



Higher Education in Tunisia: Challenges and Opportunities

agya

ARAB-GERMAN
YOUNG ACADEMY
OF SCIENCES AND
HUMANITIES

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Introduction

Education is a high priority for Tunisia. In 2015, according to the UNESCO Institute for Statistics, 22.9% of the Tunisian government's total expenditure for the year went to education. Of that, nearly a quarter (23.9%) was dedicated to tertiary education*. The tertiary education system in Tunisia includes 204 public Higher Education Institutions, of which 13 are universities, as well as a network of 25 Higher Institutes of Technological Studies (HITS). In recent years, private tertiary education has also rapidly developed in the country, with the number of private university-level Higher Education Institutions growing from 39 in 2010 to 75 in 2018.

Despite the high level of government spending on education in Tunisia, however, the employability of graduates remains low, representing a significant challenge for the tertiary education sector. Many experts note a mismatch between graduates' qualifications and the demands of the labour market, particularly in terms of necessary technical and soft skills. How can tertiary education pedagogy be adapted in order to address these challenges and improve employment rates for graduates? What can professors and educators do to better help students develop transferable skills to improve their education-to-work transition and make them more flexible in their career paths?

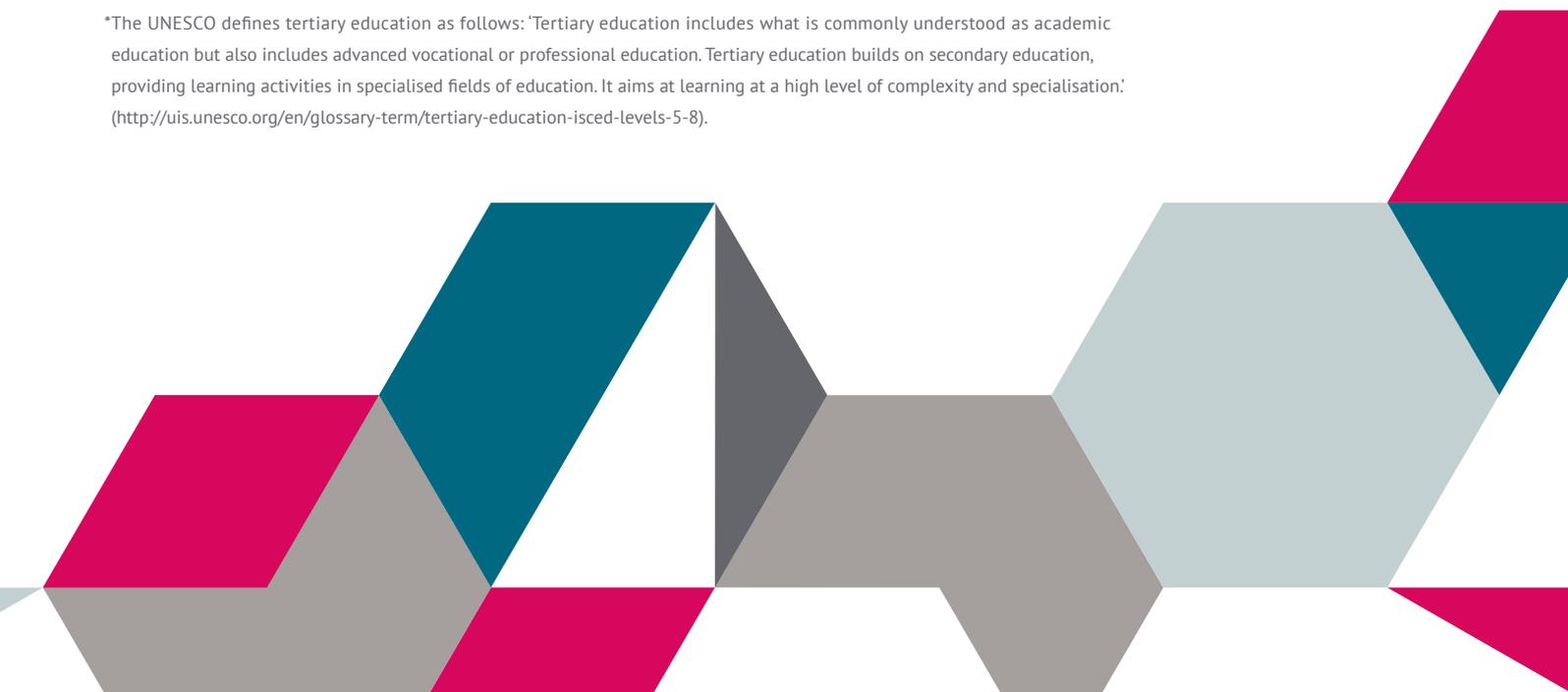
Through interdisciplinary and cross-cultural collaboration, members of the Arab-German Young Academy of Sciences and Humanities (AGYA) have been tackling just such questions about the higher education sector in Tunisia.

