Documentation to the Students Led Society Engaging to Sustainability.

Number of student organizations related to sustainability:

There are 20 students' organizations related to sustainability organized and participated in many activities. The number of students' events related to sustainability is 50 events in 2019 till present.

ACS Alexandria University student Chapter organized the following events:

- Celebration of earth week in 2019 and 2021 (Alexandria University, Egypt).
- Participation in Earth Day event titled "Climate extremes and sustainable development challenges"
- (Alexandria University, Egypt) Evidence Link: https://www.facebook.com/ACS-Alexandria-niversity-107240247822488 Training of the Safety and Health Student Team at the Faculty of Science (Alexandria University) Additional evidence link:

http://www.alexu.edu.eg//index.php/ar/?option=com_content&view=article&id=5882&catid=21&lang=ar-AA

ACS Alexandria University student Chapter celebration of earth week in 2019 and 2021 (Alexandria University, Egypt)

CCEW Celebration 2021 (Alexandria University, Egypt)

ACS Alexandria University student Chapter participation in Earth Day event titled "Climate extremes and sustainable development challenges" (Alexandria University, Egypt)

Paper club (ACS Alexandria University student Chapter)

CHEMISTRY SHOW AND INFO DESK ABOUT ACS ALEXANDRIA UNIVERSITY STUDENT CHAPTER

Training of the Safety and Health Student Team at the Faculty of Science

Students attending the university council meeting

Dr. Abdel Aziz Qansouh, President of Alexandria University, welcomed at the University Council meeting, on May 21st the students attending for the meeting and honored the winning research students in Alexandria University initiative to support research of students, The winners were announced by the University's Project Management Unit, where 72 research students submitted 72 research proposals to it.

*

Under the auspices of Alexandria University, the fourth international conference on pedagogical innovations and technology-enhanced learning APITEL 2022

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Program Details:	
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English language requirements	The Applicant must obtain a TOEFL score of 550 PBT (Paper Based Test), 79 iBT (Internet Based Test), or IELTS score of 6.0 Candidate can be admitted conditionally if he/she passes the Alexandria University English Proficiency Test (AUEPT)
Duration of Study	36 Credit Hours
Delivery Mode	Blended learning (50% on-campus face-to-face lectures and 50% self-study with online materials)
Intake	Spring & Fall
Tuition Fees	The program consists of 12 courses. The fee of each course is 2000 LE plus an administrative fee of 2000 LE per semester.

The President of Alexandria University receives the Consul General of China

Dr. Abdelaziz Konsowa, President of Alexandria University, received today, Thursday, June 16, 2022, Ambassador Jiao Liing, Consul General of China in Alexandria, where they discussed ways of cooperation and completing the steps for establishing the Confucius Institute at Alexandria University in cooperation with Shanghai University in China, in the presence of Dr. Wael Nabil, Vice President for Affairs Education and Students, Dr. Mohamed Abdel Azim Abul-Naga, Vice President for Community Service and Environmental Development, and Dr. Sameh Shehata, supervisor of the International Relations Office at Alexandria University.

Cooperation with South Korea for teaching and disseminating the Korean language

Dr. Ashraf El-Ghandour, Vice-President of Alexandria University for Graduate Studies and Research, and Dr. Sameh Shehata, supervisor of the International Relations Office at Alexandria University, received Mr. Oh Seung-ho, Cultural Counselor of the South Korean Embassy, to discuss ways of cooperation between the two sides in the field of teaching and disseminating the Korean language and culture in Alexandria.

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OPEN EDUCATIONAL RESOURCES, PEDAGOGIES, PRACTICES AND POLICIES: A DISRUPTIVE INNOVATION

	23 October 2021
9:30 am-11:00 am	Inauguration Moderator Prof. Ghada El Khayat https://cutt.ly/RgpnOkT
9:30 am-11:00 am	Welcome and Inaugural Speeches His Excellency Prof. Abdel Aziz Konsowa President of Alexandria University His Excellency Prof. Wael Nabil Vice President of Alexandria University for Education and Student Affairs His Excellency Prof. Essam Khamis Advisor to President of Alexandria University for International Ranking and Scientific Research Member of the UNESCO Open Science Advisory Committee Open science: Its Basic Pillars and Operationalization in the Arab Region
11:00 am-12:40 pm	Plenary Keynote Speeches (1): Basic Facts on Open Educational Resources Moderator Prof. Maha Adel, Alexandria University https://cutt.ly/RgpnOkT
11:00 am- 11:25 am	*"Are OER open for all?" (Prof. Mohamed Koutheaïr Khribi, Mada Center, Qatar)*
11:25 am- 11: 50 am	*"Open education between the specifications of Creative Commons and Copyright" (Dr. Mokhtar Ben Henda, Bordeaux Montaigne University, France)*
11:50 am- 12:15 pm	*"OER lessons learned: Pros and Cons" (Prof. Mahmoud Khalil, Alexandria University, Egypt and Beirut Arab University, Lebanon)*
12:15 pm- 13:00 pm	Break

2

13:00 pm -14:15 pm	**Plenary Keynote Speeches (2): Changing Practices with OER** **Moderator Dr. Bilal Said, Softeam Docaposte, France** **https://cutt.ly/RgpnOkT**
13:00 pm- 13:25 pm	*"Pedagogical innovation through Open Educational Practices" (Prof. Haifa Ben El Hadj, Qatar University)*
13:25 pm- 13:50 pm	*"Open learning environments to support innovative teaching" (Dr. Lilia Cheniti, Sousse University, Tunisia)*
13:50 pm- 14:15 pm	*"Advancing Open Educational Practice in line with UNESCO OER recommendation"(Dr. Fawzi Baroud, Notre Dame University, Lebanon)*
14:15 pm- 14:30 pm	**Break**
14:30 pm– 16:10 pm	**Plenary Keynote Speeches (3): Novel Practices and Directions** **Moderator Dr. Rim Hafez, Alexandria University** **https://cutt.ly/RgpnOkT**
14:30 pm- 14:55 pm	*"L'innovation pédagogique au service de l'employabilité des enseignants" (Dr. Sana Safa, AUF)*
14:55 pm- 15:20 pm	*" RELs et Pédagogie inversée » (Prof. Mohamed El Hadi Benelhadj, Université Abdelhamid Mehri Constantine 2)*
15:20 pm- 15:45 pm	*"L'éducation ouverte: un atout pour les pays en développement" (Prof. Mona Laroussi, OIF, Sénégal)*
15:45 pm- 16:10 pm	*"Concevoir les enjeux émotionnels et cognitifs pour mieux gérer l'apprentissage à distance" (Prof. Shereen Kakish, Université de Jordanie)*
16:10-16:35	**Teaching with labXchange** **An Introduction by Prof. Pierre Noro, Sciences Po, Paris** **Moderator Dr. Ghada El Khayat, Alexandria University** **https://cutt.ly/RgpnOkT**
	End of Day 1

24 October 2021				
9:00 am- 11:00 am	Parallel Sessions			
9:00 am- 11:00 am	Research Papers Session (Moderator: Prof. Amany Amin Reda) https://cutt.ly/Qgpb60a	Tutorial Session Designing electronic interactive book (Dr. Noha Hassan and Dr. Doaa Hussein)(Moderator Dr. Seddika Lasheen) https://cutt.ly/agpcRs1	Tutorial Session Online and offline interactive tools in education (Dr. Dina Weheba and Dr. Dina Salem)(Moderator Dr. Hala Zaatout) https://cutt.ly/Lgpvsgy	
11:00am -12:30pm	Presentation of the Pedagogical Innovation Success Story, Competition of Applications and Practices in Pedagogical Innovation Moderator Dr. Ghada El Khayat https://cutt.ly/lgpn6qp			
12:30 pm-13:00 pm	Closing https://cutt.ly/lgpn6qp			
13:00pm- 19:00pm	Workshops in Collaboration with FLDC, Alexandria University			
13:00pm- 19:00pm	MOOCs Development and Management	Mentoring and Tutoring in Digital Environments	Learning Management Systems	Flipped Classroom	Introduction to Competency Based Education
16:00pm- 16:30	Break			
16:30pm- 19:00pm	MOOCs Development and Management	Mentoring and Tutoring in Digital Environments	Learning Management Systems	Flipped Classroom	Introduction to Competency Based Education
End of Day 2				

25 October 2021					
9:00 am- 17:00 pm	Continuation and end of workshops				
9:00 am- 11:00 am	*Teaching with labXchange Workshop* *Pierre Noro and Andrew Minor* **Moderator Dr. Lilia Cheniti** https://cutt.ly/sgpm9iD				
11:00 am- 14:00 pm	*MOOCs Development and Management*	*Mentoring and Tutoring in Digital*	*Learning Management Systems*	*Flipped Classroom*	*Introduction to Competency Based Education*
14:00 pm- 14:30 pm	Break				
14:30 pm- 17:00 pm	*MOOCs Development and Management*	*Mentoring and Tutoring in Digital*	*Learning Management Systems*	*Flipped Classroom*	*Introduction to Competency Based Education*
End of the event					

Research Papers Session Moderator Prof. Amany Amin Reda, Alexandria University
"Online Academic Program Follow-up System by Integrating Several Educational Platforms through APIs". Mohamed Abdel Hafeez, Mohamed Soliman, Faculty of Engineering, Alexandria University, Egypt
"Teaching Research Methodology and Supervision: Conceptions, Challenges, and Practices of Alexandria University Instructors". Mohamed Sultan, Ghada Elkhayat, Sarah Osama, Alexandria University, Egypt
"Teaching Research Methodology and Supervision of Research Students: Best Practice Guidelines". Sarah Osama, Alexandria University, Egypt
"Classification des Profils des Enseignants selon leur Rôles dans l'Enseignement en Ligne » Youssef Eliane, Zeitoun Samar, Sawma Gilbert, Faculty of Education Lebanese University Beirut
« Concevoir les enjeux émotionnels et cognitifs pour mieux gérer l'apprentissage à distance » Shereen Kakish, Université de Jordanie
"Efficacy of a Prerequisite Pre-Clinical Simulation-based Course for PreSpeech-Language Pathology/PrePhonetics Tutoring: A Case Study", Amira Alaa Eldin Khalifa, Phonetics and Linguistics Department Faculty of Arts, Alexandria University Alexandria, Egypt
"Using an innovative training device that simulates the skill of the high jump", Mohamed El Mokataf, Faculty of Sports Education for Men, Alexandria University
"Four Corners Learning Strategy", Dina Salem, Faculty of Tourism and Hotels, Alexandria University
"The Art of Interactive Educational Movies", Dina Nabil, Faculty of Fine Arts, Alexandria University

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What do you mean by learning lab?

