

4.1 Final publishable summary report

The publishable summary includes **5 distinct parts** described below:

- An executive summary.
- A summary description of project context and objectives.
- A description of the main S&T results/foregrounds,
- The potential impact (including the socio-economic impact and the wider societal implications of the project so far) and the main dissemination activities and exploitation of results.
- The address of the project public website, as well as relevant contact details.

EXECUTIVE SUMMARY

Over the last three years, a consortium of African and European partners has carried out the AFRICA BUILD project, with support from the European Commission. Whereas challenges related to health in Africa are well known, the recent Ebola virus outbreak has recently created a dramatic perception of such a situation, reinforcing needs of providing support to improve healthcare and research in various African regions. In this context, the original objectives of AFRICA BUILD were related to: 1) analyse the state of the art in health research and education; 2) develop an open and collaborative infrastructure —i.e., the AFRICA BUILD Portal (ABP)— for education, training and knowledge sharing for health researchers in English-, French- and Arabic-speaking African countries; 3) develop and offer a large number of e-learning courses, as well as a plan for capacity building; 4) facilitate researchers' mobility and participation in local and international meetings; 5) to validate the AB impact in pilot educational initiatives, in areas such as reproductive health and HIV/AIDS research, and 6) to disseminate outcomes in scientific conferences, journals and media.

AFRICA BUILD was designed and launched in the context of the recent explosion of the social networks —the Web 2.0. In such a context, the consortium has managed to create the ABP. Based on innovative open source software and technologies, this large professional Portal includes plugins and widgets developed with the participation of the African partners themselves and gathered into the AB Community of Developers. One of the fundamental long-term goals of AB was to create the capacities and develop the necessary skills —scientific, organizational and informatics— in the African partners to allow them to launch and lead their own educational and research South-South initiatives. Through the ABP, the consortium launched two pilots related to HIV/AIDS and reproductive health. Whereas computer facilities can be scarce in many African areas, state-of-the-art mobile phones are widely available. Thus, we developed a mobile version of the ABP, optimized for low bandwidth Internet connections.

To provide feedback and expand the dissemination of the project, AB created a panel of experts, all of them leading professionals from Africa, Europe and the United States. Panelists provided their expertise in health issues and capacity building and also participated in the various conferences and workshops organized by the consortium. These international meetings were held in Eldoret (Kenya), Yaounde (Cameroon) and Luxembourg. By way of an example, the Yaounde AB conference was a milestone in the dissemination activities of the project, gathering a large number of participants from various continents, including the active participation of two Cameroon ministers.

In addition, we designed the AB roadmap to describe current initiatives in Africa, lessons learned, recommendations, and a future agenda for effectively adopting eHealth and health research in health care, education and research in Africa. Finally, the consortium agreed to continue the AB efforts beyond the timetable of the project, and expand this initiative with future collaborative actions between the partners and other external stakeholders.

PROJECT CONTEXT AND OBJECTIVES

There are still many challenges related to healthcare in Africa. The recent Ebola virus outbreak have recently created a dramatic perception of the health context in various African regions. To address



Figure 1 - A physician at his office in Burundi

such a situation, several actions must be undertaken to ensure that the continent is not left behind in achieving the Millennium Development Goals.

Regarding health care, a fundamental issue for improvement is that health researchers and professionals need access to continuing education

to improve the quality, efficiency and accessibility of their daily work. These people should be able to obtain such knowledge by learning from their peers, and having the possibility to share their knowledge. However, the lack of resources, educators, training programs and facilities hamper such needs and their solutions. In this sense, Web 2.0 technologies can facilitate distance learning and the establishment of virtual communities of researchers and health workers, providing the needed information and resources to improve current health systems.

Not only Web2.0 tools but also other resources for learning and research have been produced in the Western countries during the last years. These materials could be useful to improve education and research in developing environments such as in some African locations. To ensure efficacy, these knowledge and resources must be firstly properly adapted to the African needs and requirements—e.g. the unaffordable cost of many software licenses, the low quality of current Internet connections at many places, the lack of technical staff in many African institutions, the lack of researchers or the lack of tools designed by and for Africans are just some of the priority difficulties.

To improve access to learning materials, massive open online courses (MOOCs) have opened a new way to facilitate access to higher education through the Internet. African universities and other research institutions can use these resources through certain approaches and, once again, adapting the content and technology to their own needs.

In this context, the AFRICA BUILD project addresses a fundamental issue in the African context: how to create and develop methods and capacities in the involved regions for improving healthcare issues and how to provide access and adapt existing online resources to the African needs—by means of information technologies.

Through AFRICA BUILD, we aimed to build the needed infrastructures and networking to increase learning, research and collaborative activities among biomedical researchers in Africa. Our approach intended to learn which are and how to use the tools, processes and methodologies required to promote the abovementioned areas by making use of Information Technologies, know-how, e-learning and knowledge sharing. Thus, the main objective of the project was divided into several sub-objectives, as listed below.

1. To analyse the state of the art in health research and education in Africa to develop a Roadmap for future European actions. As a starting point of the project, it was intended to obtain a detailed information of different activities in health research and IT-enabling tools in the African continent. In this regard, the main objectives were: (i) to identify the main challenges and actors for future actions, (ii) to detect possibilities for exchanges of methods, tools and support from EC groups, and (iii) to provide this information to some workpackages of the project to assess training needs, considering both types and contents of courses as well as technological aspects and requirements.
2. To implement an IT-enabled, open and collaborative infrastructure for education, training and knowledge sharing for health researchers in English-, French- and Arabic-speaking African countries, developing virtual communities of practice. In this regard, the portal would integrate social and semantic techniques for supporting collaborative links around several open-source informatics tools. These tools would be adapted, as far as possible, from tools already developed by the Consortium. New virtual communities would be created as users of this portal.
3. To develop and offer a large number of e-learning courses, as well as to validate learning resources, methodologies and supporting evidence for improving the education capacities of health-focused centres of excellence in Africa. A plan for capacity building was to be developed for health research. In addition our plans were to develop training material that

could be stored in the collaborative platform, and to organize online and onsite training activities.

4. To facilitate researchers' mobility and participation in local and international meetings. Also to establish the mobility section of the Brokerage Service, facilitating a Web-based server where offers and demands for exchanges would be available for professionals.
5. To validate the AFRICA BUILD impact in pilot research and education initiatives related to reproductive health and HIV/AIDS research.
6. To disseminate outcomes in scientific conferences and journals, media and workshops and conferences in Africa. In addition, we planned to organize three International events to gather experts, professionals, students and people interested in the areas directly related to AFRICA BUILD.

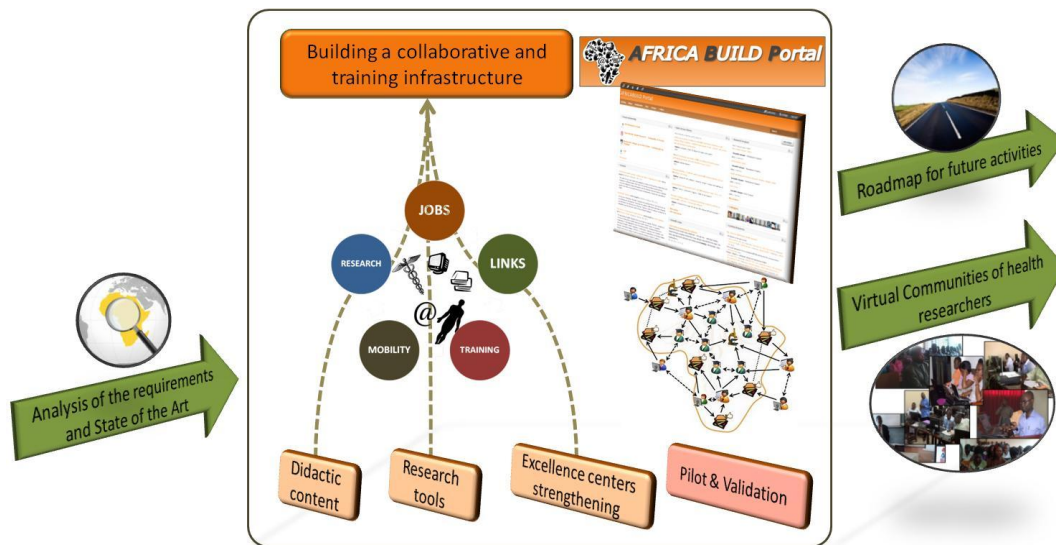


Figure 2 - Project objectives

To achieve these objectives, AFRICA BUILD was structured into several workpackages, with a particular focus on the design and development of the technical solution depicts the interactions between work packages.