In May 2018, for instance, the AGYA Working Group on 'Arab and German Education' organized a three-day conference in Tunisia entitled 'Impact of Education on Employment: Cases from Germany and Arab Countries'. Meanwhile, in August 2018, AGYA members Tobias Redlich and Henda Mahmoudi organized a hands-on workshop in which eight highly motivated students from the National Engineering School of Tunis (ENIT) came to Germany to build an open source dual laser cutter from scratch in just one month. For the Tunisian students, the workshop offered an excellent opportunity for deep, interactive learning in an intercultural environment. In October 2018, this project was presented as part of an AGYA-organized panel on 'Science Education and Experimental Pedagogies' within the Conference 'Formation à l'Esprit Scientifique et Pédagogies Expérimentales d'Apprentissage' (FESPE 2018) held at the Tunisian Academy of Sciences, Letters and Arts, Beit AL-Hikma.

This brochure provides insight into different AGYA projects related to challenges and opportunities of the higher education system in Tunisia.

The policy recommendations focus on employment readiness among young graduates, with an emphasis on how North-South-South collaboration could help curb youth unemployment. They were developed by Academy members and international experts from over ten countries in the conference 'Impact of Education on Employment: Cases from Germany and Arab countries'.

*The UNESCO defines tertiary education as follows: 'Tertiary education includes what is commonly understood as academic education but also includes advanced vocational or professional education. Tertiary education builds on secondary education, providing learning activities in specialised fields of education. It aims at learning at a high level of complexity and specialisation.' (<http://uis.unesco.org/en/glossary-term/tertiary-education-isced-levels-5-8>).



International AGYA Conference Addressing the 'Impact of Education on Employment: Cases from Germany and Arab Countries'

Conference Report

Date

02 – 04 May 2018

Venue

Higher Institute of Human Sciences of Tunis (ISSHT),
University of Tunis El Manar, Tunis, Tunisia

A project of the AGYA Working Group Arab and German Education

Organizers

Dr. Henda Mahmoudi, Biotechnologist at International Center for Biosaline Agriculture (ICBA), Dubai, United Arab Emirates, AGYA member since 2013

Dr. Anis Ben Amor, Assistant Professor at Higher Institute of Humanities of Tunis, University of Tunis El Manar, Tunisia, AGYA member since 2016

PD Dr. Salma Balazadeh, Research Group Leader at Max Planck Institute of Molecular Plant Physiology, Potsdam, Germany, AGYA member since 2014

Unemployment remains a great challenge for Tunisia, especially for women, youth and residents of the country's interior regions. According to the World Bank, unemployment in Tunisia has declined from its peak of 19 % in 2011, immediately following the revolution, to 15.5 % in 2017. However, current unemployment rates still rest above pre-revolution levels (13 % in 2010). To better understand the relationship between education and employability, and to discuss best practices and new ideas for curbing unemployment among recent graduates, AGYA organized an international conference in Tunis entitled 'Impact of Education on Employment: Cases from Germany and Arab Countries'. Held over three days in early May 2018 at the Higher Institute of Human Sciences of Tunis (ISSHT) at the University of Tunis El Manar, 75 participants, including AGYA members and distinguished international speakers, discussed lessons learned from different national contexts with a focus on how collaborative North-South-South efforts could help solve problems faced by young graduates in Tunisia and elsewhere in the region.