Eric Sanchez[1] · Elsa Paukovics[1] · Lilia Cheniti-Belcadhi[2] · Ghada El Khayat[3] ·
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Abstract

Digital and innovation competencies are nowadays highly required for students and faculty members in higher education institutions. We therefore need environments that incubate innovative learning scenarios to develop these competencies. We conducted a design-based research with the dual objective to develop learning labs in four universities and to document the design and implementation process and the addressed challenges. In this paper, we describe the concept of learning lab and the process of its setting up based on the experiments and observations conducted in the four learning labs in Lebanon, Egypt, Tunisia and Switzerland. A learning lab is defined as a physical, digital and human space for observation, experimentation and evaluation, to rethink and enrich learning and teaching attitudes and practices at the university. A learning lab is an incubator of pedagogical innovation and digital learning structured on three dimensions: spaces, activities and communities. We also identify the main challenges for the design and implementation of a learning lab. These challenges consist of the institutionnalisation of the learning lab and building, growing and nurturing a learning community.

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1 Introduction

During the last few years, we have observed a huge need in educational systems to empower learners with competencies that are more and more needed in the labour market and for citizenship such as innovation, collaboration, problem solving, critical thinking and digital literacy. This leads academic institutions to work on teaching and learning approaches, to facilitate the development of such competencies and to promote pedagogical innovation and digital learning. Indeed, pedagogical Innovation, is now considered as a priority in many higher education institutions and almost systematically included into their strategies. The pandemic during the last months that resulted in an intensive use of technologies for learning and teaching has highlighted its value.

It is important to support the various academic actors in the process of integration of digital and pedagogical innovation. We therefore need support structures for educational innovation experimentation in universities. This support can be a physical and/or a digital environment to incubate pedagogical innovations and to facilitate the design and deployment of innovative and digital learning scenarios.

In this paper, we present the concept of *learning lab*, and analyse its specificity, characteristics and components. We also propose a model for the design, deployment and evaluation of learning labs in academic institutions. We detail the implementation and the experimentation of this model as well as the lessons learned in four academic institutions from four different countries.

This paper is structured as follows. In the first section, we introduce the general context of higher education, and more specifically aspects related to digitalisation and innovation. In the second section we present the concept of a learning lab as an environment dedicated to foster digitalisation and innovation. We describe its characteristics and give a summary of the research contributions related to this topic. In the third section, we first present our research questions and describe our research methodology related to these questions. We then propose in the fourth section our model to conceptualize a learning lab and describe the way this model has been implemented and deployed in a network of four academic partners as well as the lessons learned based on the data collected. The last section is dedicated to a conclusion and future research perspectives.

2 Context: Digitalisation and innovation in higher education

The ongoing sanitary crisis demonstrated that the digitalization of higher educational systems offers opportunities in terms of remote or blended learning and teaching. However numerous challenges still need to be faced and do not only rely on the technical dimension of learning and teaching. From the teachers perspective, there is a need to conceive and adopt more innovative pedagogy and the challenges

rely on their scholarship of teaching and learning (SoTL) that should be driven by a systematic inquiry and involves critical reflection as well as scrutiny by peers (Kreber, 2002, Colet & al., 2011). We know that the challenges consist of adopting a more constructivist approach (Biggs & Tang, 2011), to improve students' assessment practices (Boud & Falchikov, 2007) and to integrate ICT into their teaching practices (Cuban & Jandrić, 2015). From the students perspective, there is a need to develop new ways of learning, for example, more autonomous and more collaborative learning methods, to develop students agency and digital skills (Trede al., 2012). From both perspectives, teachers and students need to develop digital competencies. These competencies are described in different general frameworks addressing citizens or more specific frameworks considering educators (see for example Redecker, 2017). The efforts made by higher education institutions for the development of these competencies aim to promote innovation in education.

Innovation is the enrichment of social practices (Chevallard, 1982) and is defined as a process which includes the production, acceptance and implementation of new ideas, processes, products or services (Marinova & Phillimore, 2003). Babic and Nedelko (2020) consider innovation in higher education as a process which consists of institutional adaptation to changes in an ever changing environment. This adaptation enables higher education institutions to improve their existing practices. Innovation takes different forms and addresses different levels. O'Banion et al. (2011) emphasize the need to create a culture of innovation at the institutional level. The expression "culture of innovation" refers to a state of mind, shared values and practices that value imagination and creation, collaborative work, reflection about uses and users, favour interactions, sharing of knowledge, risk-taking, but also adaptation in iterations through mental and organizational flexibility (Forest, 2018).

Innovation in education is a challenge addressed by a consortium of four universities from Lebanon, Egypt, Tunisia and Switzerland (LETS) through the design of learning labs in four different countries and academic contexts. The consortium is involved in the design and the implementation of a learning lab dedicated to pedagogical innovation in each of the 4 universities. The LETS Learning Lab project's objectives consist of (1) fostering a culture of pedagogical innovation, (2) developing innovative educational practices and (3) developing the students and teachers digital skills. In the next section we present a brief review of the state of the art related to pedagogical innovation and present the definition that we propose for the learning lab concept.

3 Learning lab, state of the art

3.1 Pedagogical innovation in higher education

Pedagogical innovation relates to innovation in teaching and learning. Pedagogical innovation consists of changing the curricula and the way they are offered through the implementation of new methods for teaching and learning (Bajada et al., 2019). When innovative educational practices are being researched, the focus is often on digital technology. However, pedagogical innovation focuses on education and not on technology (Lison et al., 2014). Furthermore, innovation is context-dependent (Lison et al., 2014), which means that it is not the artifact or its features which is important but

its introduction in a specific context. This implies that any attempt to innovate should be based on a context-analysis. Cros (2004) describes 5 components of pedagogical innovation: "the novelty, the object, the change, the finalized action and the process". In other words, pedagogical innovation is based on a contextualized and relative novelty and the change results from a finalized action, which is considered as part of a process.

In the last decade, pedagogical innovation has been widely explored with respect to school contexts but less commonly in higher education (Fraser, 2019). Thus, pedagogical innovation is still an important challenge for higher education institutions. Indeed, with the development of digital technology and the transformation of professions, teaching and learning methods need to evolve. In addition, the changing needs of students and teachers (Mai Walder, 2014) lead to the diversification of training modalities. However, pedagogical innovation is not limited to teachers' practices since the innovation in students' learning processes may be independent of any teaching practice (Silver et al., 1997). This means that students matter, and that pedagogical innovation should consider both teaching and learning practices.

The consortium of the LETS Learning Lab project addresses the issue of pedagogical innovation through the design and the implementation of a learning labs in each of their 4 universities.

3.2 Learning lab, towards a definition

Our approach to pedagogical innovation consists of the design and implementation of a learning lab in each university of the consortium. The term laboratory (lab) refers to both: a place dedicated to work (*labor* in Latin), to manufacture something and a place dedicated to scientific experimentation. Thus, the expression "learning lab" refers to both practice (to create something) and research (to experiment something) about learning. Within this context, learning can be understood in its broad sense as developing new teaching practices for teachers or new learning strategies for students. Therefore, a learning lab comes within the Scholarship of Teaching and Learning (Kreber, 2002).

We found a very limited number of research papers attempting to define what a learning lab is. Most of the other available resources are websites, brochures and blogs produced by stakeholders and practitioners. As a result, different definitions of what a learning lab is in higher education come from the hosting institutions websites. The *Stanford Learning Lab*[1] created in 1997 is a place dedicated to carry out "projects to improve the quality of teaching and learning in higher education through effective application of information technologies and the sciences of learning". The *EM Learning Lab*[2] website states that "a learning lab is a place and an ecosystem for experimentation and innovation on new forms of collaborative work and collaborative learning. These innovative collaborative spaces make simultaneous use of digital tools, environments, equipment, learning materials and pedagogical methods that promote collective intelligence". The website of the *Learning Lab Network*[3] provides criteria, actions and issues related to the learning labs.

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[1] http://sll.stanford.edu/

[2] https://executive.em-lyon.com

[3] https://www.learninglab-network.com/

A literature review shows that there is a diversity of approaches followed by researchers. Thus, a learning lab is either a method of intervention, a program (Bal et al., 2018), a physical (Carron et al., 2018) or digital (Zinger et al., 2017) space, often located in the library of the university (Cartier, 2014). In terms of objectives, we found the same diversity: a learning lab is dedicated to address educational or social challenges such as racism and equity (Bal et al., 2018) and natural hazards (Shabudin et al., 2017). Some researchers consider that a learning lab aims at training students in general or improving the students' (Brehm & Guenzel, 2018; Kift, 2017) or teachers' (Zinger et al., 2017) digital skills. We also found a diversity of contexts for the implementation of a learning lab such as governmental organizations, high schools (Bal et al., 2018), engineering schools (Carron et al., 2018) and universities (Kift, 2017).

Based on this literature review and from our perspective, we consider that a learning lab should enable a process aiming at both improving teaching and learning practices based on the use of digital technology in higher education (pedagogical innovation) and promoting a culture of innovation.

4 Research questions and objectives

Most definitions emphasize that a learning lab is dedicated to educational innovation and is based on the collaborative work of stakeholders. However, there is not yet a common vision about what a learning lab is. As a result, there is a need to conceptualize it and to understand how a learning lab can be developed and implemented to meet the challenges faced by the institutions involved in the LETS Learning Lab project.

This contribution aims to address 2 research questions (RQ):

- RQ1 relates to the conceptualization of learning labs to support pedagogical innovation in higher education. What are the core elements of a learning lab dedicated to pedagogical innovation and how these elements interact ? We address this question by building a model of a *learning lab* based on the empirical work carried out by the LETS Learning Lab Network. This model should emphasize the elements enabling to foster pedagogical innovation and to promote a culture of innovation.
- RQ2 relates to the description of the implementation of the proposed model in the 4 contexts addressed by the LETS Learning Lab Network. We consider the success of this implementation in different contexts as a proof of concept which values the model and validates its generecity. This success is assessed with data collected from the different contexts. We also want to describe the concrete elements that are produced in the different contexts as well as the difficulties faced, and the lessons learned.