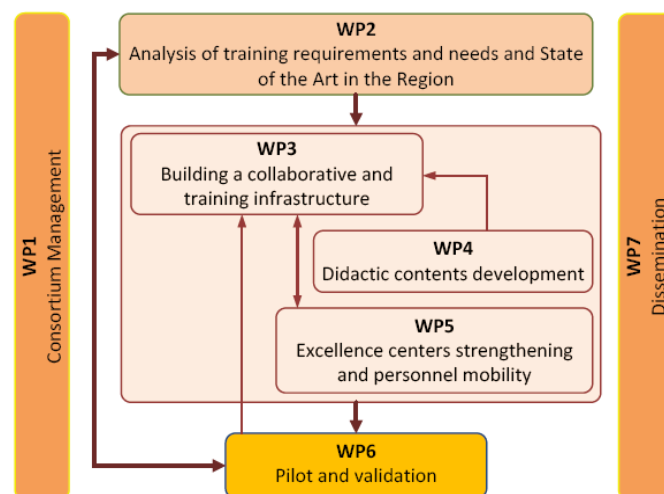


Figure 3 - Interactions between project work packages (Deliverable 1.1 - Quality Assurance Report)

MAIN RESULTS

As the previous figure shows, we divided our efforts in seven different workpackages (WPs). From WP2 —coordinated by the Ministry of Communications & Information Technology (Egypt)—, we analysed the specific training and research needs of the African partners and also their technical and human capabilities. The WP4 —coordinated by the University of Geneva, Switzerland— developed the plan for capacity building and the didactic material as courses included in the technical solution. The WP5 —led by the University of Bamako, Mali— fostered mobility between EU-Africa and Africa-Africa. Results of WP2, WP4 and WP5 fed into WP3 —led by the Universidad Politecnica de Madrid, Spain —, which developed the AFRICA BUILD Portal (ABP). The ABP greatly extends the basic functionalities of ELGG —a free and open source framework to create social networks— and Moodle —a free and open Learning Content Management System—, into a large professional Portal, including some plugins and widgets developed by the AFRICA BUILD Community of Developers.

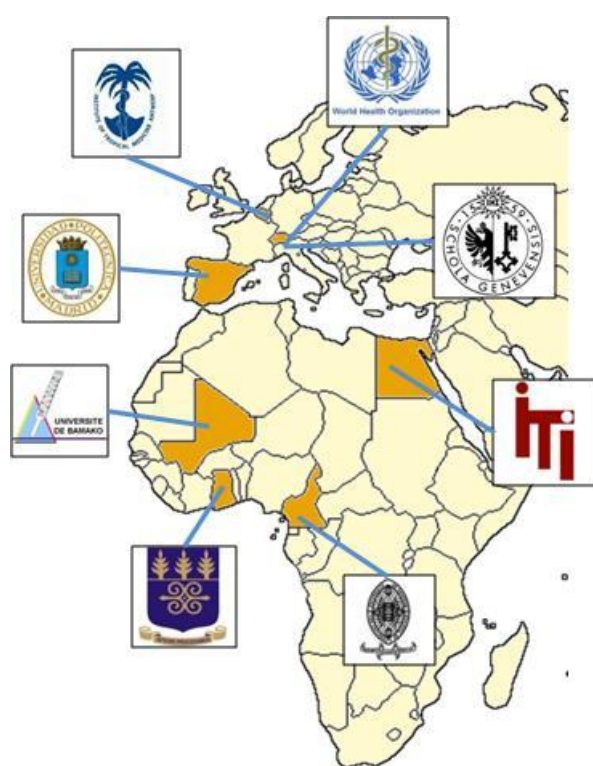


Figure 4 - AFRICA BUILD partners

WP1 provided the procedures and mechanisms for internal coordination, technical/scientific management and quality assurance. WP6 —coordinated by the Institute of Tropical Medicine, Belgium— validated the AFRICA BUILD approach in the topics of HIV/AIDS and Reproductive Health Research. The results of the project were disseminated through several channels within WP7, led by the World Health Organization.



Figure 5 - International Panel of Experts of AFRICA BUILD

The AFRICA BUILD Roadmap: a strategic plan in the region

The analysis of the state of art, would serve not only as input for other work packages but also to develop a roadmap for future activities in the area. To design and develop the ABP and create the roadmap, we followed a scientific methodology. Several studies and analyses were carried out to get a thorough overview of the situation:

- State of the art of eHealth and health research in Africa: we made an exhaustive study of scientific journals and conferences, portals and reports of international organizations to retrieve more than 250 references that were analyzed and organized through a Synthesis Matrix.
- Training and research requirements and needs existing in Africa, focusing in the four African partners of the project.
- State of clinical research, information literacy, communication skills and health informatics in various African institutions; we developed an online survey to find concrete gaps in training, get information about the use of search techniques of scientific literature and the use of knowledge coming from different sources, and informatics tools and methods used by African professionals. In addition, we developed a more specific survey to get detailed information about the African partners —on the needs and specific requirements and constraints, both technologically and in terms of training and research.
- A compilation of health research syllabi from different international institutions to identify current gaps existing in Africa, comparing this information with the existing programs and courses in the partners' institutions.

The AFRICA BUILD roadmap was developed based on the findings of the performed detailed analysis of the state of the art of eHealth as well as new trends in health research and innovation in the African Region. For such an analysis, we took into consideration the abovementioned studies, the contributions of the international panel of experts—a large list of leading people in the area, from various continents, who were selected after a comprehensive search—through the ABP, as well as feedback obtained in various sessions and workshops organized by the consortium in different virtual and physical meetings. The state of the art analysis describes current initiatives in Africa, lessons learned, recommendations, and a future agenda for each discussed topic, tackling specific challenges in eHealth implementation and health research adoption “at the micro-level” as well as policy implications. In addition, we discovered that there was a strong need to develop a generic framework for future activities “at the macro-level”. We developed a framework which, in one hand, it integrates all of the current initiatives from different perspectives. In the other hand, it addresses the current challenges in effectively adopting eHealth and health research in improving the healthcare service in Africa.

