Report on Seminar

"Interdisciplinarity in Higher Education – Dissemination and Bridges"

Activity of the Egyptian National Interdisciplinary Network (ENIN)

Seminar Date: February 24th 2024

Under the patronage of Prof. Abdel Aziz Konsowa, President of Alexandria University, we proudly hosted a one day seminar entitled "Interdisciplinary in Higher Education - Dissemination and Bridges." The seminar was organized by sectors of Higher education and Research of Alexandria University, ENIN coordinator and members of the network. This Seminar is the first activity of the ENIN Network. It took place in the conference hall of the Institute of Graduate Studies and Research, in the presence of Prof. Hisham Saeed, Vice President of Alexandria University for Graduate Studies and Research, Prof. Ahmed Abdel Rahim, Acting Dean of the Institute of Graduate Studies and Research, and Prof. Boshra Salem, the Network Coordinator, and the Assistant President of Alexandria University for international university Ranking, and members of the ENIN. The seminar was attended by a top level of higher education sector, academia, and researchers in various disciplines from the Egyptian universities interested in interdisciplinary and transdisciplinary sciences.

The seminar was opened by **Prof. Hisham Saeed** and in his speech, He indicated that the aim of the seminar is defining a vision, strategies, and future outlook for interdisciplinary science , noting that this symposium is the second event to take place in interdisciplinarity, where the first meeting was in May 2023 in Cairo under the patronage of his highness Prof. Ayman Ashour, Minister of Higher Education and Scientific Research, in collaboration With the Egyptian Knowledge Bank, during which the Egyptian National Interdisciplinary Network was announced. Prof. Saeed . expressed the need for interdisciplinary curricula has become, as collective efforts and interdisciplinary, diverse, and overlapping disciplines can shape the path of knowledge and create significant, meaningful changes and impacts. He pointed out that interdisciplinary and interdisciplinary sciences are considered an important field that brings together many different disciplines. Scientific fields interact with each other, and cooperate to solve problems and explore complex topics that transcend the boundaries of traditional disciplines. He added that through this type of science, methods and concepts from different disciplines such as chemistry, physics, biology, engineering, mathematics, medicine and biostatistics are employed to understand the phenomena of nature in a deeper and comprehensive way to produce innovative

solutions to scientific problems, to face current global challenges and achieve progress and prosperity Prof Saeed added that interdisciplinary science can involve different stakeholders for knowledge production process and is considered a promising idea for addressing the world's most pressing issues, knowledge production and decision-making.

The seminar started by a presentation delivered by Prof. **Boshra Salem,** Professor pf Environmental sciences at the Faulty of Science Alexandria University who presented the Egyptian National Interdisciplinary Network ENIN, its history and goals, scope and objectives. She pointed out that this seminar is the first discussion forum between members of the ENIN, for disseminating and infusing methods and tools of Interdisciplinary research paradigm in higher education. She explained the network mission statement; achieving cooperation between Egyptian universities in the interdisciplinary sciences to deal with complex challenges that individual disciplines are unable to deal with, in addition to the seminar aims :

- Capacity building for interdisciplinary collaboration in Higher Education Capacity building for interdisciplinary collaboration in Higher Education
- Facilitating the ongoing operation of the ENIN, scholars, researchers, and stakeholders.
- Setting a roadmap for a dissemination strategy
- Connecting designs, approaches, and scholars to improve research in solving complex societal problems.
- Broadening education and training in interdisciplinarity.
- Highlighting on the role translation in the dissemination of ideas and scientific advances.

In her presentation, Prof. **Salem** explained the difference between participatory research, multidisciplinary, Interdisciplinary and transdisciplinary sciences in terms of the diversity of both collaboration and the degree of integration. She also added that Alexandria University is keen to activate this network due to its importance and wide impact on higher education strategies in Egyptian universities. In her slides she showed the importance of Interdisciplinarity as one of the main pillars of the National Higher education strategy- Egypt-strategy 2030, and explained a proposal for the network operation in terms of structuring of sub committees, and membership procedures. The network looks forward to achieving effective integration between different research specializations in educational and research practices and creating a base of researchers in the field of interdisciplinary sciences for achieving sustainable development goals.

The presentation of Prof. Salem ended by an important message of the Network:

The Egyptian Network seeks to spread intellectual openness, integrate science into research activities, work in a team spirit, and contribute to solving complex problems that require integration between disciplines, by communicating interdisciplinary science, system thinking and keeping pace with international scientific methods in educational programs for basic and university education. The Network is regarded as one of the tools to developing research expertise in Egypt and obtain effective research results that serve to achieve sustainable development goals.