In the next section we present in detail our research methodology and the research process that we have adopted to design and set up the learning labs.

5 Research methodology

5.1 A design-based research methodology

The LETS Learning Lab project consists of combining theory and practice. Hence, the methodology is design-based. Design-Based Research (DBR) (Anderson & Shattuck, 2012; Design-Based Research Collective, 2003; Penuel et al., 2007; Sanchez et al., 2017) is a specific type of collaborative research aiming at combining pragmatic and theoretical issues. DBR first perspective is focused on the design of a specific educational setting which is, for this project, a learning lab implemented in each of the 4 partner institutions. DBR stands out as a kind of engineering science, whose main aim is the intelligent transformation of practices. The second perspective is tightly related to the first one. DBR proposes some middle-range theories where the conceptual tools that are developed aim to improve practices.

We consider DBR to be particularly well-suited to our objectives. Indeed, the objectives of the LETS Learning Lab consortium are pragmatic. The project is driven by the willingness of 4 academic institutions to foster pedagogical innovation and to develop the needed instruments. In addition, through the development of a generic model of what a learning lab is, the consortium also aims to address theoretical objectives.

The achievement of the articulation of pragmatic and theoretical objectives is permitted by the core characteristics of DBR. First, the *collaboration* of the different stakeholders allows them to develop a solution adapted to their needs. The collaboration also allows the sharing and development of knowledge. Educational researchers, professors and lecturers, members of the university board and students participated in workshops dedicated to the design of the learning labs.

Second, DBR is *iterative*. Iterative cycles concern different stages of the DBR process (Kennedy-Clark, 2015): (1) The requirement and context analysis phase was conducted as a preliminary research (2)The development and implementation phase led to the development of different kinds of learning lab activities that are adapted to the needs and expectations of the stakeholders (3) these activities were tested and revised and a preliminary conceptual model was revised accordingly to the outcomes of the tests. Iterations enabled the improvement of the solution and the refinement of knowledge.

Third, DBR is *contributive*. The contribution of the project is both pragmatic (the physical and digital spaces designed and deployed for implementation of activities and theoretical (the proposed conceptual model of a learning lab).

Lastly, DBR is carried out in authentic contexts**.** The partner institutions constitute 4 specific contexts for the design and the implementation of 4 different learning labs. The comparison of the different learning labs enables us to distinguish what is generic and what is context specific regarding the proposed model.

5.2 Narrative design

In the following, we turn the implicit knowledge we used to model the learning lab into an explicit design narrative (Hoadley, 2004) through the description of the
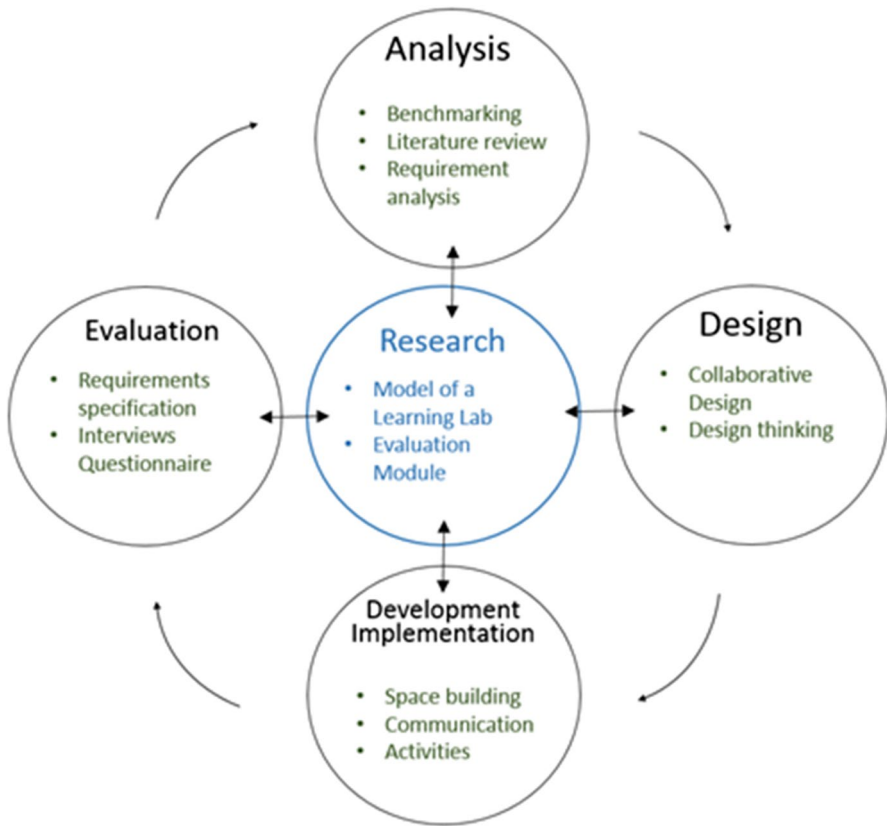
Fig. 1 Narrative Design of the Research Project

history and evolution of the design over time. Figure 1 illustrates the DBR process as a cycle of analysis, design, implementation and evaluation. This process is inspired by the ADDIE model for educational training (Branch, 2009).

Each stage of the process enables the production of knowledge (mentioned as the research stage) as shown in Fig. 1.

- *Analysis*: we performed benchmarking against the already existing learning labs, a literature review and a requirement analysis conducted through interviews with stakeholders. We also defined the problem in terms of audience, objectives and strategy.
- *Design*: two workshops were organized. The partners of the LETS Learning Lab project participated in a full day workshop dedicated to the design of the learning labs based on the outcomes of the previous analysis. Education researchers, professors and lecturers, members of the university board and students participated in a workshop dedicated to collaborative design (Kleinsmann, 2006). Based on an elementary model of the learning lab, the participants proposed some pre-

liminary concrete ideas in terms of space, activities and community. The design provided the tasks and strategies of the network.

- *Development* and *Implementation*: Based on the assignment of roles and responsibilities, the different partners concretized the preliminary ideas into the design and the setting up of physical and digital spaces. We designed a communication plan and we organized face-to-face or online activities with teachers and students. These actions were implemented and monitored individually by each partner or collaboratively.
- *Evaluation*: We wrote the requirements specifications considering the generic and specific dimensions depending on the different partner institutions. In addition, we sent a questionnaire to the teachers and students who participated in the activities and interviews carried out with partners and participants. The evaluation process was conceptualized as an *evaluation module*, a fully-fledged component of the learning lab dedicated to make visible the weak points of our approach and the needed revisions of the design.
- *Research*: The information and the knowledge that emerged from the different steps of the DBR cycle enabled us to set up a model of the learning lab. The model was the result of (1) a literature review and a state of the art of the already existing learning labs, (2) the ideas that emerged during the design phases, (3) the lessons learned from the development and implementation phase and (4) the feedback from users since we paid specific attention to the module dedicated to activities monitoring (evaluation module).

This approach demonstrates that cooperative endeavours between stakeholders and researchers allows building fundamental research. Indeed, according to a practice-based evidence paradigm, researchers and stakeholders share the same ends that are both improving an instrument (i.e.a learning lab), and a better understanding of the fundamental features of this instrument. The evaluation of the learning lab model is based on the development and implementation of a proof of concept as a demonstration of the value of the theoretical model. As a result, we used the following criteria: (1) Setting up of learning lab spaces in the 4 partner universities, (2) Getting communities on board and involved in the proposed activities and (3) the design of activities.

This research methodology enabled us to design a model for a learning lab described in the following section.

5.3 Data collected

We also collected data from the different universities. Indeed, we developed a module as an integrated part of a learning lab. This module is dedicated to assess the acceptability, usability and usefulness of the activities implemented in the 4 universities. More precisely, usefulness refers to the extent to which the learning lab enables the project to meet the objectives (innovation and teachers professional development). Usability is addressed through the satisfaction of the users: Do they consider the digital and physical spaces adapted to the implémented activities? Do

they consider that the proposed activities are suitable. Acceptability is addressed through the capacity of the learning lab to comply with the motivation and intentions of the users.

The module is mainly based on a questionnaire filled by the participants before and after each activity and semi-structured interviews with selected participants (Paukovics & al., Submitted).

6 The learning lab model

One of our research objectives is to establish a model for a learning lab that can be used as a formal framework for design of this pedagogical innovation framework. A model is a simplified representation identifying interactions between various elements. We may identify two main categories ''descriptive models'' and ''prescriptive models''. Descriptive models describe an existing situation, whereas the second type of models represent an ideal solution for a given context. Initially, our approach was qualified as descriptive since the research work is based on our involvement in setting up a learning lab network. This model can also be considered prescriptive as we established a theoretical framework which offers the main requirements and specifications to be considered when setting up a learning lab.

In answering RQ1 (i.e.the conceptualization of what is a learning lab dedicated to pedagogical innovation and the modelling of its core elements), we separate the learning lab objectives, the evaluation module and the learning lab itself.

6.1 The learning lab objectives

The work done by the partners made visible that a learning lab should enable meeting 3 main objectives. These general objectives can be broken down into several specific learning objectives. Each activity conducted in a learning lab targets specific learning objectives. These objectives vary according to the universities. These learning objectives do not relate to disciplinary competences. The activities mainly target the development of soft-skills and digital skills, support reflexivity and foster the evolution of attitudes towards teaching and learning. More specifically, they target the use of educational technology and the development of a practitioner into a researcher posture (Elliott, 1990). A competency framework describes the competencies that teachers or students are expected to master. This framework is based on the European Framework for the Digital Competence (Redecker, 2017).

Besides the learning objectives, the learning lab aims to foster interaction between academic bodies from different departments/faculties in order to enable knowledge sharing and practices and the collaboration for the co-design and co-production of educational resources. The learning lab should also highlight the commitment of the academic bodies in pedagogical innovation,projects of production of resources through internal and external communication and the dissemination of resources.

Finally, a learning lab is expected to create a favorable environment for pedagogical innovation based on the design, implementation and experimentation of innovative practices and digital technology.

