

Pan-African University and German Government Higher Education Cooperation in Algeria

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Abstract

Pan-African University (PAU) is an initiative of the African Union Commission (AUC) that started in 2008 with the objective to promote higher education, science and technology on the African continent at a high academic level. The Pan-African University Institute of Water and Energy Sciences (including Climate Change) (PAUWES) is one of the five hubs of the Pan African University (PAU) and hosted at the University of Tlemcen in Algeria. PAUWES offers graduate students access to leading academic research and the latest theoretical and hands-on training in areas vital to the future of Africa's development in water, energy and the challenge of climate change.

Funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) through the German Academic Exchange Service (DAAD), the project "Higher Education Cooperation with Pan African University Institute for Water and Energy (incl. Climate Change) - PAUWES" aims to support the development of PAUWES by enhancing its teaching and research activities in water and energy sciences. The project has been implemented by a consortium of partners which includes the United Nations University – Institute for Environment and Human Security (UNU-EHS), the Institute for Technology and Resources Management in the Tropics and Subtropics (ITT) at the Cologne University of Applied Sciences (CUAS) and the Center for Development Research (ZEF) at the University of Bonn (UB). The partnership between PAUWES and the consortium of partners has brought together many institutions of higher education and research on the African continent and the world beyond. PAUWES has also benefited from a professional network of public, private and civil society actors. While the cooperation has been very beneficial to participating partners, it is however important to portray and deliberate on the cultural differences and their potential consequences (positive or negative) for Africa and Europe joint ventures.

This paper draws from the various areas of experience within the higher education cooperation between German and Algeria Partners. The paper explicates the challenges and opportunities in terms of project governance, socio-economic landscape of the project location, project management experience and multi-culturalism of the beneficiaries. The paper concludes there is efficacy in international collaboration for high education in Africa. It further concludes that today's education should empower students with relevant modern knowledge; in this case, case networking through partnership was emphasised. Research leading to entrepreneurship as a possible conduit to respond to some of the challenges faced in different African countries. The paper therefore ends with proposals for synergies in research and entrepreneurship.

Background

The African Union Commission (AUC) Agenda 2063 states that Africa's human capital will be fully developed as its most precious resource, through sustained investments based on universal early childhood development, basic education, and sustained investments in higher education, science, technology, research and innovation, and the elimination of gender disparities at all levels of education. Access to post-graduate education will be expanded and strengthened to ensure world-class infrastructure for learning and research and support scientific reforms that underpin the transformation of the continent (African Union Commission, 2016).

One of the strategies towards achieving this aspiration is through the Pan African University (PAU), an organ of the AUC for advanced graduate education and postgraduate research. Established in response to the demand for a high academic level in science, technology and innovation (STI) on the African continent, the PAU institutes focus on addressing the key priorities of the Science, Technology and Innovation Strategy for Africa 2024 (STISA-2024). PAU is the culmination of continental initiatives of the Commission of the African Union to revitalize higher education and research in Africa (African Union Commission, 2014). There are 5 PAU institutes and PAU Institute for Water and Energy Sciences (including Climate Change) (PAUWES) hosted at the Abou Bekr Belkaid University of Tlemcen, Algeria is just one of them.

PAUWES offers graduate students access to leading academic research and the latest theoretical and hands-on training in areas vital to the future of Africa's development – water, energy and the challenge of climate change. Higher Education Cooperation with the Pan African University Institute of Water and Energy Sciences (including Climate Change) was a two phases (July 2014 -June 2016 and July 2016 and August 2018) project funded by the German Federal Ministry for Economic Cooperation and Development (BMZ) through the German Academic Exchange Service (DAAD). The project aimed at supporting the development of PAUWES by enhancing its teaching and research activities in water and energy sciences. The project was implemented by a consortium of partners that includes the United Nations University – Institute for Environment and Human Security (UNU-EHS), the Institute for Technology and Resources Management in the Tropics and Subtropics (ITT) at the Cologne University of Applied Sciences (CUAS) and the Center for Development Research (ZEF) at the University of Bonn (UB). The partnership brought together many institutions of higher education and research on the African continent and the world beyond. PAUWES has also benefited from a professional network of public, private and civil society actors.