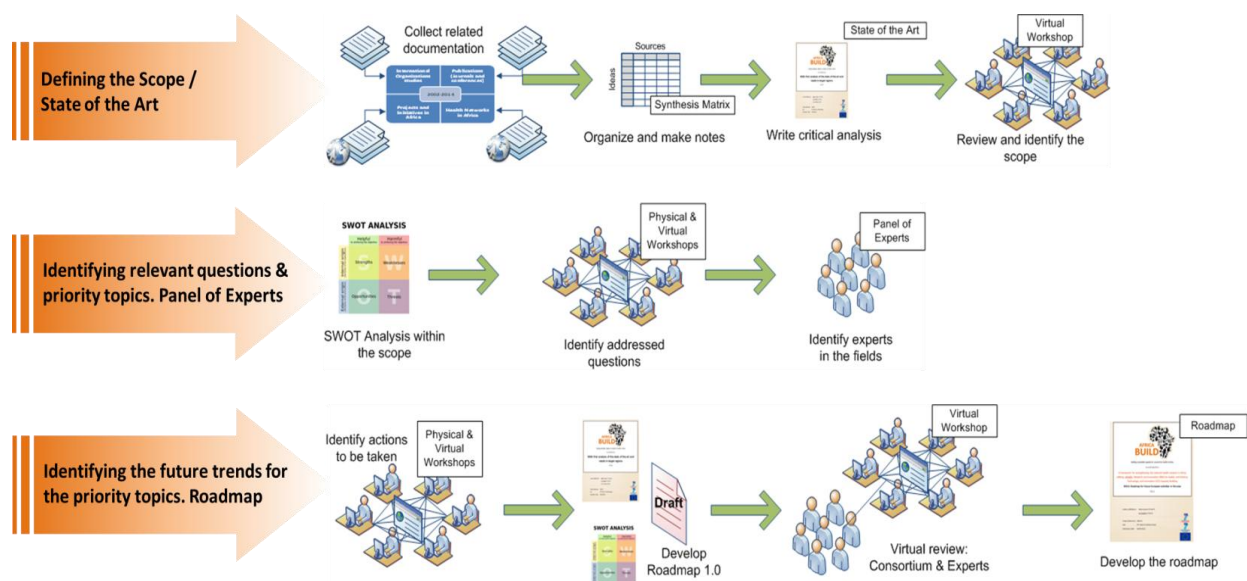


Figure 6 - AFRICA BUILD Roadmap development process

The roadmap created in AFRICA BUILD provides a framework to strength national health systems in Africa utilizing eHealth, R&I for health, and Science Technology Innovation (STI) Capacity Building. This framework will act like a network leader in the region. Also, the roadmap framework addresses a set of interrelated-intersected challenges in (i) strengthening the National Health System, (ii) developing National Health Research Systems, and (iii) adopting Health Policy and Systems Research strategies. Given the relevance of eHealth in these issues, the main recommendation of the AFRICA BUILD roadmap was to develop a collaborative web-based environment in Africa (utilizing open resources) to support the following:

- Developing interactive and automated toolkits for incorporating the international organizations' strategies in eHealth for strengthening national health research systems in Africa.
- Developing cross-sector networking platforms for sharing best practices in formalizing national and regional strategies
- Developing eLearning platforms for building the required capacities in STI as well as in health policy and system research

- Developing regional applications for i) evaluating and monitoring eHealth initiatives, and ii) creating synergy between the successfully implemented initiatives and projects in Africa

The AFRICA BUILD Portal aimed to be such environment (Figure 6).

Although funding is a priority to improve biomedical research in Africa, partnerships should be emphasized to i) strengthen the overall health research system in Africa, and ii) build the required capacities to maintain the sustainability of such systems.

The AFRICA BUILD Portal: the first professional network oriented to African biomedical researchers

From our studies, we observed that, although access to technology is still complicated in Africa, mobile phones or social networks can bring the newest technological advances to most sites and people with limited technological skills. This is an amazing paradox, with great significance for future projects. Computer facilities can be outdated and difficult to get funded, but many people in Africa have access to last generation mobile phones and their Internet connections, which could facilitate access to a wide number of medical resources for a broad segment of the population. For this reason, the AFRICA BUILD Portal, ABP (the first social network oriented to African biomedical researchers and created under the umbrella of AFRICA BUILD) has been adapted to slow Internet and telephone connections, as a proof of concept of such an idea. This portal integrates several tools oriented to training and research. The needs identified in the studies were being used to find existing courses in these areas and create a catalogue of didactic resources integrated in the ABP.

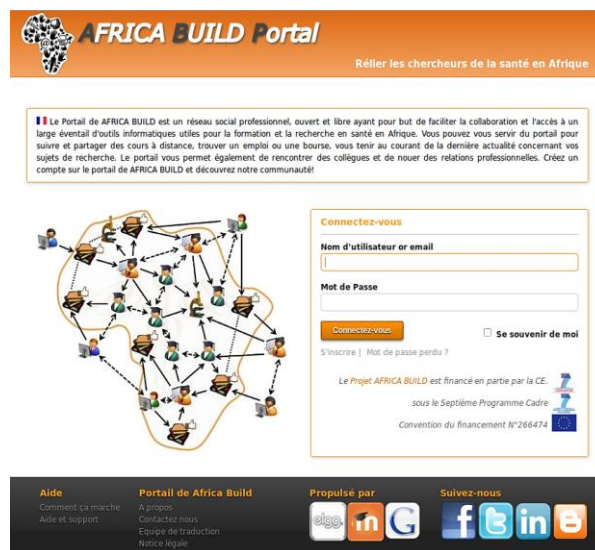


Figure 7 - AFRICA BUILD Portal Home Page (in French)

For the sustainability of the project, one of our main goals was to develop the ABP together in a joint effort between European and African developers, as a means of collaborative work and knowledge transfer. Although we did not develop the ABP from scratch—but using and adapting existing basic open and free resources—we found significant challenges in the joint development of the ABP—such as lack of technical staff in the African institutions, lack of ICT resources, poor and expensive Internet connection, and difficulties in communication, arising from the use of English, French and Arabic. To solve this problem we created the AFRICA BUILD Community of Developers (ABCOD). We trained the ABCoD on the use of the social network platform by teaching technical skills to the staff selected in each African institution, by using a “blended” learning approach. Several tools were selected to facilitate distant learning and communication within the

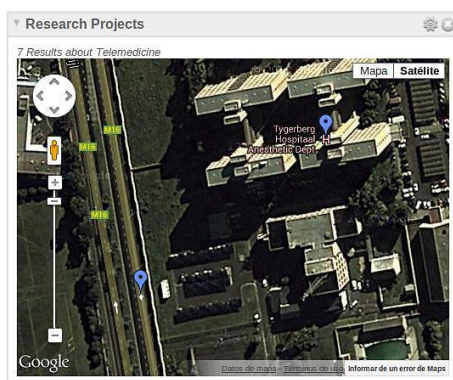


Figure 9 - Example of the use of GIS in the ABP

- A plugin for research projects and organizations: ITI-MCIT created a database to provide some information about research projects and organizations working in health research in Africa. In addition, a map feature was created inside the widget to be more intuitive, so the users can search the projects using geographical location. This map shows those locations pinned, and by clicking any pin user can get some info about the project including its URL address.
- eLearning plugin: as one of the most needed services, a Moodle server was added to the ABP. This system, in a transparent way to the user, acts as a repository of courses, quizzes and other learning materials. The UPM has managed some issues such as the design of a new communication scheme ABP-Moodle. One of the most significant improvements in the eLearning environment has been the development of a plugin which allows the inclusion in the ABP of remote courses hosted on any remote moodle (in a transparent way to the user). A section called "Progress/Diploma" was implemented within the Courses section of the ABP. This tool was suggested by some African partners, as a way to verify that the students were through the learning resources (eCertificate). This tool opens a new path towards the sustainability of the project, facilitating its use in formal courses in universities.

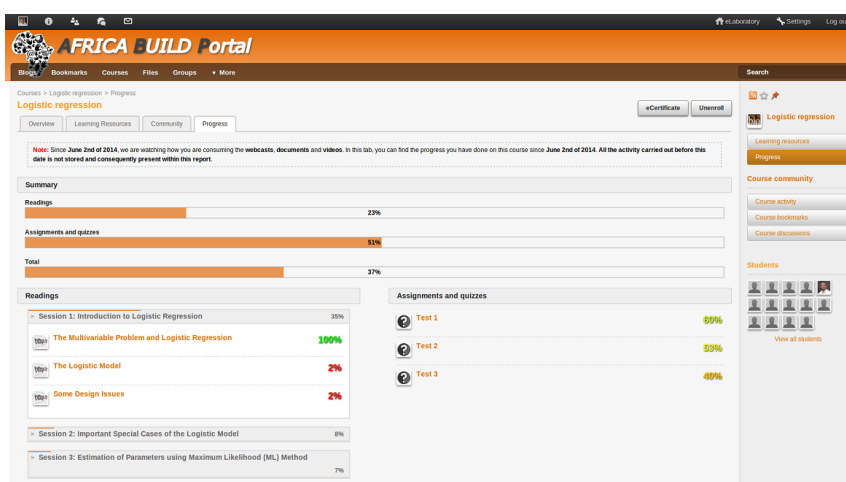


Figure 10 - The "Progress" Tab

- Educational programs: the UG-SPH created a similar plugin but including information about educational programs in Africa. Some graphical improvements were added to this database such as a small flag to each program indicating its belonging country. This database contains more than 500 records on health education programs from 38 different institutions in Africa.
- Scientific news: to compile scientific news from different sources in English, French and Arabic. This system analyzes the characteristics of the ABP user contained in her profile

(interests, research lines, skills, language, etc), and shows the more relevant news. The FMPOS worked in this plugin.