6.2 A 3-dimensional model

Based on the literature review and on the collaborative design methodology, 3 core dimensions of the model emerged:

- The first dimension is constituted by the *community*. A learning lab is mainly defined by a community of teachers and students from a given university. By community, we mean a flexible organization oriented towards shared goals, a collective experience and a "shared microculture" based on values, practices, conversational rules and behaviors (Preece & Maloney-Krichmar, 2003). The community is not limited to a learning community (Dionne et al., 2010). We managed to identify different other stakeholders who belong to this community and should be considered. These stakeholders are from the university (technical or administrative staff, pedagogical engineers and specialists of educational technology) and external (different persons who are interested in participating and experts who are invited to give talks or organise workshops). Thus, a first challenge for the design and implementation of the learning lab consists of building, growing and nurturing this community.
- We argue that a learning lab is also defined by *activities,* which constitute the second dimension. These activities are concrete learning scenarios designed, organized or facilitated by the learning lab. They require participation and commitment of the community in order to meet participants' learning objectives as well as one or more of the learning labs' objectives. Thus, in order to meet the objectives and values, these activities must allow the discovery, observation, experimentation, and evaluation of teaching and learning practices. Activities should also include innovative modalities, be learner-centered, encourage sharing of knowledge, be assessed and formalized, be made visible and valued at a university level.
- A learning lab is also defined by hybrid spaces composed of physical and digital spaces, which define the third dimension. The physical space encompasses different rooms designed to accommodate the activities and the community they aim to host. The digital space takes the form of a digital platform allowing communication (webinars, meetings) and storing and dissemination of pedagogical resources. The digital space also encompasses social networks that enable the building of the community. The main characteristics of the learning lab spaces are their affordance and modularity so that they can (1) adapt activities to users needs, (2) promote collaboration and sharing between heterogeneous audience, (3) evolve according to users needs of users and technological advances, (4) make visible the pedagogical innovations undertaken by members of the community.

Fig. 2 The learning lab as a 3-dimensions model

The 3 dimensions are not isolated. They interact so that each dimension is impacted by the choice made for the design and implementation of the two others dimensions. This leads to the fact that each decision taken in terms of design and implementation should be based on a systemic approach.

Based on the reflection that emerged from the collaborative design workshops and the concrete implementation of a learning lab in each partner's university, the members of the network agreed on a common definition about what a learning lab is. This definition states that a learning lab is *a physical, digital and human space for observation, experimentation and evaluation, to rethink and enrich learning and teaching attitudes and practices at the university* (Fig. 2).

6.3 The evaluation module

The evaluation of the learning lab is an integral part of its implementation. Thus, we designed an evaluation module based on the evaluation model of Tricot et al. (2003) addressing usefulness, usability and acceptability. Thus, the evaluation module includes different tools for the articulation of the purpose of the evaluation (the decisions expected to be taken) and what is to be evaluated (objects to be evaluated). The evaluation module aims to link the meaning of the information (the referent), the representative aspects of the object to be evaluated on which a judgement must be made (criteria) and the clues, traces and observable characteristics for judging the degree of attainment of the criterion (indicators).

The tools of the evaluation module allow the monitoring of the learning lab. The different elements of each activity are recorded and documented in an *activity plan*. Online questionnaires are filled in by participants. *Registration forms* record the characteristics and the objectives of the participants while *feedback forms* record their opinions about the activities. *Interviews* that are carried out with selected

participants give an in-depth knowledge of the usefulness, usability and acceptability of the learning lab.

In the next section, we present the implementation and deployment of this model in the learning lab network of the four universities.

7 Implementation of the learning labs

In the following, we show the way each partner, from the 4 different universities, is implementing the generic model presented above, faced difficulties and lessons learned (RQ2). This implementation is described according to the three dimensions of our learning lab model.

7.1 Space

The physical space can be illustrated by the space designed by the Swiss University. The results of the collaborative design thinking workshop dedicated to conceptualizing this space consisted in 3 different concepts. Different common elements and specific ideas were selected from these concepts. The following description results from this selection. The physical space of the learning lab is composed of a *Teaching & Learning space*, a room dedicated to experiment and record innovative teaching practices. The *Living Space* is another room where meetings, seminars, lectures and social interactions can take place. The *Living Space* is also a hub to the other rooms, and it is open and visible to potential visitors who circulate in the building. The *Project Space* is a room where people can find all the necessary amenities to initiate and carry out a project of pedagogical innovation. The project space hosts a *Fab Lab* or makerspace, i.e.useful equipment for prototyping (2D printer, laser cutting…). This physical space is a modular space so that it can (1) adapt to the activities of users, (2) promote collaboration and sharing between heterogeneous audiences, (3) evolve according to the needs of the university and technological advances and (4) encourage the appropriation of the space by users.

The digital space from the Tunisian University consists of a Facebook group that hosts approximately 1200 members. The Facebook group hosts pedagogical resources and is used for advertising the learning lab activities and for communication between members. The digital space also comprises a digital platform (Microsoft Teams) for hosting webinars and web-conferences.

In Alexandria University, the physical space is composed of different areas designated for specific purposes. The *Pedagogical Innovation Welcome Hall* showcases the achievements of the learning lab and publicizes its activities. The *Pedagogical Innovation Incubator* incubates practices and tools that support and improve education. A *Green Screen Video Production Studio* as well as an *Audio Production Studio* are used to produce content. The *team working stations* are within this space which also includes a place for *experimentation* and a *Training Room*. Digital spaces complement this physical space and allow sharing and meeting.

Whether it is for the physical space or digital space, the key concept is modularity. Indeed, the spaces serve a variety of activities adapted to the diversity of stakeholders. As a result, the spaces should be designed so that it would be possible to adapt them to various users needs. For example, in the Swiss University, in terms of physical space, the modularity is based on movable partitions of the rooms and furniture that can be easily arranged according to user needs. In terms of digital space, it consists of different tools such as learning management systems, blogs, video conference platforms and social networks.

7.2 Activities and actions

The learning lab activities are based on innovative training modalities. They are defined and designed according to the following information: (1) the *description* includes the name and the topic of the activity (*e.g.* game-based learning), the type of activity (*e.g.* workshop, webinar…), the place, the duration and the date on which the activity is held. The activities are also defined by (2) the *objectives of the activity*. The learning objectives are inspired by the European Framework for the Digital Competence [2]. An activity also encompasses (3) the *actors and tasks* that will be performed. This category is a description of the activity in terms of learning design, organization, people involved and target audience. (4) *Resources* consist of all the tools and documents useful to perform the activity (*e.g.*registration form, communication tools) or produced by the activity. (5) *Assessment* is also an important dimension of the activity. Specific feedback questionnaires or interviews with people who were involved in the activity allow us to know if the objectives have been achieved. Each activity is documented by specific comments from the organizers and from the results of the evaluation of the activity. The traceability of the activities appeared important to us.

The "game-based learning workshop" that took place in the Lebanese University is an example of such activity. The activity consisted in a 1-day workshop dedicated to a short lecture about the principles of game-based learning. The participants also participated in a role-play game about the relationship between teachers and students (the *Knives and Glasses* role-play game). They discussed what game-based learning means during a debriefing. They also collaboratively designed a game-based learning sequence adapted to their teaching practices. Each participant was expected to understand the principles of game-based learning and to be able to apply these principles in one's own practice. Two experts in game-based learning designed and led the workshop. The participants were voluntary teachers and staff from the University. The resources used for the activity were the game material and a roadmap for game design. The participants produced and discussed 3 game prototypes. They filled out a feedback questionnaire, and the organizers took notes during the workshop.

The consortium tested different formats of activities such as "*Lunch & Discover*" (a 45 min meeting dedicated to discuss a specific topic or to discover a learning/teaching tool under the supervision of an expert during lunch time), "*Breaking Infox*", an hour discussion with a leading expert to address a "hot" learning or

teaching issue (e.g.students online assessment), a roundtable about a specific topic considered important (*e.g.* a roundtable with students about their needs in terms of remote learning) and "*E-learning Fake News*", blog posts written by leading experts and dedicated to deconstruct misconceptions about teaching and learning. Other activities by the consortium included celebrating important events relating to education such as the International Day of Education on January 24th through the 100X100 OERWiki@MENA initiative having the objective to create 100 open educational resources in 100 days.

The main characteristic of the activities designed and deployed is that they target pedagogical innovation and engage a reflection of all involved participants on their learning and teaching practices. The design of an activity is time and resources consuming and the added value of the network lies in the possibility to share and exchange resources, experts and ideas.

7.3 Community

Depending on how the members of the learning lab community were involved, we define 3 categories of members. The *spectators* are members who are willing to be aware of what happens within the community and learn while observing when the activity takes place. The *participants* are active members who are deeply involved in the activities. *Contributors* are members involved in the organisation of the activity. They also produce educational resources. It is worth noting that not only academic experts can be contributors. For example, students can participate in a round table dedicated to sharing experiences about strategies for remote learning.

The building of the community follows a communication plan based on the use of social networks, disruptive communication and on the collaboration with the communication board of the university. In order to build the community and to ensure people's commitment, various means can be used such as newsletters, social networks, logo for corporate identity, creation of an online "learning lab member" profile, etc.… The measures to be taken must be consistent with the specific target audience, the learning lab objective, the activities and the human and financial resources available.

The communication plan of the Swiss University encompasses different specific measures adapted to the different academic bodies. Teachers are informed of the activities via a newsletter as well as the announcement of the different events via a mailing list. The social networks (*Instagram and Facebook*) and different disruptive communication measures are used to raise students' interest. For example, remote telepresence devices were used to meet them in the working rooms and the university restaurants.

In the Tunisian University, different initiatives took place to build the community. Several online activities of interest to both students and professors were organized. Different challenges and initiatives were launched in order to attract a community and to have it loyal to the learning lab. Pedagogical innovation competitions were introduced to help grow the community. They targeted both students and professors. Another factor that helped develop the community was the support provided by the

learning lab network. Support groups and help desks were created and training was delivered to support professors in online teaching. Seasons of training were launched under specific themes or titles like "Ramadan Gana" Workshop Series, Do22o Eshamassi Workshop series, among others. This tightened the links between the community and the learning lab. Lots of communication channels were used to maintain contact with the community. They included both formal and informal means of communication.