The first phase of the project incorporated the support for teaching at PAUWES through workshops, summer schools in Germany, e-learning materials and tools, internship programmes and MSc-theses supervision. The student population at PAUWES during this phase was 74 students representing over 15 African countries. The project further entailed the organization of networking events and the linkage of PAUWES to relevant partners for the exchange of experiences and concepts that contribute to PAUWES' institutional development. This phase observed the setup of entrepreneurship capacities through an entrepreneurship club to enhance students' interest in transforming academic and research pursuits into potential business models applicable in their communities and beyond. This

phase also put an emphasis on internship for students to get experience in companies related to their upcoming masters' research.

The 2nd phase of the project was between July 2016 and August 2018. The main aim was to provide targeted support in teaching, establishing links to institutions and administrations as well as companies. Furthermore, the project sought to strengthen the exchange of staff and students between PAUWES and the consortium partners. This was done for instance through a summer school in Germany for PAUWES students and a winter school in Algeria with students and faculty from PAUWES and consortium partners.

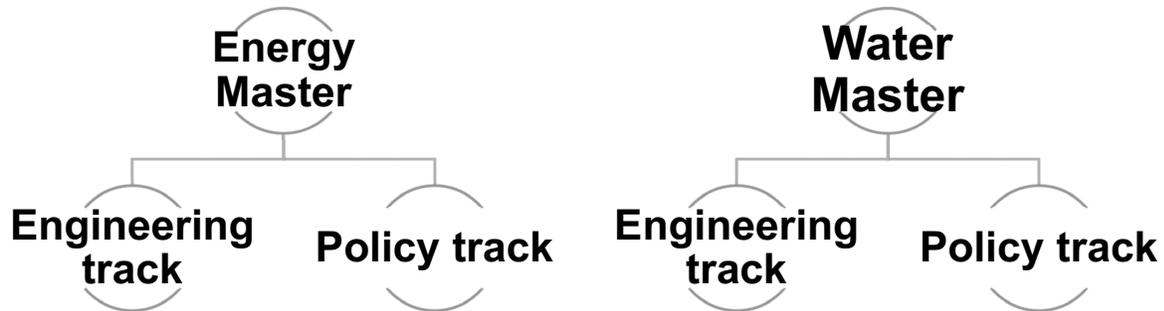
This phase attracted a higher application pool hence showing the popularity of the institute. The total number of students enrolled in 2016 and 2017 were 148 with approximately 27% being women. The students represented over 25 African countries. The graduation of the students enrolled in 2016 was at the end of September 2018. All the students were on course and graduated.

Networking was an important component of this phase. Beyond visiting institutions and companies during the summer and winter schools, PAUWES leveraged its network to disseminate the call for applications to the master programme. There was further networking in terms of supporting the links between research and practice in the energy, water and climate change nexus. To this regard, a networking conference, attended by over 150 participants was jointly organized between partners in Germany and Algeria. The PAUWES Research-2-Practice Forum was held from 16th to 18th April 2018 in Tlemcen.

Academic experience and challenges

PAUWES offers 4 masters tracks in Energy Engineering, Energy Policy, Water Engineering, and Water Policy. The delivery of the curriculum adopts standards as per the higher education framework stipulated in the Bologna Process of 120 ECTS credits (Bologna Working group 2005). The programme employs a block course structure delivered by a flying faculty whose contact hours range from 20-60 hours per course for 4 semesters over a period of 2 years. Furthermore, the masters' programme entailed a summer school in Germany and Algeria for laboratory activities, field excursions, lectures by experts which also contributes to expanding the students' professional network.