- An Open Access Library providing access to three major sources: PubMed Central, Biomed Central and the African Journals Online Library (AJOL). This functionality was created by FMSB. FMSB and FMPOS worked collaboratively to integrate some features of their respective plugins, to recommend to the user some content depending on the news or publications in which he/she would be interested.
- Mobility Brokerage Service: this plugin offers mobility recommendations to the user depending on the offers available in the ABP and the features included in his/her profile.

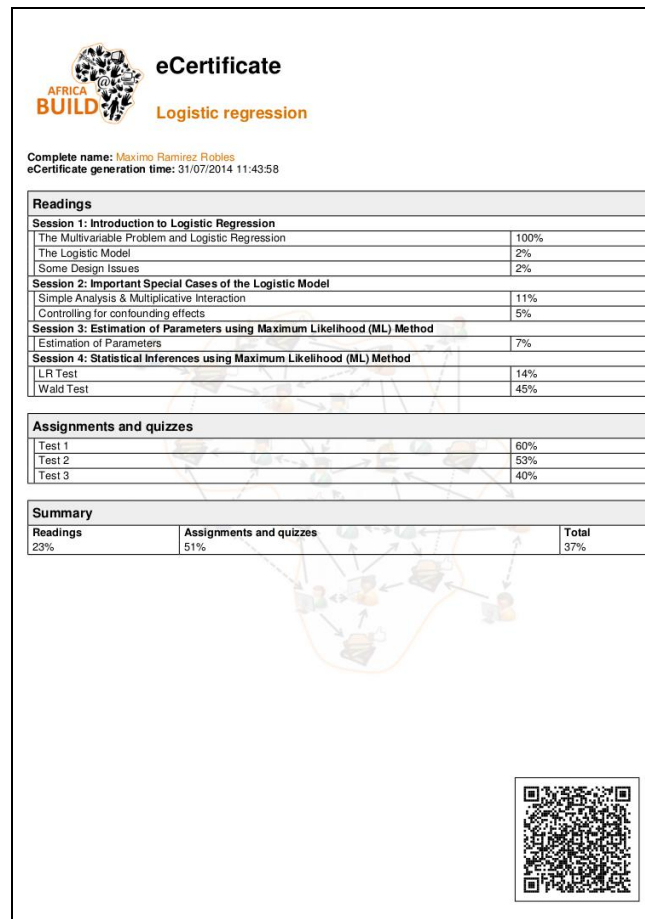


Figure 11 - Example of an eCertificate automatically generated by the ABP

To extend the audience of the ABP, the latter can be accessed in English, French, Arabic and Spanish. The UPM launched a survey to different channels to study smartphones' use in Africa. Finally, an mobile Application or App was developed for some components of the ABP allowing users the access to the learning environment of the portal from some versions of Android-based smartphones.

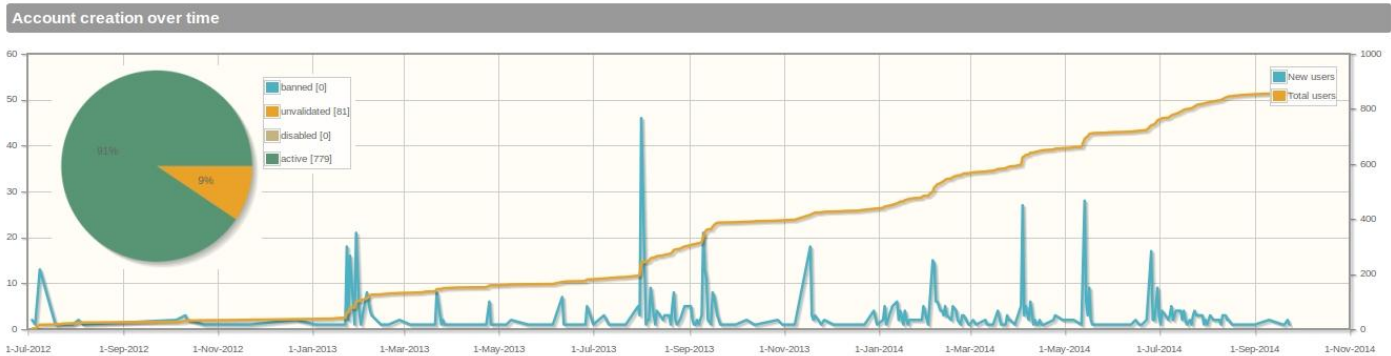


Figure 12 - ABP Users, account creation

At the time of writing, the AFRICA BUILD Portal achieved more than 750 active users, collaborating and sharing knowledge through virtual communities (more than 40) around different research topics.

The following figure summarizes some of the key aspects of the ABP, such as the number of visits, the device or most used language to access the platform or some features grouped by topic.