7.4 Acceptability, usability and usefulness of the activities

Some figures show that the learning labs complies with the motivation of the users. At the Swiss and Tunisian universities, 10 to 30 participants were involved in each activity. In addition, the Facebook group of the learning lab from Sousse has now more than 1.200 members. Some resources produced by the Swiss Learning Lab have more than 20.000 readers. However, we found that most participants are mainly passive and more interested in getting information than sharing their teaching and learning experience. As a result, we paid specific attention to organizing activities fostering active participation. For example an online roundtable with students from different universities was dedicated to discuss the impact of the pandemie on students. The Swiss Learning Lab also organized an activity dedicated to the collaborative writing of 10 tips about online assessment.

The satisfaction of the users (usability) was assessed by a questionnaire. We got positive feedback regarding the time-slot dedicated to the events (mainly during lunch-time), the topics of the activities (but the feedback comes from people who participated and who are a priori interested) and the format of the activities (exchange between different kind of participants, quality of the exchanges…) but mixed feelings regarding the duration of the activities (too long or too short depending of the participants). We learnt that expectations and availability vary among participants and that there is a need to be clear about the objectives of the activities and to vary the type of activities.

Regarding the to which the learning lab enables to meet the objectives (innovation, teachers professional development, students agency), a direct and short time assessment is not feasible. That is why we asked the participants what they learnt, if they want to go deeper into the topic and if they plan to take into account this knowledge for their teaching and learning practices. We got positive feedback. All participants confirmed that that they learnt something and that it should impact their learning or teaching practices. In addition many participants expressed their willingness to enrich their teaching and learning practices. These observations confirm that the learning lab fosters a culture of innovation or, at least, manages to attract people who are already ready to innovate. However, we are not able to assess if this willingness led to concrete changes. We consider that the impact of a learning lab may vary depending on the participants profile and context and that it is difficult to assess this impact beyond the expression of the satisfaction of the participants. As a result, the impact of a learning lab is a long process and should be considered and measured over the long term.

8 Discussion and lessons learned

The implementation of a learning lab dedicated to pedagogical innovation is a complex process. Table 1 summarizes the main issues faced by the consortium for the design, development, implementation and evaluations processes of the learning labs, details how these issues have been addressed and gives some examples from the LETS Learning Lab project.

A first issue lies in performing a design-based on theoretical and empirical knowledge. We adapted ADDIE, a pedagogical engineering framework (Branch, 2009) so that this framework allows designing specific spaces and activities, and also building a learning community. This framework also aims to foster the reflexivity of the stakeholders towards the taken decisions, based on the evaluation module.

The second issue consists of enabling a continuous assessment process for reflecting on the scientific issues related to various contexts. This issue has been addressed by developing an international network of researchers interested in educational innovation. The network offers the opportunity to reach the needed critical mass of experts and the diversity of needed expertises, and the possibility of learning labs deployment in various contexts.

A third issue is related to the involvement of stakeholders. This issue has been addressed in considering these stakeholders as co-designers for the whole process (analysis, design, implementation, evaluation). They have been invited to participate in a collaborative design workshops according to a bottom-up approach.

The institutionalization of the learning lab is a fourth and major issue. The support from the academic board and acceptance by the academic community depends on the alignment of institutional objectives with learning lab objectives and components. It should be profiled as an institutional project. For example, the activities that take place in the learning lab should not be competitive with the activities performed by the teacher training service of the university. In addition, the design of the activities needs to take into account the institutional objectives which are part of an overall strategy. The culture of innovation relies on the mutual definition of innovation (O'Banion et al., 2011). Therefore, it is important that the learning lab's objectives must be aligned with the institutional strategy of the university and supported by its board.

The issues listed above are considered as the main issues that we have observed in this research on the design and implementation of learning labs in the four universities.

9 Conclusion and future work

In this paper, we proposed a model for the design of learning labs, based on three components specifically community, activity and spaces. Following a design based research methodology, The proposed learning lab model emerged from a

Table 1 Issues to be addressed for learning lab design

Issues	Design based on theoretical and empirical knowledge	Reflecting on scientific issues regarding the specific contexts	Involving stakeholders	Institutionalizing the learning lab	Emphasizing the learning lab components
How?	Using pedagogical engineering framework	Developing an international Network of researchers	Taking into consideration users with various profiles during all the process	Profiling as an institutional project	Broaden Communities, Designing innovative activities, Structuring spaces
Examples	Adoption of ADDIE process	Collaborative Design Design Thinking	Collaborative design workshop Disruptive communication Corporate identity	Project supported by the academic board Institutional objectives	LetsShare Learning Lab Social networks Groups Portals for Learning Lab, Design of Physical spaces

literature review, the collaborative design performed by a multidisciplinary team of researchers and stakeholder and an empirical and iterative process dedicated to test preliminary ideas. The successful deployment of our model in four universities and therefore in different cultural and academic contexts, enabled us to confirm its value and, to some extent, to show its genericity. This work confirms the relevance of the way of thinking about a learning lab in terms of spaces, community and activities.

The work carried out also demonstrates the need for a bottom-up process based on the needs and the participation of stakeholders and the building of a community. Another lesson learned is that the institutionalization of the learning lab is a key to a successful implementation. The work also demonstrates the difficulty to assess the impacts of a learning lab due to its long-term effect on the improvement of teaching and learning practices and the development of digital skills.

The currently ongoing work of the consortium is focusing on ethics, data privacy and the business models for the learning labs implemented by the different partners of the network. Further work should be done by the LETS Learning Lab Network, to broaden its community, and to further develop its activities and to better structure the digital and physical spaces.

Data Availability Non available.

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Alexandria University -Open Education

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Original Article

Impact of Educational Program on Reproductive Health Knowledge of Female Preparatory School Students in Alexandria Governorate

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Abstract

Background: The integration of reproductive health (RH) into national strategies and programs is one of the targets of the Sustainable Development Goals (SDGs) adopted by the United Nations General Assembly in September 2015.

Objective: Assessment of the effectiveness of an educational program on reproductive health knowledge of preparatory school female students in Alexandria Governorate.

Methods: A pre-post study design was conducted on 102 preparatory school female students by using a pre-designed self-administered questionnaire, covering four RH domains: puberty and menstrual cycle, genitourinary and sexually transmitted infections (STIs), menopause and female genital mutilation (FGM), as a tool for assessment of their RH knowledge before and after 6 weeks of applying an educational program for them.

Results: The results revealed that the total RH knowledge of the female students improved significantly after intervention, as 64.7% of participated girls had a satisfactory level of knowledge after the educational program compared to zero % before intervention. The four RH domains: puberty and menstrual cycle, genitourinary infections, menopause and female genital mutilation all showed significant increase in their knowledge score percentage after intervention.

Conclusion & Recommendation: RH educational program had a significant effect on the level of knowledge of the girls, thus we may recommend the integration of such education in the main school curriculum for the sake of improving their reproductive health.

Keywords: Reproductive health knowledge, Interventional educational program, Adolescent girls

INTRODUCTION

Reproductive health (RH) is a state of complete physical, mental and social well-being and not merely the absence of disease or infirmity, in all matters relating to the reproductive system and to its functions and processes. It is a lifetime concern for both women and men, from infancy to old age. Evidence shows that RH in any of these life stages has a profound effect on one's health later in life. It is a prerequisite for social, economic and human development. [1] The International Conference on Population and Development — ICPD (Cairo, 1994) marked an important turning point in international understandings of the significance of RH and rights. It brought RH into the global spotlight and shifted the terms of the RH debates from demographic targets to a rights-based approach.[2] The third target of The Sustainable Development Goals (SDGs) adopted by the United Nations General Assembly in September 2015 which calls for good health and well-being included that: "By 2030, ensure universal access to sexual and reproductive health-care services, including family planning, information and education, and the integration of reproductive health into national strategies and programs".[3] Adolescence (10- 19 years of age) is the transition from childhood to adulthood during which major biological changes as physical growth, sexual maturation and psycho-social development occur.[4] This age group constitutes about (19.4%) of the Egyptian population with slight increase in the rural population (20%) than in the urban population (18.3%). This difference is an outcome of lower fertility over the past several decades in urban areas compared with rural areas.[5] Adolescence represents a critical life stage to promote the adoption of healthy behaviors for lifelong health. Investing in adolescent health can help avert problems for the next generation, such as

prematurity and low birth weight in infants born to very young mothers. Prioritizing adolescent health simply is essential to end preventable deaths. [6, 7]

Adolescents often lack basic RH information, knowledge, and access to affordable confidential health services for RH. Many do not feel comfortable in discussing RH with parents. [8] During this phase of growth the girls first experience menstruation and related problems which is marked by feelings of anxiety and eagerness to know about this natural phenomenon. [4] Parents, health care workers, and educators frequently are unwilling or unable to provide complete, accurate, age-appropriate RH information to young people. This is often due to their own discomfort about the subject or the false belief that providing the information will encourage sexual activity. [9]

Thus, the current study was conducted aiming at assessing the effectiveness of an educational program on reproductive health knowledge of female students in one public preparatory school at Alexandria Governorate.

METHODS

This study was conducted as a pre-post-test interventional study in an urban governmental preparatory school for girls located in East District of Alexandria Governorate. This was a part of a memorandum of understanding between the High Institute of Public Health- Alexandria University and the Board of Trustees of Education of East district of Alexandria, which included health education program focusing on RH issues for the students.

One class was randomly selected from each of the first and second grades. All female students in the chosen classes who accepted to participate in the study were included. Those were 102 female students.

A pre-designed self-administered questionnaire was used as a pre and post tool to collect data which included:
- Personal characteristics as: age, age of menarche, order of birth, mother's education and employment status.
- Knowledge assessment questionnaire including 37 closed ended questions; 11 multiple choice (including more than one correct answer) and 26 true or false questions. The questions covered four reproductive health knowledge domains: i) Puberty and menstrual cycle, ii) Genitourinary and sexually transmitted infections (STIs), iii) Menopause, and iv) Female genital mutilation (FGM).