1. Another presentation was delivered by Prof. Salem on the Interdisciplinary science Ranking ISR) by English Ranking body "Times higher Education (THE)" . This is a new ranking for universities to demonstrate the scholarly output in interdisciplinary science. THE will start collecting data on factors that lead to interdisciplinary research success and will adopt new measures and incentives to deliver on the promise of interdisciplinary research. There are 3 sets of data that can benchmark interdisciplinary science: Bibliometric data: data looking at research publications. This is where the outcome of interdisciplinary research can first be seen.
2. Views of Researchers. Their experience on their own and other institutions approach to interdisciplinarity research and interdisciplinary research areas.
3. Data from higher education institutions directly,

   i.e.

   - Metrics such as income allocated explicitly to interdisciplinary research.
   - No. of job adverts that explicitly mention interdisciplinary research
   - Institutional measures of research success .

Prof. Salem ended her presentation by a slide extracted from THE report showing that Egypt is the highest among top 10 countries in the proportion of research income (47.7%) dedicated to ISR per country, with at least 10 valid institutional submissions.

Prof. Manal Affara, Professor of Egyptology and Tourism, Faculty of Tourism and Hotels, Alexandria University, delivered a presentation on "Addressing Challenges Facing Interdisciplinary Learning in the Egyptian Universities." In her presentation, she discussed the ccurrent studies of Interdisciplinary Practices in Egyptian Universities. She addressed the concept and importance of learning Interdisciplinary approach in higher education and research

to the target groups at all level of change: Academia, Researchers, Undergrad students. Prof. Affara highlighted the benefits from learning and delivering the interdisciplinary approach.

She argued that the challenges facing dissemination and implementation of interdisciplinary approach in the organization are three folds: monocular culture, fixed mindsets, and resistance to change. Besides lack of dissemination the benefits of interdisciplinary approach in higher education, and lack of resources (Human and fund resources) can hinder initiatives for transformation change. She emphasized on the framework of building the future culture should be based on creativity, Innovation, strategies refinement and finally transformation change.

Based on the previous context Prof. Affara, suggested strategic pathways for promoting interdisciplinary learning in the Egyptian Universities by: 1- Exerting Strategic Leadership, 2- Capacity Building and Innovative culture building in the Universities. 3- Designing a strategic controlling system. 4- Establishing a supportive Budget to strategy. 5- Set a collaborative vision by the Egyptian Universities to build trust and transparency, and avoid fragmentation. 6- Set an effective communication strategy: establish a unit structure in each University to design interdisciplinary approach curriculum (she referred to her project on 2021 designed an ITD curriculum whose team come from 7 universities). The unit's tasks prepare bylaws and data-base (which we don't have yet), enhance resources, build capacity, apply facilitator in the transdisciplinary team projects to support collaboration. Monitor and design system for evaluating interdisciplinary programs. 7- Set inter-consortium between universities, it allows to share faculties and resources between universities. 8- Coaction practices to support and empower initiatives.

Prof. Affara, ended her presentation by the open question: Do you have other key tools to address the challenges of interdisciplinary learning and practices in Egyptian Universities?

The following presentation was delivered by **Dr Sally Galal**, Associate professor at the Faculty of Pharmacy, Alexandria University. In her presentation she explained a SWOT analysis for implementation of interdisciplinary science, with a list of weaknesses:

• Limited number of Trans-disciplinary programs, • Complex- Time consuming Grant raising process for new programs, • The need for Solid Intellectual Property framework. • Some SCHE policies discouraging trans-disiplinary research. • Poor communication between researchers in different disciplines with understanding of diversity and cross-cutting attributes of discipline transformations and Authorization and & administrative complexity. The opportunities as set by Dr. Galal are: Expanding Egyptian universities with new interdisciplinary program, • Expanding international scholarship opportunities for youth scholars, • Current environmental, economic, and social challenges boosted a paradigm shift towards sustainable sciences & induced

Stakeholders interest. DR Sally presented a strategic approach for implementing transdisciplinary research in educational setting, starting by curriculum design, collaborative teaching, flexible learning spaces, Real world projects, Industry partnerships, Staff professional development. She demonstrated this strategy by a successful implementation in the faculty of Pharmacy in transdisciplinary research for undergraduates, blending Medicine, Engineering, Dentistry and Arts in a network aiming to :

- Train the students on holistic approach in knowledge Creation
- Enhance deep leaning through multi/Transdisciplinary research Skills, and
- Promote Grant applications for student research & to foster Alex-Uni publications & Rank.