According to the Organization for Economic Co-operation and Development (OECD) report 'Education at a Glance 2017', education has a substantial impact on employment prospects. Amongst OECD countries, on average, 84 % of the population with a tertiary education is employed. However, this varies by field of study: in 2017, employment among graduates of the arts, humanities, social sciences, journalism and information graduates is 81 %, while graduates with a background in information and communication technology (ICT) enjoyed 88 % employment. According to Lane and Conlon (2016), education systems face challenges in responding to changes in the skills demanded by labour markets, particularly those required by technological advances like those transforming today's global labour markets. Unsurprisingly, employment prospects for graduates today are higher among those with better ICT skills and those comfortable with using ICT for problem solving. Such competences may be developed outside of the formal education system and, in some cases, can help people find jobs despite having lower educational levels.

The conference participants hailed from more than ten countries and included scholars, stakeholders from universities, members of the private sector and representatives of government ministries. Over the course of eight panel discussions, they exchanged knowledge and experiences on topics such as:

- The challenges and the expectations in academia and industry collaboration
- The relationship between education and employment
- The collaboration between Arab countries and Germany for graduates' exchange
- How does education affect employment rates?
- Scientific research promotion and impact on employment
- Academics in STEM and employment opportunities
- Social change and the relationships between education and employment
- Effective education for employment: a global perspective
- Effective education for employment: enabling environments

In reflecting on the impact of the AGYA Working Group on 'Arab and German Education', AGYA member and conference co-organizer Henda Mahmoudi summarized: 'Since 2016, the working group has continuously engaged with challenges and prospects of the education system in Tunisia. We are convinced that this Arab-Arab-German collaboration creates significant added value as it builds bridges across disciplines and countries and fosters innovation over the long term.'

During the conference, the participants also had the chance to visit StartUp Haus Tunis, an Arab-German project implemented by the non-profit organization enpact in cooperation with the German Westerwelle Foundation. StartUp Haus Tunis is a best-practice example of an Arab-German collaboration that aims to foster an entrepreneurial spirit and culture in which a strong community can exchange ideas and promote peer-to-peer learning.

By providing a platform for knowledge exchange between Arab and German experts, the conference aimed at raising awareness among the stakeholders about the necessity of reforming tertiary education and other sectors in order to decrease high rates of youth unemployment, especially among graduates. From the conference's eight panel discussions and final 'Expert Forum Discussion', nine recommendations were formulated.



'Since 2016, the AGYA Working Group Arab and German Education continuously engages in discussions of challenges and prospects of the education system in Tunisia. We are convinced that this Arab-Arab-German collaboration creates significant added value as it builds bridges across disciplines and countries and fosters innovation over the long term.'

AGYA member Dr. Henda Mahmoudi,
Biotechnologist at International Center
for Biosaline Agriculture (ICBA), Dubai,
United Arab Emirates



Recommendations

Education is beneficial to societal transformation processes. Capacity building and strong partnerships especially in the higher education sector help support the shift in society towards a knowledge-based development. Within the framework of the international AGYA conference entitled 'Impact of Education on Employment: Cases from Germany and Arab countries', AGYA members and international experts from over ten countries discussed lessons learned and future prospects regarding education system reforms and employment readiness. They emphasised on how North-South-South collaboration between organizations could help curb youth unemployment and foster sustainable development opportunities in Tunisia. From the conference's eight panel discussions and final 'Expert Forum Discussion', the following recommendations were formulated:

Strengthen collaboration between academic institutions and industry.

Universities and research institutions play an essential role in the construction of knowledge-based economies. Academic institutions are central to driving innovations and creating highly-skilled workforce that build the foundation of a knowledge-based economy. Therefore, collaboration between academic institutions and industry in Tunisia should be strengthened both to improve graduates' employability and, at the same time, meet labour market needs for skilled manpower for economic growth.