A scoring system was used giving a value of 2 for each completely correct answer, a value of 1 for the partially correct one, and zero for incorrect one for the multiple-choice questions, while the true or false questions were given a value of 1 for correct answer, and zero for incorrect one. The maximum score was 48. The percentage of total score from maximum score was calculated. Then it was divided into two categories as follows: unsatisfactory (less than 60%) and satisfactory (60% or more). The score percentage of each of the included four RH domains was calculated and divided into the same categories.

The study was conducted through 3 phases:
1. Pre-intervention reproductive health knowledge assessment: The participating girls answered the predesigned self-administered RH knowledge assessment questionnaire.
2. Intervention phase: The participating female students were divided into four groups, each group attended two hours educational session. It took the form of health education sessions which included Power Point presentation, open discussions and handouts.
3. Post-intervention reproductive health knowledge assessment: 6 weeks after the intervention all participating female students completed the same questionnaire previously used in the pre-intervention phase.

Statistical Analysis

Data were coded, tabulated and statistically analyzed using the computer package SPSS version 20.[10] The cut off point for statistical significance was P value <0.05. The following tests were used:
- Kolmogorov-Smirnov test: to test normality of quantitative variables
- Mann Whitney Wilcoxon (MWW) test & Kruskal Wallis (K-W) test: as non-parametric tests for quantitative variables not normally distributed.
- Bonferroni Post Hoc test: to test differences in between groups
- Wilcoxon (W) signed ranks test: to test significant difference between paired quantitative data with abnormal distribution.

Ethical Considerations

The proposal of this study was reviewed and approved by the Institutional Review Board and Ethics Committee of the High Institute of Public Health, Alexandria University. The study conformed to the International Guidelines for Research Ethics. Permission from the Alexandria Education directorate was obtained to carry out the study. A verbal consent was taken from the participated students and written consents from their parents (through school administration) after explanation of the purpose and benefits of the study. There is no conflict of interest. Confidentiality of the data was assured.

RESULTS

Table (1) shows that the mean age of the participating female students was 12.8 ± 0.7 with a minimum of 11 and maximum of 14 years. About one third of them (32.4%) were the first ordered sibling in their families and 71% of them reached puberty. In relation to their mothers, more than one third of them (34.3%) had basic education, 14.7% were university graduates and the

minorities were illiterates. Most of the mothers (64.7%) were house wives.

Table (2) reveals that before the intervention, none of the participated female students had satisfactory RH knowledge in general. Knowledge about genitourinary infections was the worst with a median score percentage 33.3 (26.7- 40.0) followed by knowledge about puberty and menstrual cycle with median score percentage 35.4 (25.0- 45.8). The highest level of RH knowledge was related to knowledge about female genital mutilation (FGM) with median score percentage 75.0 (00.0- 100.0) followed by those about menopause with median score percentage 50.0 (20.0- 60.0).

The total RH knowledge increased significantly after intervention where 64.7% of participated female students showed satisfactory level of knowledge compared with zero % before intervention. The four RH domains: puberty & menstrual cycle, genitourinary infections, menopause and female genital mutilation all showed significant increase in their median knowledge score percentage, where, they became 62.5 (54.2- 70.8), 53.3 (46.7-53.3), 70.0 (60.0- 80.0) and 100.0 (75.0- 100.0) respectively.

Table (1): Personal characteristics of participating preparatory female students

Personal characteristics	Preparatory female students (n=102)	
	No.	%
Age (years)		
11-<13	33	32.4
13-14	69	67.6
Min-Max	11.0-14.0	
Mean ± SD	12.8±0.7	
Birth order		
1st child	33	32.4
2nd child or more	69	67.6
Reached puberty	73	71.6
Educational level of mothers		
Illiterate	12	11.8
Read and write	17	16.7
Basic education	35	34.3
Secondary education	23	22.5
University education	15	14.7
Employment of mother		
Housewife	66	64.7
Working	36	35.3

Table 2: Comparison between knowledge score percentage of the studied female students before and after the intervention program

Knowledge	Preparatory female students				Significance
	Before program		After program		
	No.	%	No.	%	
Domain 1: Puberty & menstrual cycle					
Unsatisfactory (<60%)	99	97.1	33	32.4	
Satisfactory (≥60%)	3	2.9	69	67.6	
Min-Max	0.0 – 62.5		37.5 – 79.2		W=8.382
Median (Q1-Q3)	35.4(25.0-45.8)		62.5(54.2-70..8)		P<0.0001*
Domain 2: Genito-urinary infections					
Unsatisfactory (<60%)	102	100	78	76.5	
Satisfactory (≥60%)	0	0.0	24	23.5	
Min-Max	0.0 – 46.7		20.0 – 66.7		W=8.149
Median (Q1-Q3)	33.3(26.7-40.0)		53.3(46.7-53.3)		P<0.0001*
Domain 3: Menopause					
Unsatisfactory (<60%)	51	50	18	17.6	
Satisfactory (≥60%)	51	50	84	82.4	
Min-Max	0.0 – 80.0		20.0 – 100.0		W=5.893
Median (Q1-Q3)	50.0(20.0-60.0)		70.0(60.0-80.0)		P<0.0001*
Domain 4: Female sexual mutilation					
Unsatisfactory (<60%)	48	47.1	21	20.6	
Satisfactory (≥60%)	54	52.9	81	79.4	
Min-Max	0.0 – 100.0		0.0 – 100.0		W=5.921
Median (Q1-Q3)	75.0(0.0-100.0)		100.0(75.0-100.0)		P<0.0001*
Total score					
Unsatisfactory (<60%)	102	100%	36	35.3%	
Satisfactory (≥60%)	0	0.0%	66	64.7%	
Min-Max	0.00- 58.3		35.4 – 70.8		W=8.511
Median (Q1-Q3)	40.7(31.3-47.9)		62.5(54.2-66.7)		P<0.0001*

W=Wilcoxon signed ranks test   * significant (*p*<0.05)

The female students who have reached puberty had higher median knowledge score percentage 41.7 (34.4-48.9) while those who haven't had median knowledge score percentage 25.0 (4.2- 43.8). This relation was statistically significant with MWW= 3.405 and *p=* 0.001. Female students whose mothers were illiterates had low median knowledge score percentage 37.5 (1.1-43.3) while university graduate mothers' daughters had statistically significant higher median knowledge score percentage 47.9 (41.7- 56.3). Daughters of working mothers had a median knowledge score percentage 42.8 (21.9- 51.1), meanwhile daughters of house wives had a slightly lower median knowledge score percentage 39.6 (33.3- 43.8) with no statistical significant relation.

Table (3) represents the relation between pre-intervention knowledge score percentage and personal characteristics of participants. The female students aged 13-14 years were more knowledgeable with a median score percentage 41.7 (35.4- 50.0) compared with those younger than 13 years who had median score percentage 25.0 (4.2- 43.8). This relation was statistically significant where MWW = 3.843 and *p<* 0.0001. Being a first ordered sibling in a family was related significantly with less median knowledge score percentage 31.3 (18.8 – 43.8), while those who had a birth order of 2 or more had a median score percentage of 41.7 (33.3- 52.1) with MWW = 3.39 and *p=* 0.001.

Table (3): Relation between pre-intervention knowledge score percentage and personal characteristics of the studied female students

Personal characteristics	Preparatory female students			Significance
	Score of knowledge before program			
	No.	Min-Max	Median (Q1-Q3)	
Age (years)				
11-<13	33	0.0- 56.3	25.0(4.2-43.8)	MWW=3.843
13-14	69	18.8- 58.3	41.7(35.4-50.0)	P<0.0001*
Birth order				
1st child	33	0.00- 47.9	31.3(18.8-43.8)	MWW=3.39
2nd child or more	69	0.00- 58.3	41.7(33.3-52.1)	P=0.001*
Reached puberty				MWW=3.405
No	29	0.0-56.3	25.0(4.2-43.8)	P=0.001*
Yes	73	0.0-58.3	41.7(34.4-48.9)	
Educational level of mothers				
Illiterate	12	0.0-56.3	37.5(1.1-43.3)	K-W=3.972
Read and write	17	0.0-58.3	33.3(12.5-46.9)	P=0.005*
Basic education	35	0.0-58.3	39.6(20.8-43.8)	(Illiterate/university)
Secondary education	23	20.8-58.3	43.8(31.3-52.1)	*
University education	15	4.2-58.3	47.9(41.7-56.3)	
Employment of mother				
Housewife	66	0.00- 58.30	39.6(33.3-43.8)	MWW=0.727
Working	36	4.20- 58.30	42.8(21.9-51.1)	P=0.467

MWW= Mann Whitney Wilcoxon test, K-W= Kruskal Wallis test   * significant (*p*<0.05)
(Illiterate/university)*: Significant difference by Bonferroni Post Hoc test

DISCUSSION

RH is an essential component of healthy development for young people. There is an increasing body of evidence that RH education through acceptable reliable sources can result in young adults adopting responsible choices and favorable sexual behaviors.[11,12] Despite its widely recognized importance, promotion of RH through education remains a sensitive and controversial issue.[13] Providing adolescent girls with reliable trusted sources of RH education poses a challenge in the different world regions and the different cultural contexts. The present study was conducted to explore adolescent girls' RH knowledge, and their informational needs. It also aimed to construct and examine the effect of a culturally sensitive educational program to improve girls' RH knowledge. A large body

of scientific research in both developed and developing countries has shown that RH education programs, as a reliable trusted formal source of RH education, have improved the overall health of young people.[14] However, in Egypt, health education is deficient in the public school curriculum, and activities related to RH are particularly inadequate. A few short lessons on reproductive health were first added to the school curriculum after the 1994 UN population conference.[15]

Results of the current pre-post intervention provide evidence of the efficacy of a cultural sensitive intervention designed to improve adolescent girls' RH knowledge in Alexandria, Egypt. Success of a similar intervention tackling similar RH areas was reported in Alexandria.[16] A nearly similar study design was conducted in Alexandria, Egypt, 2011, as part of a two-year program implemented by the Alexandria Regional

Centre for Women's Health and Development about RH awareness among girls in secondary schools in Alexandria (an older age category than ours). The program's goal was to raise awareness about the needs of adolescent girls for age-appropriate RH information and to identify the existing gaps in the school system for meeting such needs. They reported successful increase in girls overall knowledge by 60%.[16]

School-based RH interventions proved success also in other developing countries such as India, Bangladesh, Nigeria, Mumbai, Iran and Tanzania.[17] Another school-based educational intervention proved success in Upper Egypt; however, it only covered knowledge about AIDS among secondary technical schools students with a range of age 16 to 20 years of both gender. Only 30.8% had satisfactory knowledge about AIDS in the pretest. Statistically significant improvement in knowledge was revealed after program implementation [18].

