© istockphoto.com

Why Should the Solution Lab Format Be Integrated in Higher Education in Tunisia?

Working Paper developed as part of the project "Solution Labs Tunisia"

funded by the German Federal Ministry of Education and Research (BMBF),
grant numbers 01DH20028A and 01DH20028B

Nizar Abdelkafi, Emmanuel Muller, Ridha Ben Cheikh, Andrea Zenker

Milan, Kehl, Tunis, Karlsruhe

November 2024

Publishing Notes

Why Should the Solution Lab Format Be Integrated in Higher Education in Tunisia?

Project: Solution Labs Tunisia

Websites: https://www.isi.fraunhofer.de/de/competence-center/politik-gesellschaft/projekte/sollab-tun_od.html

https://www.imw.fraunhofer.de/de/forschung/unternehmensentwicklung/digital-health/projekte/SolLab-Tun.html

https://www.hs-kehl.de/sollab-tun/

Funding Body: Federal Ministry of Education and Research (BMBF), supported by project management agency Projektträger Jülich, grants no. 01DH20028A and no. 01DH20028B

Authors and responsible for content

Prof. Dr. Nizar Abdelkafi, Politecnico di Milano School of Management, previously Fraunhofer Center for International Management and Knowledge Economy IMW, nizar.abdelkafi@polimi.it

Prof. Dr. Emmanuel Muller, University of Applied Sciences Kehl, muller@hs-kehl.de

Prof. Dr. em. Ridha Ben Cheikh, Ecole Nationale d'Ingénieurs de Tunis, ridha.bencheikh@enit.utm.tn

Dr. Andrea Zenker, Fraunhofer Institute for Systems and Innovation Research ISI, andrea.zenker@isi.fraunhofer.de.

Picture credits

Cover page: ©shutterstock.com/Rawpixel.com

Recommended citation

Abdelkafi, N.; Muller, E.; Ben Cheikh, R.; Zenker A. (2024): Why Should the Solution Lab Format Be Integrated in Higher Education in Tunisia? Milan, Kehl, Tunis, Karlsruhe: Fraunhofer ISI.

Published

November 2024

Acknowledgement

We extend our sincere gratitude to the German Federal Ministry of Education and Research (BMBF) for their financial support and to Projektträger Jülich for their administrative guidance throughout the project. We also deeply appreciate the dedication and contributions of our Tunisian colleagues and partners, whose willingness to experiment and co-develop the "SolLabTUN" approach has been instrumental in advancing this innovative initiative.

Contents

1 Abstract and Overview

In higher education, particularly in fields such as engineering, business, and technology, there is an increasing need for educational approaches that bridge the gap between theoretical knowledge and practical application. One such innovative approach is the Solution Lab (SolLab) format, which has been successfully implemented in Germany and then in Tunisia. A Solution Lab provides a platform where many participants such as students, young entrepreneurs, experts with specific knowledge in certain technical areas and eventually company employees come together to address real-world challenges proposed by businesses. Through a combination of collaborative problem-solving, mentorship, and direct engagement with companies from the manufacturing and service sectors. Solution Labs can be considered as a format that prepares participants for the professional world and enables industry to benefit from the skills and competencies residing in the University. This paper introduces briefly the various aspects of the Solution Lab format as it has been implemented in Tunisia, emphasizes its importance for education at master's level programs, stresses its role in fostering collaboration with industry and diverse institutions, and finally identifies the DICAMP master program on innovation management at the National Engineering School of Tunis (ENIT) as an ideal context to integrate the Solution Labs in higher education.

2 Introduction: Overview of the General Characteristics of Solution Labs (SolLab) Developed in Tunisia

The Solution Lab format is a distinctive and innovative format that brings together a diverse group of participants, including - among others - students, young entrepreneurs, and company employees, to work collaboratively on concrete challenges proposed by companies. These challenges can vary widely, encompassing technical, business, and marketing-oriented problems. The diversity of the challenges ensures that participants are exposed to a broad range of real-world problems, allowing them to apply their academic knowledge and skills in a practical context.