Such collaboration would have a positive impact on:

- Employment opportunities for graduates;
- Regular enhancement and updating of academic programmes according to market needs;
- Research funding opportunities;
- Internship opportunities for students.

Promote and facilitate the knowledge transfer between Tunisian higher education institutions and industry, society and policy-making.

It is of utmost importance to develop structures to better utilise innovative findings and to transfer research results from higher education institutions into industry, society and policy-making alike. Higher education institutes should not only further open up to local and national businesses but also to international collaboration, which may also

help maintain new funds, bring more knowledge generated at Tunisian universities into practice and boost both quantity and quality of the research carried out. Exchange programs between staff from research institutions and industries may facilitate those collaborative partnerships on a local, national as well as an international level.

Train students with transferable skills by implementing general preparatory courses.

The education system in Tunisia must be transformed to enable new and innovative forms of learning that address additional needs of the labour market, such as the ability to communicate effectively and solve problems collaboratively. Such transferable skills apply for all professions and would better facilitate students' education-to-work transition and help them be more flexible in their career paths. General preparatory courses should be established within Tunisia's university system that provide students with transferable general knowledge and academic foundations. Such classes would also help students expand their knowledge and skills beyond their disciplinary boundaries.

These transferable skills are key both to the improvement of individual life prospects as well as to society as a whole: the employability of the individual is increased while the Tunisian society benefits from the economic development through better trained work force.

Promote dual study programmes taking best practices from Germany into account.

An example for successful cooperation between universities and potential future employers are dual study programmes. This concept could be implemented in the Tunisian context in a similar manner. Additionally, internship programmes for Tunisian university graduates at German or Arab companies in the region could further enhance the applicability of the graduate's skills. A transfer of best-practice-knowledge should be supported by organizing workshops and conferences where representatives of universities and companies from Germany, Tunisia, and other Arab countries can build networks of high-quality collaboration.

Increase the transnational short-term mobility in the field of education and training.

Transnational mobility in education is playing a crucial role for the promotion of life-long learning for individuals as well as in the modernisation of training and education systems in general. People working in the field of training and education like researchers, teachers and trainers in Tunisia should have the opportunity for short-term exchange visits in institutions in Arab countries and Germany that successfully use innovative educational methods. In these transnational short-term exchange visits, they would share good practices with their foreign colleagues and learn from each other. This cross-border cooperation will create added value on both sides as valuable knowledge will be exchanged and staff development and training will be further enhanced.

To facilitate and actively promote transnational short-term mobility, mobility barriers should be reduced and financial incentives as well as practical assistance to increase mobility should be offered.

Create expertise and collaborative initiatives in the field of (higher) education.

The sustainable creation of expertise and collaborative initiatives in the field of education should be fostered by establishing an Education Hub in Tunis. Here, regular events with international experts could be held and a focal point of educational cooperation in the region could be established. This would be supported by the fact that a new Franco-Tunisian University of Africa and the Mediterranean is also planned in Tunis. The opportunity of developing close relations to relevant institutions in Germany and other Arab countries while still in Tunisia might also increase the international mobility for Tunisian teachers and researchers.

Build strong partnerships between schools, families and communities.

Strong partnerships should be built between schools, families and communities, using modern communication tools to reduce communication challenges like time and distance. Increased family engagement is beneficial for the prosperous guidance of children to adulthood. Thus, strengthened partnerships and shared responsibilities between schools, families and communities would enable educational institutions to jointly take preventive measures to reduce early school dropouts.

Establish high-quality instruments to support career choices that match national labour market opportunities.

High-quality career guidance as well as data on skills and labour market trends for key economic sectors in Tunisia should be provided to students. Every university should have a single easy-to-access service point where prospective students, students and graduates can receive professional orientation, psychological support and capacity building opportunities in career and life-management skills. This would help individuals make well-informed career and learning choices.

Create a friendly environment for developing innovative business ideas and offer young entrepreneurs opportunities to network and pool their interests in North-South-South collaborations.

