Summary Concept memo

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Proposed Project Name	**Increasing the Conformance of Academia towards Rehabilitation Engineering (i-CARE)** **Or** **Conformance of Academia towards Therapeutic and Engineered Rehabilitation (CATER)**
Main Objective	To build solid grounds for well-structured rehabilitation therapeutic and engineering education and practice at academia and professional rehabilitation centers conjointly.
Thematic focus	Health Service, Physical Disabilities, Rehabilitation, Engineering, Technology.
• **Direct target group**	Health and Engineering academic staff, Health sciences and Mechatronics Engineering students, El-Wafa medical rehab teams.
• **Indirect target group**	Alumni, Disables people, Rehabilitation services providers, Health care professions and workers, users and third party players, and Community in general.
• **Stakeholders**	Ministry of higher education

	Academic institutes (Local/International) Local investors/industry Medical equipment companies Ministry of health NGOs – attentive to disabilities and rehabilitation People with physical disabilities
The problem	In Palestine, There are huge theory-practice gaps, this fact is based on both individual clinical practice and research evidence. In Gaza Strip, a huge number of victims was recorded after frequent wars. The majority of these cases suffering from the lack of health care services provided for them. This distress is highly meaningful with amputee patients. In addition, as a result of the advanced medical technology, a remarkable increase in the number of geriatrics all over the worlds. This facet need a special health care interest for geriatric mainly in rehabilitation aspect. The current two concerns reveals shortage in: - Curriculum / course updating : - Practice settings - Staff experience in knowledge, communication and clinical skills. The rational of the applying project is to narrow the theory-practice gap through strengthening of the heads of triad, which are the staff, curriculum and practice settings. The problem in general is the well characterized gap between academia and the professional field, it being the rehabilitation technology sector, in this proposal. Despite this fact, several academics and students from the mechatronics engineering department have attempted to break this gap, humble self-initiatively, by carrying out graduate projects on rehabilitation engineering. These projects included; mobility devices, functional physiotherapy machine, body-supportive frame, visual aid tool, exoskeleton wearable, smart bio-sensors, electrical stair ramp, multi-functional voice-operated wheelchair, etc. These projects in general were not complete success stories as they have not made through to the commercialization stage, due to a number of reasons (problems); 1- Little or no professional knowledge and guidance available amongst academics (pertaining rehabilitation technology). This has deprived engineering students who wish to carry out rehabilitation-related projects from important know-how and guidance. 2- Absence of basic courses related to rehabilitation needs, analysis and assessment from the engineering curriculum.

	3- Absence of lab facilities to deliver vital practical knowledge related to biomechanics, bio-signals and artificial limbs. 4- There are no universities in Gaza-Strip that offer degrees in rehabilitation engineering. Therefore, the market needs professionals in this field. This is very important, as these products are usually *custom-made*, therefore making them locally will be more adequate and will reduce the cost of providing them. 5- Little attraction or awareness among investors to invest in rehabilitation technology solutions and projects. The skills and expertise in the distinct fields of rehabilitation are well-established in Gaza. These fields include (Rehabilitation, Physiotherapy, Medicine, Mechatronics, Mechanical, Biomedical engineering, Marketing, Management). However, professionals from these fields need to be brought together in order to raise the quality of rehabilitation service.
Importance of the project	Technology has always been central to the treatment of patients in orthopaedics and rehabilitation, and the use of technology has never been greater than it is at present. Today you can choose from a large and ever increasing variety of devices. The project in rehabilitation technology is designed to prepare graduates to assume professional responsibilities in the field of assistive technology as rehabilitation engineers, service providers, and consultants, to name a few possibilities. The degree presents a balance between a clinical rehabilitation preceptorship and practical engineering instruction. The multidisciplinary approach assures that the student receives a balanced exposure to clinical rehabilitation and gains technological understanding and an appreciation of scientific principles. The academic department is closely linked with El-Wafa Medical Rehab Hospital to develop new educational model in Rehabilitation Technology in the Gaza Strip which will serve as an educational reference for health academic and educational staff, health sciences students, bio-medical engineers, academic staff, students, physical rehabilitation teams, and rehabilitation services users and reduce the gap between theory and practice. The project will participate in finding technological solutions to help people with disabilities each case in particular. And work in: • Consulting in the healthcare and social services sectors, as well as in rehabilitation technology • Developing state-of-the-art technology for training equipment, rehabilitation, and orthopedics • Working on the methodology and advancement of clinical