The structure of the Solution Lab spans five days, during which participants, referred to as talents, work in teams under the supervision of two coaches. The role of the coach is primarily that of a facilitator, guiding the group through the problem-solving process without directly contributing to the development of the solution. This approach places the responsibility for innovation on the talents, encouraging them to think creatively and work collaboratively. The final day of the Solution Lab is dedicated to presenting the solutions to the participating companies. This presentation not only provides a platform for feedback but also opens the door to potential follow-up activities, where promising ideas can be further developed and implemented.

The Solution Lab is a flexible format. While the standard duration of a lab is five days, experiments with four-day formats have been conducted, demonstrating the lab's adaptability to different time constraints and contexts. The success of the format in Tunisia is evidenced by the fact that, in addition to the five labs conducted with project funding, two labs have been organized independently using local resources. This independent adoption highlights the value and potential that local stakeholders (e.g. Mechatronic cluster) see in the Solution Lab.

The challenges addressed in Solution Labs have a broad spectrum. Whether tackling a technical problem, elaborating a marketing strategy, or developing a business model, participants can apply their knowledge in a real-world context, thereby deepening their practical skills. This hands-on approach is particularly valuable where the ability to innovate and develop out-of-the box solutions is increasingly important.

Moreover, the Solution Lab format emphasizes teamwork and collaboration, which are skills that are essential in the modern workplace. By working closely with others, participants learn to communicate effectively, manage conflicts, and leverage the diverse perspectives of their team members to develop innovative solutions. These experiences prepare participants for the challenges of their future careers and help them build interpersonal skills.

3 Educational Value for Professional Master Level Programs

Integrating Solution Labs into Master level programs offers significant educational benefits that go far beyond traditional classroom learning. At the master's level, students are expected to move beyond theoretical knowledge and begin applying what they have learned in more complex, real-world situations. The Solution Lab provides an ideal platform for this transition, offering a structured yet flexible environment in which students can engage with practical problems while still benefiting from the guidance and support of their instructors, who can take the role of coaching or co-coaching.

One of the primary educational advantages of the Solution Lab format is its emphasis on applied learning. In contrast to traditional lecture-based courses, where students primarily absorb information, Solution Labs require students to actively engage with the problem at hand and get involved in problem-solving. This can help students develop a deeper understanding of the subject matter. Furthermore, by working on concrete industry problems, students can see the direct relevance of their academic studies to the professional challenges they will face after graduation.

In addition to deepening their technical expertise, students participating in Solution Labs also have the opportunity to develop a wide range of soft skills that are increasingly valued in business. These include teamwork, communication, and conflict resolution, as well as the ability to manage stress and work under tight deadlines. The collaborative nature of the Solution Lab format encourages students to work closely with their peers, learning to work in groups, while also developing their leadership and organizational skills. This enhances the employability of students and ensures that they are better equipped to contribute to the success of the organizations they join.

The Solution Lab format is particularly well-suited for integration into courses that require a combination of technical and business perspectives. For example, in business and innovation classes, students can use the lab as a platform to develop creative solutions to real-world problems, while in technical or industrial engineering programs, the lab can provide a space for students to apply their technical knowledge to industry-relevant challenges. This versatility makes the Solution Lab format an excellent fit for a wide range of academic disciplines, allowing it to be tailored to the specific needs and goals of each program.

4 Collaboration with Industry

The Solution Lab format also offers significant opportunities for collaboration between universities and industry, which can bring substantial benefits to both sides. For universities, working with industry partners allows them to ensure that their curricula remain relevant and aligned with the needs of the job market. By involving companies directly in the educational process, universities can provide their students with access to real-world challenges and the latest industry trends, ensuring that graduates are well-prepared for the demands of their future careers.

For companies, participating in Solution Labs offers a unique opportunity to engage with the next generation of talents and actively contribute to the development of the future workforce. By providing challenges for students to work on, companies can gain fresh perspectives on their problems and explore innovative solutions that they may not have considered otherwise. Furthermore, by sending employees to support student groups during the lab, companies can play a direct role in shaping the education of future professionals. This involvement not only helps to ensure that students develop the skills and knowledge that are most relevant to the industry but also allows companies to spot and recruit promising talents before they even graduate.