Young entrepreneurs should be supported through the provision of fast, non-bureaucratic grants for start-up projects in Tunisia. Students or graduates in the transition phase between studies and work should be able to apply, as individuals or teams, for government grants that would support turning their innovative ideas into reality or be used for testing or developing 'novel' products or services. Young entrepreneurs with innovative ideas should be empowered through support for start-up ecosystems and more access to statistics and data on Tunisian consumers. One-stop shops should be established for multiple services, such as office or co-working space, financial resources and legal advice.

These recommendations are the result of the discussions and presentations that took place during the panels and forum over the course of the conference. However, they may not necessarily represent the individual opinions of each participant.

Best Practice Example: Tunisian Students Replicate Open Source Hardware in a Month-long Workshop in Germany

Date

August 2018

Venue

'OpenLab Hamburg' at Germany's Helmut Schmidt University (HSU), Hamburg, Germany

Organizers

Dr. Tobias Redlich, Engineer at the Helmut Schmidt University (HSU), Institute of Production Engineering, Hamburg, Germany, AGYA member since 2014

Dr. Henda Mahmoudi, Biotechnologist at International Center for Biosaline Agriculture (ICBA), Dubai, United Arab Emirates, AGYA member since 2013

Short for 'fabrication laboratories', FabLabs are open manufacturing spaces where anyone can access robust and easy-to-handle production machines like 3D printers, CNC machines and laser cutters. They are also places for 'makers' to exchange knowledge and experiment. One such FabLab is 'OpenLab Hamburg' at Germany's Helmut Schmidt University (HSU), led by AGYA member Tobias Redlich. In a month-long AGYA workshop in cooperation with HSU, eight highly motivated students from the National Engineering School of Tunis (ENIT) built an open source dual laser cutter called 'LaserDuo'. The LaserDuo integrates two different laser sources, designed to cut and engrave a wide range of materials such as steel, wood, cloth or marble for digital fabrication projects. In line with the open source concept, all of the information needed to fix or reproduce the machine is freely available to the public. Coached by the LaserDuo's developer, Daniele Ingrassia, the students successfully built their own fully-functional machine from scratch in just one month.

The workshop was organized by AGYA members Tobias Redlich, the Chief Engineer of HSU's Laboratory for Manufacturing Technology (LaFT), and Henda Mahmoudi, Biotechnologist at the International Center for Biosaline Agriculture in Dubai (United Arab Emirates), in cooperation with Helmi Ben Rejeb from FabLab ENIT. It marked the second major German-Tunisian collaboration between AGYA and ENIT within the framework of the AGYA project 'Twinning for Innovation', which explores the groundbreaking potential of FabLabs and the open source movement to foster and empower grassroots innovation and value creation through international cooperation and knowledge exchange. 'AGYA invites us to think outside of the box and actively supports projects that transcend social and scientific boundaries', explains AGYA member Henda Mahmoudi regarding her motivation for joining the project.

'Within AGYA, we can realize our own research ideas and get funding for it', explains Redlich, citing one of the benefits of being an AGYA member. 'As the projects are interdisciplinary and always involve both an Arab and a German partner, the academy encouraged me to look beyond my own discipline and supported me in broadening my professional network in the Arab world – something I would not have done without AGYA. For this workshop, Tunisian AGYA members Henda Mahmoudi and Anis Ben Amor helped me set up the contacts in Tunisia. It's just fantastic!'



Interactive Learning and Knowledge Exchange in an Intercultural Environment

For the Tunisian students, the workshop offered an excellent opportunity for deep, interactive learning in an intercultural environment. Over the course of the month, they not only learned new theoretical concepts and technical skills related to digital fabrication, but also had the chance to apply their new knowledge in a complex project from start to finish. One student noted, 'This is the first time that we have lectures combined with a workshop and actually get to build such a complex machine'. While FabLab ENIT already provides the students with an important outlet in which to apply their studies in practical, self-driven projects, the AGYA workshop gave them experience on machines they currently lack in their own lab, and the knowledge and skills to execute complex open source hardware projects themselves.