Figure 14: Academic structure of master programmes in PAUWES



The Africa Union Commission supports the dissemination and selection process of students, professors and leadership personnel of the institute. The process promotes a geopolitical balance of the representation within the student's body. It is however a challenge to get a strong pool of applicants from Least Developing countries in Africa such as South Sudan and Comoros. The multicultural experience helps to interlink people from different African countries, to work together, exchange and look into developing solutions to the unique challenges in their communities. The nationalities represented within the student body at PAUWES creates both an academic and social opportunity for student to engage and decipher the context of the different African countries. PAUWES believes this diversity is complementary to the learning experience with different contributions based on the multiplicity of knowledge backgrounds in the classroom.

Although the academic language of instruction is English, Anglophone students are met with the challenge to learn French for social and administrative interactions in Algeria. Nationally, literary Arabic and Tamazight (regional variations of Berber) are the national languages of the Algeria while French is also used widely in education, administration, culture, technology and other settings (Berger 2002). PAUWES has therefore instituted French lessons for English speaking students. Conversely, Francophone student who need to improve their English command take English classes as well. Furthermore, residing in Algeria presents the students an additional opportunity to learn Arabic.

The students identified the major academic problem at PAUWES as being the lack of laboratories at the institution to undertake practical experiments. This situation was partially addressed through the summer school in Germany where the students underwent practical training at partner universities. The students were appreciative of the experience in Germany as it presented state-of-the-art applications in water and energy, further inspiring them with ideas for entrepreneurship and utility of updated technology in their countries. However, this duration was too short to learn and internalize all the applications related to their studies. Currently, the institution is developing new

strategies to further collaborate with the University of Tlemcen laboratory facilities. It should be noted that the institution is in the process of building their own state of the art laboratories for a more permanent solution. Students also express that the institute does not have a physical library, but an online library is in implementation.

The curriculum is delivered in block courses delivered by flying professors from different universities and faculty at the University of Tlemcen, this provides an opportunity for students to create a wide academic network. Concomitantly, a flying faculty presents a lack of permanent, in-house academic faculty in the institution hence they depend on short-term academic staff. Students have expressed the insufficient contact time with the lecturers for consistent supervision and consultation. Students further articulate that they have to grasp the required concepts of a particular module during intensive one to two-week periods which is quite challenging at times.

Socio-economic experience and challenges

According to the World Bank Doing Business 2018, the quantitative indicators on business regulation and the protection of property rights for Algeria ranks at 166 out of the 190 economies which has an impact on business transactions and shipping of goods (2017). The World Bank indicators on repatriating investments and income suggest that most of the economies within this grouping require documentation justifying the purchase of foreign exchange or comply with other administrative requirements to ensure legitimacy. The World Bank further groups Algeria amongst the economies with moderate to heavy restriction on repatriating investments and income. Vice versa, when it comes to receiving investment inflows, Algeria has an equity score of 50 out of 100 owing to the required investment approval for capital transfer (2013). Albeit these being macroeconomic inferences, the experience during the project implementation encountered long lead-times and delays when local contractors were paid via wire transfer in foreign currency. The students were also required to follow local administrative processes which entail giving supplemental information when withdrawing foreign currency for international travel or personal use.

The official working days in Algeria are Sunday to Thursday versus Monday to Friday for German partners. This therefore requires operational activities to be concentrated within 4 core working days per week. Additionally, the bank holidays in Germany and Algeria have to be monitored to prevent collision in the working calendars of partners based in the 2 countries. Failure to this, the project could stand possible challenges for project activities, decision making or required reporting.

The host country provides an affordable living environment by offering subsidised accommodation, food and transportation to students. Additionally, the Masters' students receive a monthly stipend of approximately Eur 700 which is sufficient in covering the living expenses and home travel for the students. In comparison to the minimum wage of Algeria of DZD 18000 or Eur 133.28², adopted with guidance of the 1994 Industrial Relations Act amendment by adding section 87bis (ILO 2014), the master's stipend is competitive given the living expenses in

² Exchange rate sources from the central bank of Algeria at the rate of 135.05 to the Euro. (Accessed in Nov 2018) <http://www.bank-of-algeria.dz/html/marcheint2.htm>

Algeria. This cost benefit provokes questioning the degree to which the students are academically versus monetarily motivated to pursue the master's programme. During the 2 project phases, it was deduced that the competitive level of scholarship trends not to increase the scholarly motivation but deflect the academic focus of the students. Nonetheless, based on the rate of completion, the graduation rate has been 100%.