The collaboration between universities and industry facilitated by Solution Labs also supports technology transfer and innovation. By working closely with companies, students and faculty can gain insights into the latest industry trends, which can then be integrated into the academic curriculum. This enhances the relevance of the education provided but also helps to drive innovation that is relevant for the local economy.

In Tunisia, the Solution Lab format has already demonstrated its potential to foster strong links between universities and industry. By continuing to build on previous experiences and expanding the program to include more companies and academic institutions, the Solution Lab model can play a key role in strengthening the country's innovation ecosystem and supporting the development of a highly skilled workforce.

5 The Case of ENIT/DICAMP Program

The partnership with the National Engineering School of Tunis (ENIT) represented an excellent case of how the Solution Lab format can be successfully integrated into higher education. DICAMP, ENIT's innovation management master program, with its focus on innovation, creativity, entrepreneurship, and open innovation, is particularly well-suited to incorporating Solution Labs. The DICAMP program is an ideal setting for the integration of Solution Labs, as the program already includes courses that align well with the objectives of the Solution Lab format, making it a natural fit for this approach. During the project, many DICAMP students participated in the labs, demonstrating high levels of motivation and engagement. Their involvement enhanced their learning experience and creativity, as it has been reported by the students themselves during the Solution Labs organized within the scope of the project. The integration of DICAMP students also provides first evidence that the Solution Lab format can be integrated successfully into academic curricula.

Looking ahead, ENIT could take over the organization and implementation of Solution Labs, making them a permanent feature of the DICAMP program. This would allow students to continue benefiting from this format. By involving industry directly in the educational process, ENIT can offer a curriculum that is closely aligned with the needs of the market, thereby producing graduates who can drive innovation in the Tunisian industry. The active participation of companies, particularly through sending employees to support student groups, further strengthens the link between education and industry.

By integrating Solution Labs into the DICAMP program, ENIT can offer a more dynamic and engaging learning experience for students. This approach benefits students and can provide industry with a direct link to the next generation of talent. By involving companies in the educational process, ENIT can ensure a more sophisticated practical orientation of the DICAMP program, which in turn becomes more attractive for master students

6 Conclusions

The Solution Lab format represents an excellent tool for bridging the gap between academia and industry in Tunisia. By providing students with the opportunity to work on real-world challenges in a collaborative, hands-on environment, Solution Labs offer a unique and valuable learning experience that prepares them for the requirements of industry. The integration of Solution Labs into master's level programs can help to ensure that students develop further technical expertise and soft skills.

Furthermore, the Solution Lab format provides significant opportunities for collaboration between universities and industry. By involving companies directly in the educational process, universities can guarantee that their curricula remain relevant and aligned with the needs of the job market, while companies can gain access to fresh perspectives and new ideas. ENIT's DICAMP Master program can serve as a prime example of how the Solution Lab format can be successfully integrated into higher education. The potential for expanding this model to other institutions and programs is immense.

The integration of Solution Labs into the DICAMP program can be done as a project independent of a specific lecture or as a mini-project integrated into a specific course. One basic idea behind the Solution Lab is that there is no competition, because the participating teams should work together in a collaborative way. Each team can help the others with advice and concrete support. However, the use of grades to evaluate student performance in the Solution Lab can create a competitive environment among students, which is against the basic principle of no-competition. This aspect needs to be critically considered in the future. One possible solution is to use only 'pass or fail' as possible outcomes of participation in Solution Labs instead of using a grading system that assesses different performance levels of students. In conclusion, the integration of the Solution Lab format into higher education in Tunisia offers significant benefits for students, universities, and industry alike. By continuing to build on the successes of the existing labs and expanding the program to include more participants and challenges, the Solution Lab approach can play a key role in fostering technology transfer and University-Industry collaboration.