The workshop also pushed the students, from different fields of studies including electrical engineering, mechanical engineering and computer science, to learn beyond their disciplinary specializations. 'I study computer science', one student reflected, 'so I didn't understand a lot about building this kind of machine beforehand. In this workshop, I gained a lot of practical knowledge, especially related to electronics and CNC machines that will be very useful in the future: on a personal level, because I want to do embedded programming, but also collectively, as we will use our new knowledge to expand the overall capability of our FabLab in ENIT. We'll teach new members the skills we learned'. More than the completed laser cutter, knowledge exchange and the potential to advance the growing FabLab and open source movement in Tunisia and the region was the most valuable takeaway for many of the workshop participants. As one student explained, 'In this hands-on workshop we learned how to build this laser cutter and when we return back to Tunis, we can share the knowledge of how it is built and how it works with the FabLab community in Tunisia and in other Arab countries'.

'While many people develop open source machines', noted LaserDuo developer Ingrassia, 'they are not building them with a set of students. This AGYA project is the first example of this model worldwide. We are going a step further and empowering the students to teach others to build this machine. They can teach all of Tunisia how to make the LaserDuo and, with that, make many other different kinds of machines. Thus, we are unlocking the full potential of open-source hardware as a model for innovation'.



'FabLabs might be the answer to the question of how to provide people around the world with the means and capabilities of local value creation in a globalized world.'

AGYA member Dr. Tobias Redlich,
Engineer at the Helmut Schmidt University (HSU), Institute of Production Engineering, Hamburg, Germany



Open Source Hardware Fundamentally Changes Manufacturing and Value Creation in Our Societies

'I feel that we're at the forefront of a movement that is really exciting', explains AGYA member Tobias Redlich. Though some engineers may not consider the students' feat cutting edge for the field, given that more sophisticated technology exists on the market, Redlich insists that 'the real value is the technology combined with the social impact and how manufacturing takes place in FabLabs. With decentralized production that can be controlled and customized locally, open source hardware changes the whole way of manufacturing and value creation in our societies and no one is talking about this in science.'

For Redlich, 'it's the interdisciplinary research questions we ask that are interesting. How do new digital fabrication technologies, the concept of open source, communities of practice like the 'maker community' and FabLabs, the internet, and international cooperation all work together and maybe form a new way of economy?' In his opinion, no single discipline can answer such a broad question: 'It's not just an engineering question or a social science question. It involves many different disciplines and perspectives, which is both an immense challenge and opportunity.' Redlich emphasizes that 'AGYA has been the ideal platform for incubating this kind of exciting, open-ended research across disciplines. It provided the initial power and energy needed to get the project started and now it's going strong, with concrete results! AGYA really helps raise the profile and legitimacy of cooperative, interdisciplinary research. It's amazing what we've been able to accomplish!'

Fablabs as Experimental Pedagogy

Short for 'fabrication laboratories', FabLabs are modern and open high-tech workspaces, which offer public access to the means of 'Digital Fabrication' in order to foster education and the realization of individual ideas. 'Digital Fabrication' means to manufacture things based on a digital model – it starts to change our everyday world and our commercial life in a fundamental way. FabLabs are usually equipped with a variety of machines like 3D-printers, laser cutters, a CNC milling machines, electronics compartment etc. FabLabs belong to the FabLab movement – a global network of more than 1000 open workspaces.

Concise courses for beginners provide fast and easy access to the utilization of the machines. Handling the machines does not require special training. Additionally, workshops, lectures and regular meetings offer the opportunity for networking and exchange, mutual learning and knowledge creation. FabLabs invite all students, pupils and private individuals, plus companies and other institutions, who are interested in craftsmanship, design and technology. In these open high-tech workspaces, contextualized learning in STEM takes place in an authentic, interdisciplinary, and collaborative context.

FabLabs are spaces for research, learning and innovation, and foster a lively, creative and collaborative community. The workshops pursue the concept of learning by doing: In the process of constructing truly functioning prototypes, users typically pass through several stages entangling different processes such as idea generating, sketching, concept, design, prototyping and experimenting as well as re-evaluation and reflection.