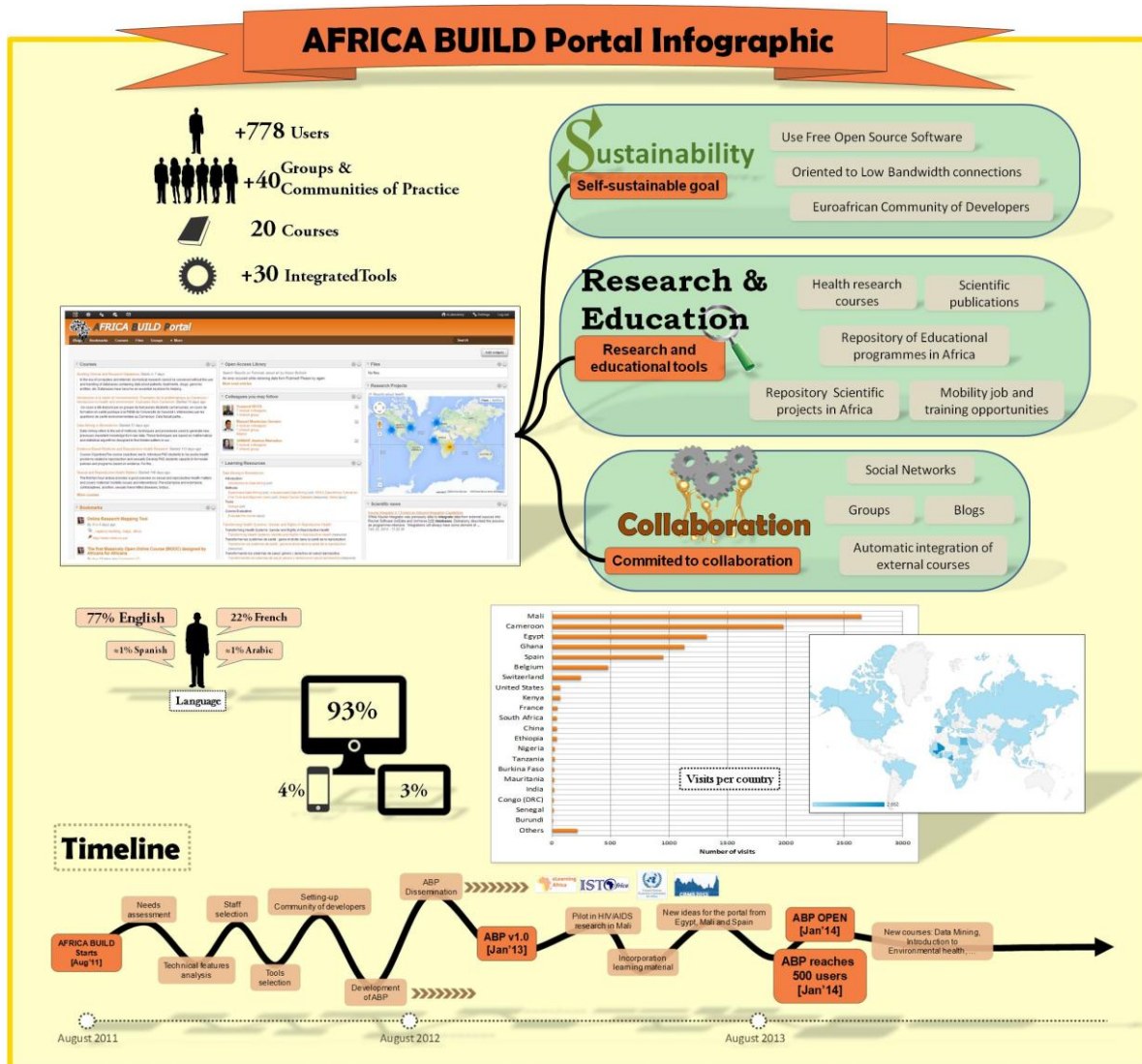


Figure 13 - The AFRICA BUILD Portal infographic

The AFRICA BUILD Courses: a new repository of didactic material for Health Research in Africa

UniGE coordinated the development of didactic materials in AFRICA BUILD. This partner brought to the project not only its experience in the development of learning materials in Africa, as coordinators of the successful RAFT Network, but also the tool called Dudal. This tool, Dudal, is oriented to facilitate Webcasts in places with low bandwidth connections. Thereby, students can follow and discuss simultaneously the slides and explanations of the teacher without cuts in the video streaming.

To develop a plan for capacity building, we performed a comprehensive analysis of African training needs in the health research domain (especially in the four African partners) as well as the different formats for representing the academic curriculum and requirements of an institution- Unlike Europe—where there are standardized approaches, such as, for instance, the European Credit Transfer System, ECTS—in Africa there are different formats of representation of the academic requirements and credits, even within the same country. To overcome this challenge we have created a format for the upload of the didactic resources that will be taught under AFRICA BUILD.

Many African institutions had (or plan to have) a curriculum in science, allowing the formation of new researchers, but they manifested a need for the improvement and revision of existing programmes. In addition, the lack of teachers and educational material hampers the execution of these programmes. In this context, AFRICA BUILD aimed to alleviate some of the problems by using: (i) Content Management Systems, e-learning tools and institutional repositories, allowing the storage of learning material accessible through Internet; (ii) Web 2.0 tools, such as Social Networks, and some e-learning tools allow the creation of communities, by connecting students and teachers. The AFRICA BUILD Portal is the technical solution provided to solve these issues.

Regarding the need expressed by the African partners of AFRICA BUILD about a revision or recommendation for their programmes we developed a plan based on the most relevant concentrations found in health research studies in the curricula of the top 5 American, European, Asian, Australian and African universities:

- Biostatistics
- Epidemiology
- Environmental health
- Health policy, management and ethics
- Research methods
- Medical Informatics

Other areas such as biomedical engineering, genetics, computational biology or drug / device development (to mention some examples) were also among the main subjects included in the curriculum, but with lower relevance. While medical informatics is not scored at the top it was already recognized as an educational need and challenge in the African universities, given its capabilities to provide support to all medical disciplines.

Based on the results of the training needs assessment we developed a plan for capacity building and a list of needed courses. The AFRICA BUILD Consortium developed and included in the ABP the next list of courses:

- Writing a Scientific Paper
- Recherche sur la sécurité des patients
- Building Clinical and Research Databases
- Evidence Based Medicine and Reproductive Health Research
- Data Mining in Biomedicine
- Sexual and Reproductive Health matters

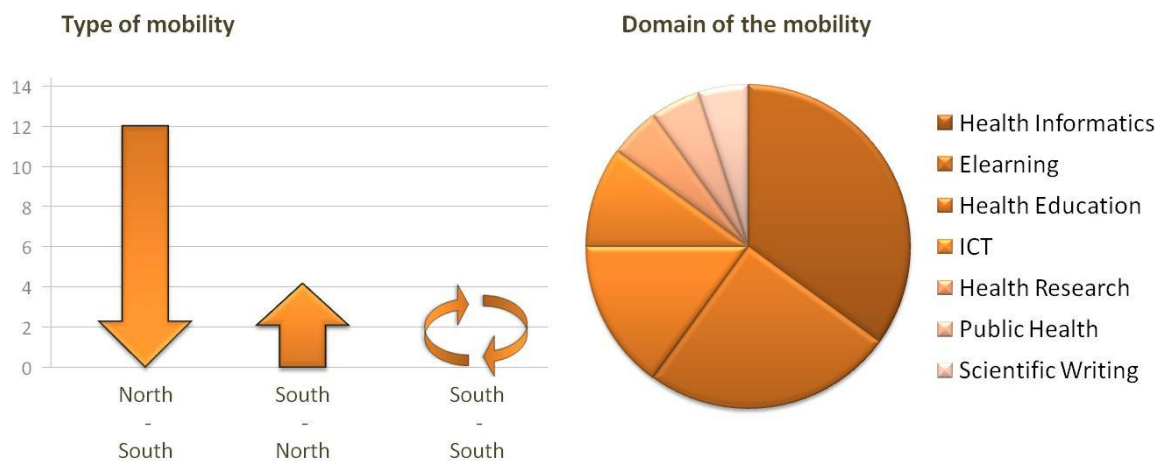


Figure 15 - Mobility initiatives completed



Figure 16 - Screenshot of a demand posted on the Mobility Brokerage Service

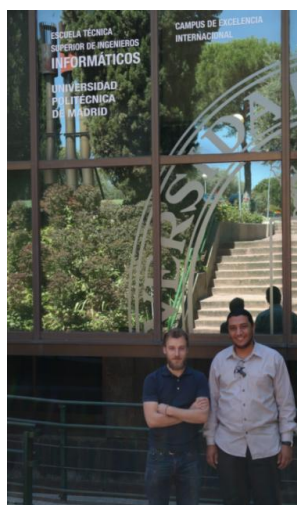


Figure 17 - Maximo Ramirez (UPM) and Islam Askar (ITI-MCIT) in Madrid in one mobility activity

Although mobility took place both before and after the launch of the Mobility Brokerage Service most of their negotiations and arrangements happened outside the ABP. Reflecting the fact that personal and direct contacts were preferred instead of centralized services. Mobility actions took several forms: attendance to workshops, seminars, site visits, on-site coaching, teaching etc. This organized mobility was a crucial component for capacity building of individuals and strengthening of institutions. Also, mobility became a critical tool to work collaboratively between institutions for specific tasks of some work packages, allowing a transfer of expertise during the project. Scientific writing, production and delivery of online courses, the development of Web 2.0 tools or development of mobile applications were some of the subjects where expertise was exchanged between partners.

Mobility gave African institutions the skills and competencies needed to fully participate in the ABP development, in the production of online courses and also in the development of the project itself. While these activities were limited, given some circumstances —funding, political

situations, medical issues, etc— these exchanges were finally possible and well received among African institutions for enhancing research and development, innovation, training, etc. Support from external and internal sources for funding is a key issue, but results can be fundamental to overcome traditional borders and develop new joint initiatives.

The AFRICA BUILD pilots: delivering specific training programs in HIV/AIDS and Reproductive Health Research

We developed two pilot programmes to learn and apply Evidence Based Medicine (EBM) and research in the field of HIV/AIDS and Reproductive Health. From the analysis of the different learning modes existing in the African partners, we created two courses. The first was developed in French in Cameroon and Mali, the latter in English for Ghana. Teachers of the courses were trained so that they were able to use the ABP and generate didactic material. Through the ABP several resources were offered: video-recorded tutorials from subject-matter experts, interactions on discussion forums, collaborative learning experiences with virtual group works, and feedback from experts or fellow course participants, among others.