In the pre-intervention assessment of RH knowledge in the current study, none of the female students had satisfactory level of knowledge. Similar results were reported by Mounir et al., on assessing RH knowledge and attitude among female university students in Alexandria, revealing that none of them had satisfactory knowledge level while 61.7 % and 38.3% respectively had fair and poor score levels.[19] Participation in the intervention resulted in improvement in different RH domains among participating female students. However, despite the significant improvement in the total knowledge scores, best knowledge scores were regarding FGM and menstruation. This could be attributed to the persistence high prevalence and slow decrease of FGM in Egypt despite the deliberate efforts to combat FGM.[5]

Despite its importance, least end-line knowledge score was encountered for genitourinary infections. Mounir et al., also found that only 11.9% and 3.9% of Alexandria University female students reported complete answer about STIs and methods of their protection respectively. [19] Thus, future interventions should put more stress related to infection issues and STIs. Comparably, a systematic review of published literature on awareness and knowledge of STDs in Europe reported low levels of awareness and knowledge about sexually transmitted diseases, with the exception of HIV/AIDS, among school-going adolescents.[20]

In the present study, the pre- intervention RH knowledge score was related significantly with not being a first ordered sibling, this result agrees with the results of El-Lassyand Madian, as they explained this by that elder sisters were the main source of information about the occurrence of menarche for 53.8% of girls.[21] In the contrary, the present results concerning the relation between mothers' education and RH knowledge score didn't match El-Lassyand Madian[21]

findings' as they reported negative correlation between mother's education and their daughters' menstrual knowledge and practices. Meanwhile, the present results were similar to that reported by Simbar et al., who found that RH knowledge and attitudes of Iranian college students were significantly correlated with a higher level of education of mothers ($p < 0.05$) and older age of studied girls ($p < 0.01$).[22]

Results of the present intervention are important for several reasons. First, to-date this one of the rarely studied school-based RH education intervention is the first developed culture-sensitive program specifically designed for Egyptian girl to improve their RH knowledge. Second, the potential for applicability of this intervention to other Egyptian schools should be considered seriously. In addition, the results provide guidance for the inclusion of specific content in interventions to improve adolescents' RH knowledge; specifically, FGM, pubertal changes and menstruation, and STIs and genital infection. It supports recommendations about the need and importance of trusted reliable school-based RH education. This will ensure that adolescent girl will have correct favorable RH knowledge that will enable them to pass this critical period safely and promote their adult lives.

CONCLUSION & RECOMMENDATIONS

It's recommended for future intervention programs to be based on control groups such as the quasi-experimental design or the RCT with longer term mixed qualitative- quantitative evaluation. Despite these limitations, this study is an important contribution for assisting Egyptian policymakers and those working in the areas of adolescents' health in planning and establishing school-based RH education programs to support adolescent girls during this transitional period and go safely to adulthood. It is an important effort in providing an evidence base for policy makers and practitioners working in the area of youth and adolescents' RH to renew the existing national RH strategy, and to address the rising threats and challenges in the area of youth and adolescents' RH. In addition, it provides researchers with a base from which to test and develop similar interventions for Egyptian schools. Finally, further studies should be conducted to determine effective ways of implementation of school-based RH programs and interventions in different types of schools (public, private and technical) the effect of knowledge improvement on safe behaviors.

Limitations of the Study

The results of this study should be considered in light of several limitations. First, the short duration of the evaluation, where there was a need to test the effect of the intervention on longer duration to determine the amount of retained knowledge, but unfortunately, the study duration was limited by the scholarly schedule.

Second, the sample size was small and was not based on random recruitment which affects the generalizability of the results, which was difficult to implement due to difficulty of obtaining permissions to conduct such type of studies. Finally, the pre-post design limits causal inference and temporal relationship (cause-effect relationship) between the intervention and the results which is recommended for further research.

Conflict of Interest: None to declare.

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Student Activities Union

Student Association Council:

Activities - of all kinds - are practiced in university cities, through a student entity called the "Student Activities Union", where the union draws plans for activities at the beginning of each academic year, and these activities are practiced through committees formed by election among university city students

The Student Activities Union Council is composed of a Secretary and an Assistant Secretary for each of the Student Activities Union committees

Student Activities Union Committees:

Cultural and Political Committee

Technical Committee

Housing Committee

Nutrition Committee

Health Care Committee

Science and Technology Committee

social Committee

Trip Committee

Mobile and Public Service Committee

Students' activities

Alexandria University believes that student activities are important to educating the student. Participation in the activities gives students new skills, builds new relationships, and forms the student's integrated, balanced personality, and reveals students' talents and abilities, and then refines and develops them.

The student activities practiced by Alexandria University students vary between scientific, sports, scouting, artistic, social, and excursions, in addition to the activity of families and social leaders. All students are allowed to participate in these activities. Providing prizes for competitions organized in each activity, and the university is keen to participate competitively in these activities at the level of Egyptian and international universities

Student Activities Complex (Stadium and Swimming Pool)

STUDENT EXCHANGE AGREEMENT

Between

University of Alabama at Birmingham

(UAB)

Birmingham, Alabama, U.S.A.

And

ALEXANDRIA UNIVERSITY

(AU)

Alexandria, Egypt

⌘⌘⌘⌘⌘⌘

In the interest of expanding educational opportunities, UAB and AU agree to promote the exchange of students under the following provisions:

1.　　Exchange Coordinator
Each party to the agreement will appoint an officer who will be responsible for the coordination and administration of the exchange, including the selection and counseling of the exchange participants. For UAB, the Assistant Program Director for Education Abroad will serve as Exchange Coordinator. For the AU, that role will be played by _____.

2.　　Duration of Exchanges
Students may be exchanged for a summer, a semester, or an academic year.

3.　　Number of Students to be Exchanged
The number of qualified students to be exchanged will be determined by mutual agreement between the two institutions.

4.　　Balancing the Exchange
Parity in numbers of exchange students is the objective of the agreement. Numbers should be counted in semester units: 1 summer= 0.5, 1 semester=1, 1 academic year=2. Each party should be prepared, however, to consider a disparity in any given semester or year during the period agreement. Any and all imbalances shall be resolved by the end of the period of agreement.

5.　　Academic Status
All students will remain enrolled as regular degree candidates at the home institution and will not be enrolled as candidates for degrees at the host institution. Students are expected to maintain full-time status at the host institution. Exchange students will have the rights and be subject to the same regulations at the host institution.

6.　　Student Eligibility
The Exchange Coordinator at each institution, acting after consultation with the appropriate academic unit, will be responsible for the selection of suitable nominees for exchange. It is understood that the Coordinator will nominate students who are both academically and personally suitable for exchange abroad and that details of academic background as well as references will be provided to the host institution. It is hoped that

the host institution will not reject a nominated student unless he/she does not meet established admission requirements for international students, or unless the host institution cannot guarantee availability of required courses.

Students involved in the exchange will have proficiency level in ~~Arabic~~/English that will allow them to attend regular university classes. The appropriate level will be demonstrated through the required tests in each institution.

7.   Transcripts
Both institutions agree to provide a transcript at the end of the period of study, giving details of the courses studied and grades and credits awarded.

8.   Student Program Fees
Each student will pay his or her regular tuition and fees to the home institution and will receive these benefits in turn from the host institution. All housing and meal costs will be the responsibility of the exchange student. The host institution agrees to provide all necessary assistance in arranging accommodation in the residence halls or off campus, as appropriate. All travel costs will be the responsibility of the individual student. Miscellaneous fees such as special course fees, fieldwork courses, key deposits, books, etc. will be paid directly by each participant. Neither institution will charge incoming students an application fee.

9.   Vacation Periods
The individual student will be responsible for his or her own housing and meal arrangements and costs during vacation periods (breaks, holidays, or between semesters).

10.   Insurance
Each participant will provide his or her own health and accident insurance. Proof of adequate insurance coverage must be provided to the international office of each institution. In the case of (AU) students coming to UAB, they will be required to provide proof of health insurance that meets UAB's minimum standards for insurance coverage before registering for courses.

11.   Dependents
The obligations of each institution under this agreement are limited to the exchange of students and do not extend to partners or dependents. Expenses of accompanying partners and dependents are the responsibility of the exchange student.

12.   Visa Requirements
Participants will be required to meet any visa requirements that pertain to studying in the host country. In the case of (AU) students coming to UAB, they will need to document having sufficient financial resources for the period of stay.

13.   Effective Date and Termination of Agreement
This agreement shall be in effect for five years from the date of its signing. At the anniversary of the agreement, each institution will exchange a brief report indicating any imbalances of student numbers and/or other issues or problems. This agreement may be amended, and/or extended by mutual written consent of both institutions for a period beyond its original date of expiration. Either party may terminate this agreement by serving written notice to the other party. In this case, if either party desires to balance the numbers before termination, the other party will cooperate in that effort. Otherwise, termination will take effect six months from the date of the written notice.