	Rehabilitation technology its integration into high-tech systems • Performing data analysis and implementing medical information systems in the field of health informatics • Research and development. Graduates will be highly sought-after on the job market thanks to their expertise: • Their knowledge makes them perfectly trained for the health telematics, prophylaxis technology, and rehabilitation technology sectors. • Their typical tasks include developing high-tech solutions in the field of health telematics, equipment and material design, and in prosthetics, or developing state-of-the-art technology for training equipment, rehabilitation, and orthopedics.
Specific Objectives	1. Developing several training courses in health and rehabilitation technology to boost the practical practices in (RT) and its applications. 2. The development of the higher education sector and capacity building of academic staff in the field of Health and Rehabilitation Technology. 3. Encouraging the service learning by developing an educational system for Health and Rehabilitation Technology, and developing the students' skills and linking them to educational projects representing a real community needs. 4. Facilitating a transition towards more technologically sustainable development in Palestine and partners' countries. 5. Promotion of community awareness and increase its impact on rehabilitation technology.
Operations **Phases and Activities**	**Assessment phase** 1- Assessment of current mechatronics engineering program in terms of its suitability for conferring graduates with sufficient skills and knowledge to design and implement rehabilitation tools, devices and projects. 2- Assessment of current faculty members' skills and knowledge to deliver rehabilitation engineering topics and experiences. 3- Assessment of current faculty facilities suitability for covering the practical aspects of rehabilitation courses. 4- Assessment of current faculty alliance with professional rehabilitation service providers.

Development phase

Based on the assessment activities, the following activities will or may be necessary;

1- Modification of the **mechatronics engineering** program to include a number of courses that familiarizes students with rehabilitation technology.
2- Modification of the current syllabus in **faculty of applied medical science** to include the proposed three subjects (1 core and 2 elective courses). Like not limit to (Prosthetics and Rehabilitation).

Mobility

2- Professional and comprehensive training of selected of faculty members who will be responsible to educate and guide students in rehabilitation technology projects. These faculty members will also be responsible to establish a well-defined track/trend of rehabilitation engineering at Al Azhar University – Gaza, which could possibly lead to a B.Eng or a Master degree in Rehabilitation Engineering.

- Mobility of professional academic lecturers to joint practical academic courses with related partners with average 3 months duration.

- Mobility of the target students to specific teaching agency as universities and hospitals for ideas and experience exchanges.

LAB

3- Development of an **engineering laboratory** designated for teaching practical knowledge related to bio-mechanics, bio-sensors, bio-signals processing, artificial limbs, etc.

4- Establish an alliance with a rehabilitation service provider to open the door for mutual consultation and training of students who wish to pursue a career in the field.

EXPO

5- A year of rehabilitation technology theme will be announced. This means that most (if not all) graduate projects in that year will be focused on rehabilitation technology. This counts to about 20 graduate projects. A competition of the best design may be announced to

	promote the idea, and the judging committee will be formed from all partners. 6- An expedition of graduate projects can be organized to increase awareness among stakeholders at the end of that year. **Conference** 7-Organize Conference in Health Care and Rehabilitation Technology, and all partners can participate to exchange knowledge and new trends in this sector. 8-Various activities throughout the project may include; field visits/trips, workshops/seminars/lectures, knowledge/curriculum model sharing, online training of academics, access to online materials from EU partner universities. 9- Joining national and international academic programs to enhance both staff and students academic experience research skills.
Expected outcomes	1- Developed modern post-graduate programs in the field of health and rehabilitation technology. 2- Efficient curriculum and academic course as a core for advanced and post graduate educational courses. 2- Well-trained academic staff and technical service provider in the field of rehabilitation technology. 3- Qualified graduates with much more knowledge, attitude and practice will be equipped to deal with disabilities, geriatrics and amputee patients. 4- Joint research activity in the field of rehabilitation technology among local and international scholars. 5- Establishment of bio-engineering laboratory. 6- Several distinct graduate projects focused on rehabilitation technology. 7- Application to establish a Rehabilitation Engineering Degree (sandwich program) lodged to MoHE jointly with Faculty of EIT, Faculty of Applied Sciences and Al Wafa Hospital. 8- Increased awareness of the importance of rehabilitation professional services and solutions.