Figure 18 - Some images of the pilots in Accra, Bamako and Yaoundé

350 students followed these courses. From the experience of the pilots, we suggest that online courses can be useful for African health researchers, particularly when the course content is strongly linked to the specific needs of the target audience and they can be placed in an adequate context. In our pilot courses the students or researchers taking the courses needed EBM skills and related exercises to develop research proposals for their Master and PhD training school. Therefore, integrating the online courses in PhD or post-graduate curricula is most promising if aimed at connecting peers and retaining them over the entire duration of the training and thereafter.

However, course attendance was enhanced when facilitators with good communication skills supported the students and encouraged them to continue participating in the online discussions. It is also important to propose challenging exercises linked to the course content to engage students in the learning process. Discussing students' experiences when applying the learned skills and receiving feedback from the facilitators has also been identified as a cornerstone to retain students in the training activities.

In most African settings, two factors can be pointed out to be of crucial importance for planning face-to-face interactions: first, courses with a mixed approach (online plus face-to-face format) achieved better students' participation, acceptance and retention rate; second, the lifespan of the virtual Communities of Practice's interactions was extended when people knew each other on a personal basis.

The AFRICA BUILD events: gathering experts, professionals, students and people interested in health research in Africa

During these three years, we organized three main events bringing together experts, professionals, students and people interested in health research and education in Africa. With these conferences we aimed to increase interest in the AFRICA BUILD project, and also attract several stakeholders and share information among them. Although the first intended locations for the conferences were Europe, Mali and Egypt, finally, due to political problems our conferences and symposiums were finally held in Kenya, Cameroun and Belgium. These events were organized linked to other international conferences in the field. We detail them below.

1. Symposium co-located with HELINA Conference (8 October 2013, Eldoret, Kenya)



AFRICA BUILD Symposium

**Co-located with HELINA 2013 Conference
8 October 2013**

Figure 19 - Banner of the Symposium at Eldoret

The eighth Health Informatics in Africa —HELINA 2013— Conference, took place in Eldoret, Kenya from the 7th to 8th of October 2013. The AFRICA BUILD Symposium was co-located with this conference, oriented to: healthcare professionals, interested in health care technology, ICT, Telecommunications and Microelectronic professionals dedicated to develop applications for health care; decision makers, government officials, industry leaders, eHealth organizations; and researchers in health management, public health, biomedical/health informatics, medicine and professionals interested in ICT applications for health care, and students. This is the main medical informatics conference currently being held in Africa.

AFRICA BUILD presented six short papers at the main conference, to draw more attention to the project and the Symposium.



Figure 20 - AFRICA BUILD Symposium at Eldoret (Kenya)

About the Symposium, two members of the Panel of Experts of AFRICA BUILD were invited to talk about related topics —Andrew Kanter presented the Millennium Villages Project and MVG-Net through a Global Health Informatics perspective, and Irene Onyancha spoke about the ASKIA Portal, an access point to scientific and socio-economic knowledge in Africa. Each AFRICA BUILD partner leader talked about the results of the project. This symposium finished with a round table discussing weaknesses and strengths, as well as open questions in the context of "Africa & Global Health: Towards a new education". This symposium was well-attended by African researchers.

2. International Conference (25 November 2013, Yaoundé, Cameroon)



Figure 21 - Conference flyer

The AFRICA BUILD international Conference in Yaoundé, Cameroon gathered around 150 people participated in this event, which included several ministers, health practitioners, professors, researchers, experts, students and different stakeholders interested in using information technology to improve health research and training in Africa. The discussion focussed on different initiatives and challenges in this area. It was announced as a major event in the city, and brought the attention of national media. Among those who attended the conference were the Health Minister of Cameroon,

André Mama Fouda, and the Minister of Women's Promotion and the Family, Marie Thérèse Abena Ondo. They participated in the first sessions of the conference. Below is the link to the opening session by André Mama Fouda https://www.youtube.com/watch?v=5TW_6EoDeyc.

Some members of the Panel of Experts of AFRICA BUILD were invited to this conference and presented keynote addresses: (i) Prof. Dr. Lucila Ohno-Machado presented her experiences in the creation of a successful biomedical informatics program at the University of Eduardo Mondlane in Mozambique; (ii) Professor Housseynou Ba spoke about the main obstacles and challenges of eHealth in Africa, giving to the audience interesting data about the penetration of the new technologies at different levels; (iii) Lynette Moretlo Molefi presented several case studies of different real eHealth initiatives carried out at South Africa; and (iv) Irene Onyancha explained their efforts on giving access to federated scientific and socio-economic knowledge bases on Africa through their platform called ASKIA.

From the Call for Abstracts and Posters launched for this conference, twelve abstracts were accepted and presented during the afternoon. The conference ended with a round table chaired by the AFRICA BUILD Consortium, in which the audience actively discussed about the accessibility to research data and information from the Sub-Saharan countries. There was a great interest in providing more interaction between African researchers and research journals in this kind of countries.



Figure 22 - AFRICA BUILD banner in Boulevard de 20 de Mai at Yaoundé, and Family Picture (In the middle, Marie Thérèse Abena Ondo and André Mama Fouda respectively) AFRICA BUILD Workshop (9 April 2014, Luxembourg)

3. AFRICA BUILD Workshop (9 April 2014, Luxembourg)

Med-e-Tel is an event of the International Society for Telemedicine & eHealth (ISfTeH), the international federation of national associations who represent their country's Telemedicine and eHealth stakeholders. The AFRICA BUILD Workshop was co-located with this conference. This event showed all potentialities and experiences gained through the AFRICA BUILD Portal, from the ICT profile to the benefitting educational role to health researchers and other health care professionals and biomedical informatics developers, deployed in resource-limited and/or North countries.

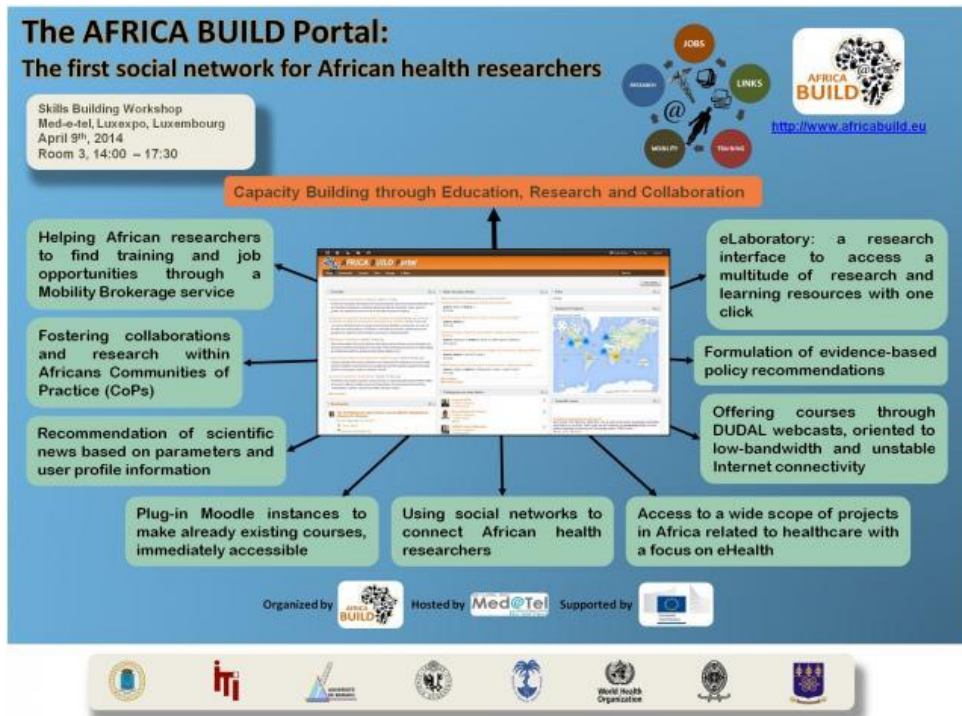


Figure 23 - Flyer of the AFRICA BUILD Workshop at Med-e-Tel

The attendees were very active, posing many questions and giving feedback to the AFRICA BUILD Consortium. In addition, AFRICA BUILD got into the Top-Ten-By-Mention of #MEDeTEL14 influencers in Twitter.



