedback*. https://www.jisc.ac.uk/guides/enhancing-student-employability-through-technology-supported-assessment-and-feedback

Hinton, C., Towell, J., Macfarlane, A., Refling, E., Mccloy, U., & Amesbury, J. (n.d.). *Student Success ePortfolio: Student, Faculty and Employer Perspectives on the Value of ePortfolios in Assessing the Development of Essential Employability Skills*. http://www.heqco.ca/SiteCollectionDocuments/Formatted_LOAC_Durham_REVISED_SEPT9.pdf

Keengwe, J. (2019). *Handbook of research on blended learning pedagogies and professional development in higher education*. Information Science Reference, An Imprint of IGI Global. doi:10.4018/978-1-5225-5557-5

Lewis, L. (2017). ePortfolio as pedagogy: Threshold concepts for curriculum design. *E-Learning and Digital Media*, *14*(1–2), 72–85. doi:10.1177/2042753017694497

Ring, G., Waugaman, C., & Brackett, B. (2017). *The Value of Career ePortfolios on Job Applicant Performance: Using Data to Determine Effectiveness. 7*(2), 225–236. http://theijep.com/pdf/IJEP259.pdf

Tomar Mishra, P., Mishra, A., & Singh Chowhan, S. (2019). Role of higher education in bridging the skill gap. *Universal Journal of Management*, *7*(4), 134–139. doi:10.13189/ujm.2019.070402

KEY TERMS AND DEFINITIONS

Competency-Based ePortfolio: ePortfolio equipped with *ad hoc* features to make the students' competences visible and connect them with the learning achievements.

eAssessment: Assessment methods and practices that rely on the use of information technology for the presentation of the assessment activity and the measurement of the students' learning.

Employability Skills: Transferable skills needed by graduates to make them employable.

Evidence: Proof of the student's achievement of the learning outcome/s.

Micro-Credentialing: Process for earning micro-credentials (e.g., mini-degrees or certifications) in a specific topic area.

Open Badges: Verifiable, portable, visual records embedding metadata about skills and achievements.

Skills Gap: The mismatch between the skills in demand by employers in the labour market and those the workforce possesses.

Sub-Saharan Africa: The geographic area of Africa located south of the Sahara.