Algeria presents a new socio-cultural experience to the students, most of who do not come from a similar cultural context. Students have to adjust to Algerian lifestyle, food, religion, communication barriers and other cultural tenets. Students call attention to the precepts of socialization between males and females, for instance, living in separate residences with a stipulated curfew principally for female students. Resultantly, this limits the extent to which both genders can team up and work together on academic assignments after official class hours. Furthermore, Algeria is preponderantly Islamic with culture and traditions mostly guided by the Islamic teachings. Students of other religions face challenges as there are limited alternatives to establishments of other faiths.

Entrepreneurship and Networking Experience: challenges and opportunities

The African Union in its Continental Education Strategy for Africa (CESA 16-25) emphasises in its guiding principles that quality and relevant education, training and research are core for scientific and technological innovation, creativity and entrepreneurship (AUC 2017). The Future of Job report iterates that both companies and universities are experiencing numerous shifts and a more trans-disciplinary workforce, thus changing the skills needed. Workers will require to acquire new knowledge and some of the top-ranking skills such as complex problem-solving, critical thinking and creativity (WEF 2018). At PAUWES there is a wide understanding that beyond providing quality education in water and energy; engineering and policy, today's education needs to be aligned with preparing students with modern skills and tools that can be harnessed to address current and future challenges.

According to the World Economic Forum, not only is the global economy slow to generate new jobs, but also young people continue to be disproportionately affected by unemployment. This highlights the need for new approaches to education and job creation. Entrepreneurship is therefore seen as a vital solution for creating employment. With partners, PAUWES has adopted an innovative approach to promote entrepreneurship within the academic experience. For instance an active entrepreneurship club supported by training has been taken up positively by both students and staff.

The diversity of students and staff in the institution, in addition to conferences, workshops and webinars organized by the institution, brings together experts, scholars, entrepreneurs and policy-makers from different parts of the world. This presents an excellent opportunity for networking and connecting the students to the international community. Students also benefit from the large pool of PAUWES partners who sometimes offer them opportunities to conduct internships and master thesis research within their institutions. Additionally, the project developed an online platform established as the PAUWES Community of Practice³ to connect for interaction and collaboration

³ The PAUWES Online Community of Practice can be accessed on: <http://www.pauwes-cop.net/>

with, academia, practitioners, entrepreneurs and other insightful partners around PAUWES themes of water, energy and climate change.

The cooperation for higher education prioritized the need to support PAUWES integration into a scientific networks in Africa (and beyond) and have access to a wide network of potential partners. A step towards achieving this was the PAUWES Research-2-Practice Forum 2018 which brought together over 150 experts/scientists, education leaders, decision makers, entrepreneurs, private and public sector, policy makers, civil society actors and institutions interested or active in applied and practice-oriented research to discuss state of the art, challenges and innovative solutions in the areas of renewable energy, water and climate change and build strategic partnerships in Africa. PAUWES further leveraged this platform to consolidate and improve the PAUWES research agenda by bringing both research practitioners and practice-oriented experts together. It also improved the integration of PAUWES into scientific networks in Africa and beyond and established PAUWES as a Pan-African (and beyond) hub/platform for the topics of water, energy, climate change and their nexus.