Figure 24 - Some tweets around AFRICA BUILD at Med-e-Tel 2014

POTENTIAL IMPACT

The main objective of the project was the creation of communities of researchers who can share resources between them to improve and foster health research in Africa. The potential impact of achieving this goal was the promotion of African health scientists along with their institutions and research networks in order to create a sustainable and attractive research landscape for health research in Africa.

During the execution of AFRICA BUILD, we have followed different dissemination strategies in order to reach our target audience:

- African communities of health researchers and practitioners
- African communities of health informaticians
- Related projects and programs in Africa
- Academic health institutions
- NGOs
- Policy makers
- Public institutions

All these audiences have been reached through several channels:

- The AFRICA BUILD Website: our Website <http://africabuild.eu> reached more than 80.000 visits in these three years. More than half of the visits came from Africa, followed by Europe and Asia.

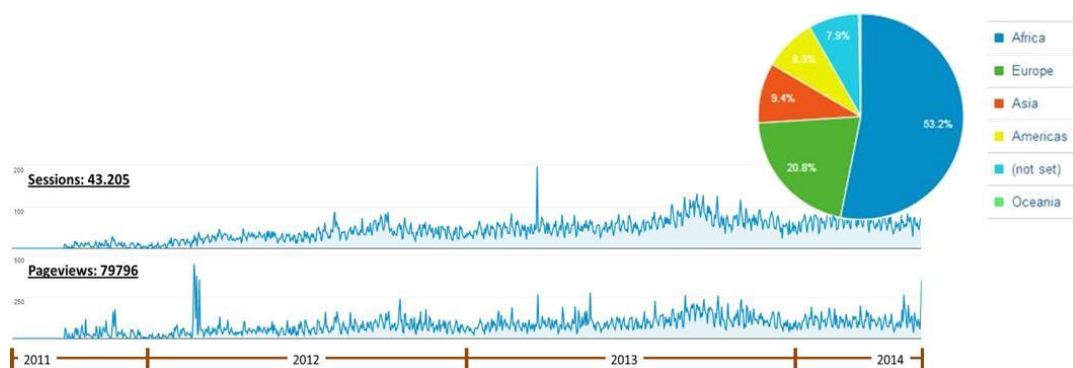


Figure 25 - Pageviews and sessions of <http://africabuild.eu>

- The AFRICA BUILD Portal (ABP): this platform enables capacity building through eLearning and allows African health researchers to get in touch with their peers, share knowledge and experiences, and exchange opportunities for mobility (finding and offering training and work offers). More than 750 users have used this tool to access learning and research material in the last period.
- Newsletters, fact sheets and posters: during the project, several printed or virtual material have been developed and distributed through mailing lists and Websites.

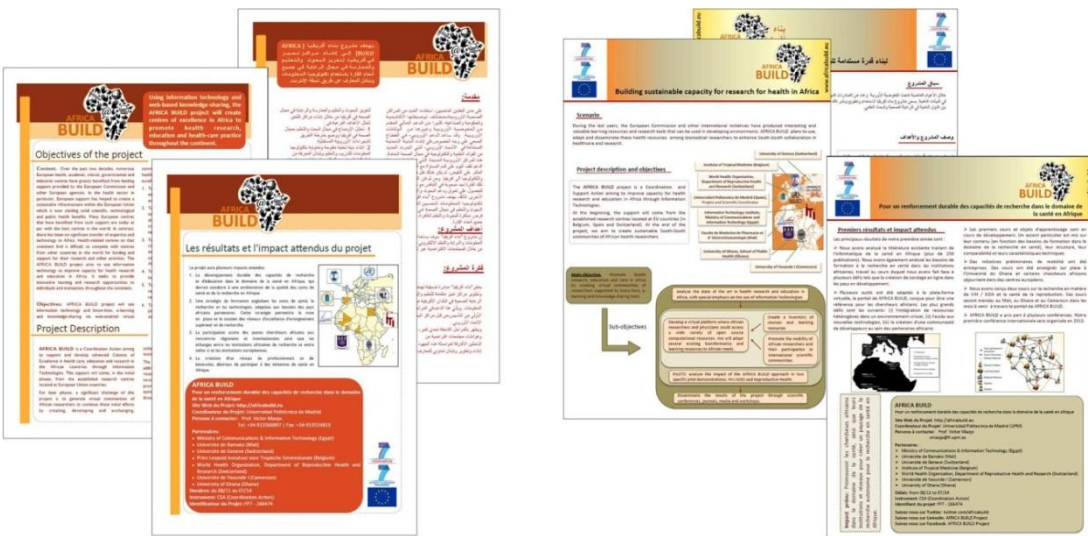
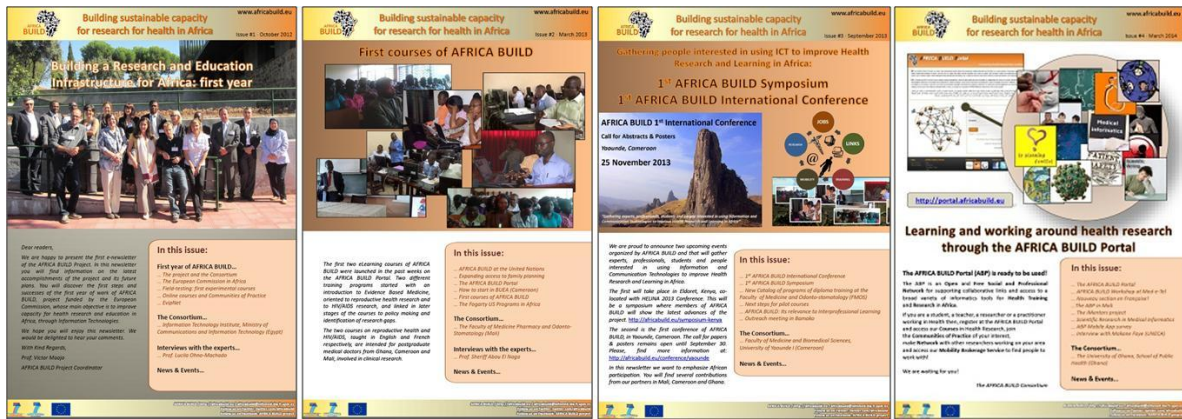


Figure 26 - Newsletters and Fact sheets

- Videos: according to some recommendations for strengthening AFRICA BUILD project dissemination we developed two videos, a quick overview of the AFRICA BUILD project (https://www.youtube.com/watch?v=ux5KRCY_Jml), and an explanation of the features of the ABP (<https://www.youtube.com/watch?v=VPayqa7cSM>).



Figure 27 - Snapshots of the AFRICA BUILD Consortium video

- Social Networks: AFRICA BUILD disseminated its activity through LinkedIn, Twitter and Facebook.
- Scientific papers: members of the AFRICA BUILD Consortium published 19 papers in some international conferences (<http://africabuild.eu/dissemination/publications>).
- The AFRICA BUILD Symposium, Conference and Workshop stated in the previous section.

Exploiting the AFRICA BUILD Portal

The AFRICA BUILD project sought to promote health research and education among African researchers by using Information Technologies, know-how, e-learning and knowledge sharing —this would be achieved under some principles of collaboration and open source environments to foster the creation of sustainable communities of African researchers.