A presentation by Prof. Samma ElDek, Professor of material Science and nano technology at the faculty of postgraduate Studies for Advanced Sciences – Beni Swief University. In her presentation she emphasised the importance of interdisciplinary science particularly in her filed of research in Nanotechnology. She presented her scholarly output and research projects in the centre of nanotechnology of her faculty as an interdisciplinary research centre with a vision dedicated to interdisciplinarity in science: "The vision of the faculty is to become a unique scientific school in carrying out researches and interdisciplinary studies among universities, local, regional and global institutions. Additionally, to contribute in solving the industrial problems and achieving sustainable development goals tackling EGYPT vision 2030 "Prof. ElDek explained that one of the key characteristics of the nano vision is that it is 'convergent,' in the sense that nanotechnology brings together different sciences and technologies into a single field. This convergence has been expected to lead to an increase in interdisciplinarity in research at the nanoscale. It also has science policy and human capital implications for the development of educational programs and training approaches. There are consequences as well for governance regimes that must incorporate diverse R&D and regulatory policies, and allow for flexibility of structures and approaches. She then demonstrated an example of an entire interdisciplinary faculty in Faculty Beni-Suef University which is the faculty of Postgraduate Studies for Advanced Sciences. This faculty includes interdisciplinary programs e.g. Integrated management of Environment and water , Occupational safety and health, Building materials and advanced medical imaging. Stem cell biology Energy informatics and others. She ended her talk by stressing on the role of the network as an important tool for interdisciplinary science in higher education in Egyptian universities.

Dr. Hoda Yousry, Associate Professor of medical genetics, Faculty of Medicine- Suez Canal University delivered a presentation on "The dashboard for demonstrating successful stories of existing projects". In her presentation she pointed out that what is considered interdisciplinary today might be considered disciplinary tomorrow. E.g. biomedical engineering which is a merging between biology and engineering is becoming a discipline. Also, Medical engineering, Agriculture engineering, bionics and biomimicry, genetic engineering, and environmental health. She demonstrated some success stories e.g. in the centre of excellence in molecular and cellular medicine with its advanced systems of automated nucleic acids extraction , sequencing and evaluation laboratory, PCR lab systems, Gel electrophoresis and gel documentation system, Biobanking Facility, and others. All these advanced equipment were acquired through a deries of funded projects since 2013 and stull running. One of these projects is the " Kaizen Students project" Kaizen is a Japanese term meaning change for the better or continuous improvement. It is a Japanese business philosophy that concerns the processes that continuously improve operations and involve all employees. Kaizen sees improvement in productivity as a gradual and methodical process, A funded project by STDF on " Image Reconstruction Method for Low-dose Computed Tomography". Throughout these projects it was leant that Interdisciplinary Research has three important keys

1. It accelerates research progress by bringing groups of people together to address the problem.
2. It expedites the transition of research into products that can actually be used by the funder and the community in general.
3. It prepares individuals to think in an interdisciplinary manner and prepares them to be a more agile sort of workforce.

Seminar recommendations

The attendees of the seminar agreed on the following general recommendations:

Recommendation	Addressed to
The importance of setting up a promotion committee for interdisciplinary studies	Supreme council of universities, and the Ministry of Higher Education
Conducting meetings with universities' presidents as decision makers to involve them in planning interdisciplinary science in education and research	University Presidents

Designing a university requirement course for undergraduates in interdisciplinary science	Ministry of Higher EDuvaetion
Adding a course in interdisciplinary Science for postgraduate students as a requirement to obtaining higher degrees	University Presidents
Extend Capacity building lectures online for dissemination of knowledge	Graduates of the Interdisciplinary expert courses delivered by the ministry of higher education in collaboration with the Egyptian knowledge Bank
Planning for property rights challenges in case of interdisciplinary research projects	University Presidents and project offices

Recommendations for the Network continuation

Recommendation	Addressed to
Supporting the network to become an official entity that belongs to the ministry	Ministry of higher Education
Adding a sub-domain in the ministry of website devoted to the Network	Ministry of higher Education
Providing resource availability to continue and initiate more network activities	Ministry of higher Education

It is important to note that all participants of the seminar admitted that while stressing the importance of interdisciplinary science , this does not mean compromising basic sciences, as they are the base of all sciences and the building blocks of multidisciplinary, interdisciplinary and transdisciplinary sciences.