International AGYA Panel on 'Science Education and Experimental Pedagogies'

Date

11 October 2018

Venue

'Tunisian Academy of Sciences, Letters and Arts, Beit Al-Hikma', Carthage/Tunis, Tunisia

Organizers

Dr. Henda Mahmoudi, Biotechnologist at International Center for Biosaline Agriculture (ICBA), Dubai, United Arab Emirates, AGYA member since 2013

Dr. Anis Ben Amor, Assistant Professor at Higher Institute of Humanities of Tunis, University of Tunis El Manar, Tunisia, AGYA member since 2016

Dr. Vanessa Lux, Research fellow at AE Genetic Psychology, Ruhr University Bochum, Germany, AGYA member since 2014

As societies have become increasingly knowledge-based, higher education, research and innovation play a key role of cultural, socio-economic and environmentally sustainable development. Analyzing and discussing challenges and potential opportunities in the fields of education, research and innovation, the members of the AGYA Working Group Arab and German Education aim to give recommendations for reducing educational disadvantages, increasing the capacities of emerging students and scholars, and improving education systems. AGYA members from various disciplines come together to initiate projects on the boundary between science and society and to deepen the Arab-Arab-German knowledge exchange and cooperation.

In the International panel on 'Science Education and Experimental Pedagogies' AGYA members presented best practice examples for using active pedagogical techniques and discussed opportunities, challenges, and prerequisites of implementation in different contexts and countries. The panel served as roundup for several AGYA projects in the field of education and was the ideal opportunity to present capacity-building projects of AGYA members to a broader audience. The panel took place within the Conference 'Formation à l'Esprit Scientifique et Pédagogies Expérimentales d'Apprentissage (FESPE 2018)' organized by the 'Tunisian Academy of Sciences, Letters and Arts, Beit Al-Hikma' from 11 – 12 October 2018, in partnership with the Ministry of Education, the Ministry of Higher Education and Scientific Research, Ministry of Women,

Moderator

Dr. Anis Ben Amor, Assistant Professor at Higher Institute of Humanities of Tunis, University of Tunis El Manar, Tunisia, AGYA member since 2016

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Dr. Tobias Redlich, Engineer at the Helmut Schmidt University (HSU), Institute of Production Engineering, Hamburg, Germany, AGYA member since 2014

Dr. Henda Mahmoudi, Biotechnologist at International Center for Biosaline Agriculture (ICBA), Dubai, United Arab Emirates, AGYA member since 2013

Dr. Nuha Al-Shaar, Assistant Professor at the American University of Sharjah, Department of Arabic & Translation Studies, United Arab Emirates, AGYA member since 2014

Dr. Hamida Trabelsi-Bacha, Coordinator of the Anthropology Department at the Higher Institute of Human Sciences of Tunis (ISSHT), University of Tunis El Manar, Tunisia

Prof. Dr. Fadi El Hage, Delegate of the Rector for Regional Development and External Programs, Saint Joseph University of Beirut, Lebanon

Family, Childhood and the Elderly, ISEFC, CNIPRE, ESPRIT private university, UNICEF, UNESCO, ALECSO and AGYA. The conference was an excellent opportunity to broaden partnership structures in education, science and research.



About AGYA

The Arab-German Young Academy of Sciences and Humanities (AGYA) is based at the Berlin-Brandenburg Academy of Sciences and Humanities (BBAW) and at the Academy of Scientific Research and Technology (ASRT) in Egypt. It was established in 2013 as the first bilateral young academy worldwide. AGYA promotes research cooperation among outstanding early-career researchers (3–10 years after PhD) from all disciplines who are affiliated with a research institution in Germany or any Arab country.

AGYA Office in Berlin

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The academy provides support and funding for the innovative projects of its members in various fields of research as well as in science policy and education. To date, AGYA members have developed and carried out more than 150 interdisciplinary projects in over 60 cities and 30 countries. The diverse projects have dealt with topics relevant to society, such as scarcity of resources, public health, migration, education and cultural heritage protection. AGYA is funded by the German Federal Ministry of Education and Research (BMBF) and various Arab cooperation partners.

Imprint

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