Collaboration can be supported by some tools of the Web 2.0 —blogs, wikis, chats—, but although there are plenty of such tools, in some regions such as Africa there are difficulties such as poor Internet connection or lack of adherence to technological tools that may hinder the use of existing tools. Furthermore, AFRICA BUILD pursued a very concrete objective, and there were no health-oriented research tools that could be used in the African context.

The main exploitable outcome of the project is the AFRICA BUILD Portal (ABP). This tool tried to demonstrate that it was possible to share learning and research tools among African biomedical researchers through Web Technologies, but after three years of development, now, it is more than a proof-of-concept. With more than 750 active users, the ABP contains 20 courses, more than 30 scientific and collaborative resources, and 46 communities, and it has become a useful tool for the end user. As an indication of interest, a large number of people aiming to get a PhD in public health and other areas contacted the UPM to get information about academic programs in Africa, from countries other than the participants in the consortium.



Figure 28 - Number of users and connections within the AFRICA BUILD portal

Members of the AFRICA BUILD Consortium were selected as the first users of the ABP through the pilots. They would attend to the courses in the ABP first and subsequently could be the drivers of the platform, creating didactic material, applications or disseminating the project and ABP. Dissemination of the ABP was performed through different virtual —Website, e-mail and social networks— and physical —reports, newsletters, conferences, etc— channels. After the end of the project, AFRICA BUILD was well-known in the African partners institutions, and, as we have mentioned, several dissemination strategies were followed through its execution phase. After the end of the project —July 2014— the exploitation strategies are focused on the results of the project and their sustainability once the project ends. In AFRICA BUILD, “sustainability” means that the project outcomes will be used in further activities by the partners, new projects or other communities and organizations. Funding from the European Commission could not be any longer the motivation for developing further activities, and the African partners soon acknowledged it.

Please, answer the next questions about the AFRICA BUILD Portal (<http://portal.africabuild.eu>)

1. Is there a target market for the AFRICA BUILD Portal?
 Yes (please, give some details) No
2. List the main Strengths of the AFRICA BUILD Portal
3. List the main Weaknesses of the AFRICA BUILD Portal
4. Which elements of the AFRICA BUILD Portal need strengthening in order to become more exploitable?
5. What are your plans to disseminate the AFRICA BUILD Portal and increase the number of users? |
6. What obstacles or difficulties might you face when trying to exploit the AFRICA BUILD Portal in your environment?

Please, answer the next questions about the results of AFRICA BUILD

1. Do you intend to use the results of AFRICA BUILD on your public or private projects?
 Yes (please tell us what results and how do you intend to use them?)
 No
 Maybe in the future, right now it's not the case (please tell us what results and how do you intend to use them?)
2. How will you use the experience that you have gained during the AFRICA BUILD Project?
3. Any other ideas that we should consider?

Figure 29 - Exploitation plan questionnaire

The purpose of this section is to compile and present the various possibilities of the project results, the use of the knowledge gained from it, and the expansion of the AFRICA BUILD Portal. After the end of the project, all the partners were asked to complete a questionnaire with their main plans to exploit the AFRICA BUILD Portal.

Several proposals from the partners have been gathered and summarized in this document as different ways to promote the AFRICA BUILD results in educational, research or commercial environments. These proposals are summarized below.

All the partners agreed in the existing target market for the AFRICA BUILD Portal. This would comprise:

1. African academic organizations, which may use it to both educate their students and collaborate with other organizations in research and education programs.
2. Medical professionals in Africa may use it to support their Continuing Medical Education (CME)
3. Medical students preparing their thesis (methodology of research courses)
4. Medical doctors implicated in research projects
5. Researchers in different fields of health, especially those at the beginning of their research career

The AFRICA BUILD Portal has been seen by the Consortium as an excellent socio-professional network —easy to understand and use—with many valuable resources for teaching, learning and exchange of knowledge. Its main advantages are that: (i) it is specifically developed for the African context, from a technical perspective (i.e., it works with low bandwidth connections) as well as concerning the didactic contents (i.e., it responds to identified training needs in Africa); (ii) it is free and open, is user-friendly and based on a fast and solid technical platform, providing permanent access to knowledge and direct contact between learners and trainers —in addition it provides self-

studied courses—; (iii) there are some African institutions behind to pull the activity and African partners participated in building it, so the feeling of ownership may support its sustainable growth and dissemination; and (iv) provides an initial set of valuable learning and research resources. On the other hand, there are some aspects that need to be improved such as:

More resources related to research and training need to be included such as: self-learning courses, informative videos, publications articles other useful sources of information.

The ABP has to be widely promoted since it is still unknown by many African researchers and health professionals

Definitively, new and active users are needed from the African academic and research institutions. These users may promote the website to their colleagues and use the ABP to teach, learn or share knowledge.

To reach these users, the Consortium is planning to perform the next activities:

- Share and promote the AFRICA BUILD Portal through different channels:
 - o Social networks
 - o National and International meetings with other scientific communities
 - o Emails, radio, newspapers, posters and TV spots
 - o Additional papers in top scientific journals and conferences
 - o Demonstrations to PhD students and MPH students studying or doing research with their institution, and to partner institutions in the global South (Burkina Faso, RDC, South Africa, Gabon, and outside of Africa in Cambodia, India, Nepal and Peru)
 - o Their respective networks of contacts (i.e RAFT Network, the WHO mailing list, SOCIM events, etc)
- Involve external experts in the promotion of the ABP
- Use the ABP in their own institutions:
 - o As a Learning Content Management System to store the content of the programs
 - o Referring students to courses on portal for use as additional learning resources
 - o Introducing the Portal to health professional groups to employ for their continuous professional development programmes
 - o Creating video courses as supplementary learning resources for students

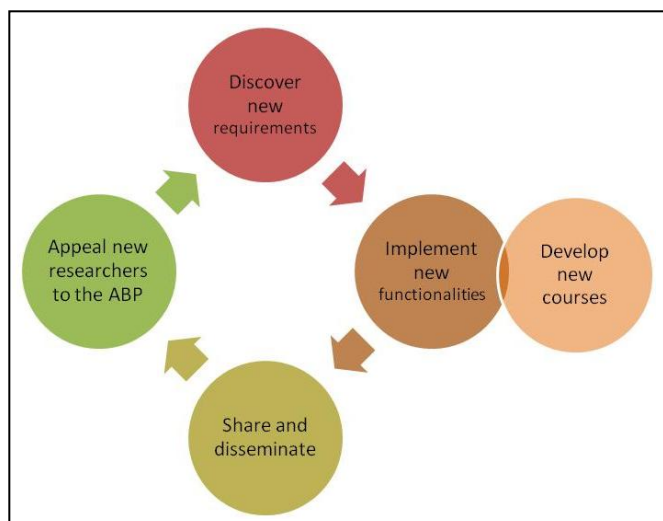


Figure 30 - The *prosumers* cycle

In conclusion, since the ABP is a social network, it needs to be maintained by people who produce and consume —i.e. prosumers— content to make the tool a useful, active and dynamic resource. Based in some existing needs, the research and learning tools have been implemented during these three years. We have involved an African community of developers to improve and maintain the technology that

supports the tool. Users can access the ABP in the three most spoken languages in Africa —English, French and Arabic— and Spanish. We have created an initial repository of courses and teaching materials based on the needs expressed in the African institutions. At last, there have been several pilot courses —not only about HIV / AIDS and Reproductive Health Research—, which have reached more than 750 African students and researchers who finally knew, and evaluated the ABP.

In AFRICA BUILD we have initiated and repeated this cycle that must now be repeated by Africans to be self-sustaining. Currently, African institutions must take control of this platform to generate new requirements, implement new features and courses, disseminate content and get new researchers to repeat the cycle and make the tool scalable (Figure 28).

AFRICA BUILD

Building sustainable capacity for research for health in Africa

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University of Ghana (Ghana)

Contact: Prof. Samuel Bosomprah

Timetable: from 08/11 to 07/14

Instrument: CSA (Coordination Action)

Project Identifier: FP7 - 266474

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