The forum further contributed to PAUWES outreach and awareness to potential future collaborators. PAUWES received several propositions for future cooperation, partnerships and collaborations with various organizations, companies and institutions such as the Islamic Development Bank (IDB), AfriLabs, Africa Water Association (AfWA), Low Carbon Energy for Development Network (LCEDN), Africa Funded, among others. Additionally, this networking event contributed to the growth of the PAUWES community of practice, linkages to potential faculty and opportunities for students' internship. Other project networking strategies to broaden PAUWES included hosting online webinars with students and linkages to other projects such as RARSUS4, WASCAL5 for research and internships. These networking activities have greatly contributed to the connection between PAUWES and collaborators given the geographical location of Tlemcen and the international commuter possibilities in this area.

Scaling Entrepreneurship and Outreach at PAUWES

PAUWES recognizes that for long-term, high impact solutions that will respond to the unique challenges in the region, it is imperative to develop more sophisticatedly engineered innovations with high potential for scaling. Resources are needed to achieve this. As a first step, PAUWES now seeks to leverage the network created, the intra/entrepreneurial skills at hand, on a fabric of water and energy specialists to produce much needed products and services which address the development priorities of the continent. While entrepreneurship is not necessarily a trajectory for all students, it does come innately in some of the policy and engineering students. Nonetheless, partnerships are important in contributing further resource and capacity building for innovation and entrepreneurship.

⁴ Risk assessment and reduction strategies for sustainable urban resource supply in Sub-Saharan Africa

⁵ West African Science Service Center on Climate Change and Adapted Land Use

PAUWES seeks to achieve this in the short term by implementing 2 concepts:

1. *Transforming Master Theses into Products and Successful Businesses*

Internships and master theses provide excellent frames for the integration into engineering curricula of steps and processes for starting a new business based on identified challenges, opportunities and the development of concrete solutions and products respectively to address these challenges. PAUWES seeks to transform students' master theses into products around which a business model can be developed. This approach would build on the expertise, competences and resources of partners both from entrepreneurship ecosystem (AfriLabs) and academia (PAUWES and Stellenbosch University) for the design of a replicable and scalable model which can be adopted at the continental level. By scaling entrepreneurship initiatives at PAUWES through such incubation, PAUWES innovative graduates together with partners, can establish enterprises which can be accelerated and scaled. Enterprises that complement the objective of the Africa Union Agenda 2063, *The Africa We Want!*

2. *Doctoral Incubator*

Support African students with a focus on PAUWES and other PAU graduates in the development of a successful applied oriented PhD thesis which must lead to the creation of a sustainable start-up. Expected outputs of the program are "PhD products" such as start-ups, consulting companies, social enterprises and/or independent applied oriented research groups. The PhD products must address priorities of Agenda 2063 of the African Union in energy, water and climate change as formulated in the PAUWES research Agenda. The long-term objective of the program is to support the development of unique and sustainable start-ups, companies, enterprises, etc. providing complex and scalable knowledge-based solutions and services across the continent.

Conclusion

PAUWES continues to update its curriculum and seeks to grow a portfolio of climate change courses to be offered within each master's track. Despite the challenges, the project owes its success and achievements to the execution model of the project which put great emphasis on capacity building at technical and managerial level where by the consortium of higher education worked together with PAUWES to develop good organizational structures, reporting, setting deliverables within a time frame, for delivery of key results as stipulated in the project.

Most importantly, this was a good opportunity for collaboration between project personnel in both Germany and Algeria who came from different countries and worked closely with the personnel at PAUWES for the support to the student beneficiaries at hand. The coordination and support by PAU within the African Union Commission structure further helped to set systems for recruitment, student application and shortlisting and networking with other AU agencies. Achieving gender parity of students and faculty was highly emphasised throughout the project and having a 50-50 gender representation is a consistent message and goal for all the project partners.

There is a wide understanding that today's education needs to be aligned with preparing students with modern knowledge and tools that can be harnessed to address current and future challenges. Today's higher education in Africa should encompass a long-term vision of equipping the current generation of students with relevant skills that attend to the needs of their communities in Africa. In turn, students who are fuelled by a spirit of enquiry and supported with resources to developing innovative solutions for the challenges in their communities, can deploy their skills through entrepreneurship and intrapreneurship possibilities for job creation.

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