14. Agreement

In agreement with the above terms of participation, the following signatures are affixed:

University of Alabama at Birmingham (UAB)   **Alexandria university (AU)**
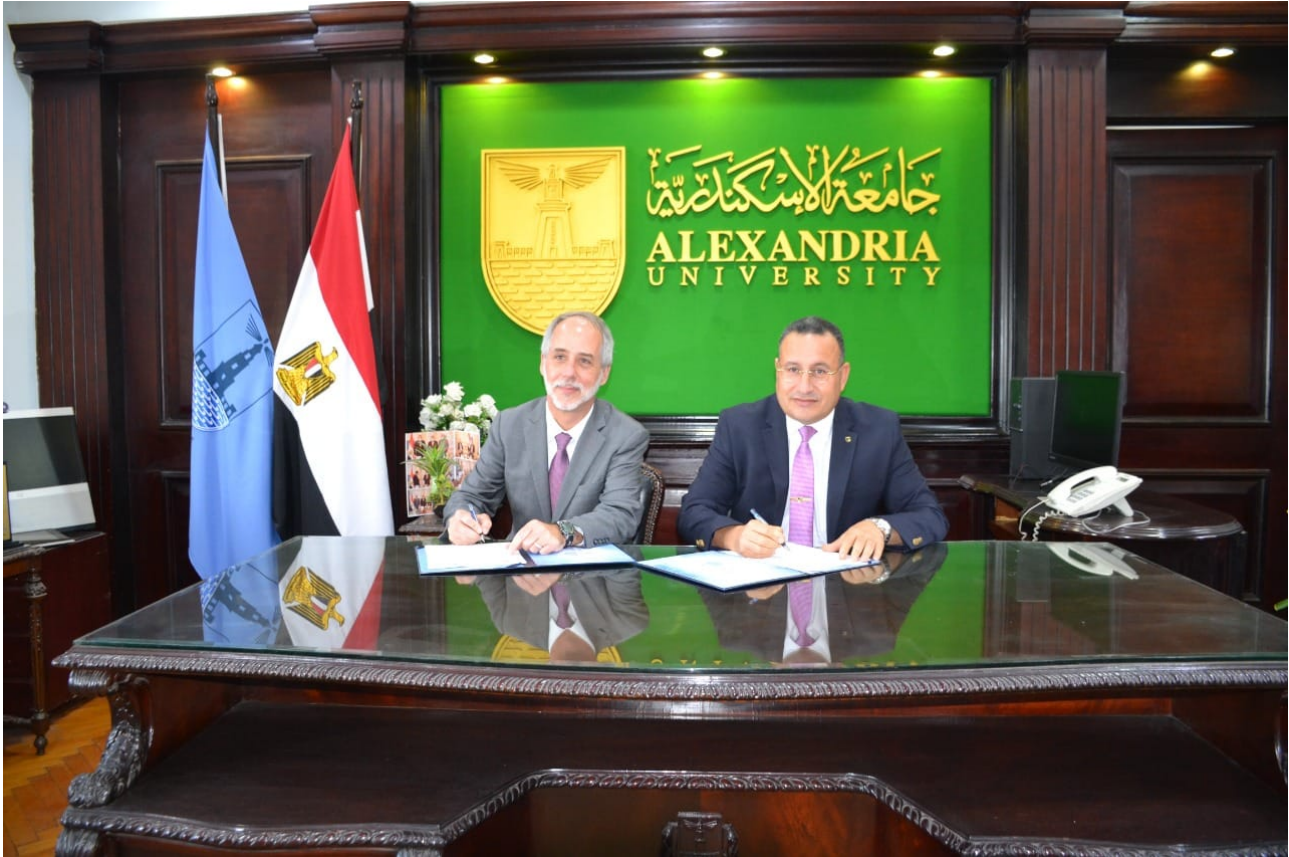
Science valleys and technological incubators of Alexandria University

This is one of the goals of the community service and environmental development sector strategy to investment in the existing scientific, innovative and administrative capabilities and expertise available at the university.
It is also part of the university vision and goals , where the university realized that its strength lies in the scientific and intellectual capacity of its youth and in turn will lead to the formulation of investment of innovations and promotion of cooperation with international institutions and industrial sector with the focus investment emerging in industries or markets.

A dedicated committee is initiated for the science valley with the role of transferring ideas, innovations and research outputs to emerging technology companies as spin-offs. This role is in line with the National Strategy for Science, Technology and Innovation 2030. This committee pays an important role in catalyzing to raise the level of scientific capabilities and achieve optimal investment of available resources and competition with their products in global and regional markets.

General objectives of the committee
- Promoting innovation, technology development, transfer and marketing in cooperation between local and international stakeholders, in order to support the knowledge-based economy and to access home-made products.
- Enhancing the utilization of the university's current resources to establish technology incubators in cooperation with industrial entities.
- Study the applications submitted by the university to establish valleys, technological incubators and companies, and make sure that they are used to achieve the university's vision

Pillars:
- The National Strategy for Science, Technology and Innovation 2030
- Law No. 1 of 2019 establishing the Innovators and Innovators Care Fund
- Science, Technology and Innovation Incentives Law No. 23 of 2018 and its implementing regulations.
- The guidelines for establishing technology incubators within the framework of the National Program for Technology Incubators (INTALAQ) issued in January 2020.

The valleys of science and technology are the avenue where technology incubators and companies have emerged, aiming to promote innovation, technology development, transfer, and marketing in cooperation between local and international stakeholders, in order to support the knowledge-based economy, and to access home-made products, referred to in this bylaw as medicines.

Technological incubators
Laboratories and entities supporting scientific research and innovation that are established for the purpose of providing business services and technical and scientific facilities for scientific research projects, support mechanisms and technical consultations for innovators and emerging companies through the outputs of scientific research, in order to reach prototypes that can be manufactured.

Signing contracts for an incubator of educational innovations and EdTech education between Alexandria University and the Academy of Scientific Research and Technology.

With financial support of five million five hundred and twenty five thousand pounds, the PILOT incubator is a new addition to the incubator package of the "Intelaq" program, which has so far reached 48 incubators in various fields, and the distribution of incubators to different parts of Egypt has been taken into account to serve the largest base of beneficiaries.

The incubator aims to:

- Financing 15 projects in the field of educational innovations and educational technology, with an amount of up to EGP 200,000
- Providing technical support and consultations to emerging companies in the field of educational innovations and educational technology.

Spreading the culture of entrepreneurship in general and entrepreneurship within the university community.

- Providing distinguished training programs in the field of entrepreneurship.

President of Alexandria University Inaugurates Faculty of Dentistry's 22nd International Conference

Created: 16 November 2022

Professor Dr. Abdelaziz Konsowa, President of Alexandria University, inaugurated Tuesday evening the twenty-second international conference of the Faculty of Dentistry, and witnessed the signing of a letter of intent for cooperation between Alexandria University and the British University of Manchester to establish a joint bachelor's degree in dental medicine and oral surgery.

The opening session of the conference was attended by Dr. Zahi Hawass, the famous archaeologist and former Minister of Antiquities, Dr. Jacqueline Azer, Deputy Governor of Alexandria, Nihal Balbaa, Deputy Governor of Beheira, Dr. Ahmed Adel Abdel Hakim, Dean of the Faculty of Dentistry, in addition the presidents of the Universities of El Alamein, Pharos, and the Arab Academy for Science, Technology & Maritime Transport, the former governor of Sharkia, the Head of Dentists' Syndicate, and the Undersecretary of the Ministry of Health in Alexandria, as well as a group of faculty members and representatives of major medical companies.

At the beginning of his speech, Dr. Konsowa conveyed the greetings and appreciation of Dr. Ayman Ashour, Minister of Higher Education and Scientific Research, to all participants in the conference, and confirmed that Alexandria University is proud to organize this conference, which is full of tremendous scientific content in the field of dentistry, where many dental affiliates around the world are keen to participate. He also emphasized the university's support for scientific conferences, as part of its vision, which includes creating an atmosphere for exchanging scientific development in all fields of knowledge and disseminating it among its members. He pointed out that Alexandria University is committed to the charter of freedom of thought and unlimited knowledge exchange and is open to historic and distinguished international universities through cooperation protocols in academic and research fields and through joint programs and degrees.

In her speech, Dr. Jacqueline Azer, Deputy Governor of Alexandria, thanked Alexandria University for organizing this conference and appreciated its scientific status and the participation of many dental professors from different countries of the world to exchange experiences, visions and research, which confirms that Egypt occupies a distinguished scientific rank.

Dr. Ahmed Adel Abdel-Hakim, Dean of the Faculty of Dentistry, said that it is celebrating the 46th anniversary of the first international scientific conference of dentistry in the Middle East, where the golden generation of dentistry professors set a road map to put the Faculty in its proper position. He stressed that the Faculty is keen to continue organizing this international conference with the participation of leading scientists and technology innovators in the field of dentistry to exchange experiences, research and training, which results in the advantage of attracting major companies of medical devices, equipment and tools to sponsor the conference. He also thanked everyone who took part in organizing the conference to help it come out in this brilliant way.

Dr. Mohamed Moataz Khamis, Secretary General of the Conference, confirmed that it includes more than 150 participants, professors and researchers from 20 countries, and enjoys cooperation with prominent scientific entities

inside and outside Egypt, such as the Egyptian Society of Orthodontics, the Egyptian Society of Paediatric Dentistry and the International Society for Dental Research, as well as the faculties of dentistry at the Arab Academy and Pharos University. He also said that the conference is accompanied by a selection of lectures and workshops to present all that is new in the field of dentistry, and an exhibition of the latest equipment and supplies from major medical companies.

Dr. Zahi Hawass presented a documentary about recent discoveries in the Pyramids and the Valley of the Kings. He reviewed the new discoveries related to King Tutankhamun and the history of the king's dynasty on the Western Bank of the Nile, and the relationship of the different dynasties of Pharaonic Egypt to the stage of 2500 BC.

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Alexandria University aspires to restore the historic status of Alexandria University and to achieve a comprehensive qualitative leap in various fields of knowledge within a frame work of noble human values, enabling it to take a leading position in its national , Arab, African, Mediterranean and global environments.

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Students Dorms

The university cities are one of the important castles and edifices of the University of Alexandria, as it serves a group of students, who are expatriate students, equivalent to 7000 thousand male and female students annually.

The importance of this sector is due to the fact that it operates 24 hours a day and throughout the year, as it takes full care of expatriate students, providing them with accommodation and subsistence in addition to recreational programs and targeted social, sports and cultural activities prepared by the competent authorities in these dormitories. Thus, the effective role of the services sector in the university is achieved in sponsoring and strengthening the educational process.

History:

The foundation stone was laid for Smouha Dormitory (Male & Female students) in 1954. The official opening and residence took place in Smouha Dormitory (Male) in January 1958 and for female in December 1958. As for the new dormitory in Smouha, which is designated for student accommodation now, it was opened in 1975.

Then, after that, were established the other dormitories (Saba Basha Dormitory

& Mergham Dormitory).

Branches

Smouha Dormitory (Male)

Smouha Dormitory (Female)

El-Shatby Dormitory

Saba Basha Dormitory

Mergham Dormitory