Innovation and Technology Transfer

Integration of Information & Assistive Technologies (IAT) and Tele-Rehabilitation.†

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Assistive Technology (A.T.) studies and develops methods, systems and applications of specific technologies used by individuals with disabilities in order to perform functions that might otherwise be difficult or impossible. In general A.T. concerns assistive, adaptive and rehabilitative mechanical and electronic tools, sensors, biodevices, robots and systems able to perform (by means "low" or "high" technologies) a task (in easier and safer way) and even the process used in design, selecting, locating and using them.

Information Technologies (IT) in Health Care (e-Health and Telemedicine systems and services) are digital applications based on Information and Communication Technology (ICT), permitting interactive transmission of clinical data, signals and biomedical images, in order to enable patients, living in remote locations, even at home, to receive the best possible care delivery.

Today, a large variety of AT and IT applications in HealthCare are available. It can include several tools going, for instance, from mobility systems (as walkers, wheelchairs, exoskeletons, etc.) to computer systems (hardware equipment and peripherals as keyboards, display, printers, sensors of IoT and software as intelligent interface, serious games, . . .) in order to assist persons with disabilities in accessing to information systems, data bases, portals, web sites, communication networks, etc. This is very important for the inclusion (even if digital but not only). Moreover, telemedicine systems based on networking platforms, sensors and devices in Internet of Things (IoT), intelligent algorithms are pivotal for telemonitoring and telerehabilitating patients with disabilities (neurodisability, disabilities of movement, etc.) permitting all them to stay connected with others (patients, health operators, etc.) and social inclusion.

Rehabilitation is the medical activity in order to give correct and useful therapies (physiotherapy, speech therapy, occupational therapy, etc.) to patients with chronic diseases or after surgical interventions as in neurological diseases, orthopaedic, spine injures, etc.

Rehabilitation can regard the management of chronic neurological diseases such as stroke, multiple sclerosis, brain or spinal injury, Parkinson's disease and dementia, etc. For instance, the role of intensive multidisciplinary rehabilitation following stroke is well established. Task-specific approaches that deal with lost abilities, for example, hand function, are also important in stroke rehabilitation. Today, rehabilitation is based on new methods, technics and innovative technologies (as robots) able to favourite better therapy and health exercises.

In this field the integration between Information and Assistive Technologies (IAT) can permit an important heath activity as the monitoring and rehabilitation at distance. Tele-rehabilitation is an attractive method of delivering services to disabled patients without a need for both the patient and health care professional to be in the same location at the same time. It has a major role in providing remote rehabilitation to patients with chronic neurological conditions, and fills a service gap among those who have limited access to specific care. Tele-rehabilitation also allows experts in rehabilitation to engage in a clinical consultation at a distance. Some fields of rehabilitation practice that have explored tele-rehabilitation are: neuropsychology, speech-language pathology, audiology, occupational therapy, physical therapy and robot-aided rehabilitation.

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