Module 3 TRN CULTURAL SENSITIVITY, Learning Unit 3.1. Communication

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THEORETICAL COMPO NENT

Principles and Values

Socially assistive robotics (SAR) addresses critical areas and gaps in care by automating supervision, coaching, motivation, and companionship aspects of one-on-one interactions with individuals from various large and growing populations, including stroke survivors, the elderly and individuals with dementia, and children with autism spectrum disorders (ASDs). This learning unit examines the interaction challenges of SAR from the points of view of the user, caregiver, and peer and the possibilities of effective communication with SAR in the delivery of care.

The learning unit is founded on the core principles from medical ethics:

- autonomy
- beneficence
- non-maleficence
- justice

It respects the general principles and values for the IENE 10 associated with culturally competent and compassionate care:

- co-operation
- commitment
- kindness
- acceptance
- empathy
- friendship/relationship
- encouragement
- ensuring patient dignity

Aims

This learning unit aims to enhance the ability of participants to address issues of human-robot interaction and communication of personnel, family, carers, and robots. Furthermore, it explores how this can be achieved in the best way to benefit those in need.

Learning outcomes

At the end of this training, the participants will have acquired

- an overview of human-robot interaction through hearing, sight, and touch;
- an understanding of the importance of communication between health and social care staff, client and their family members, carers, and SARs during the provision of care;
- enhanced ability to achieve effective communication with SARs.

Relevant definitions and terms

Human-Robot Interaction (HRI). HRI is "the science of studying people's behaviour and attitudes towards robots in relationship to the physical, technological and interactive features of the robots, with the goal to develop robots that facilitate the emergence of human-robot interactions that are at the same time efficient (according to original requirements of their envisaged area of use), but are also acceptable to people, and meet the social and emotional needs of their individual users as well as respecting human values" (Dautenhahn, 2013). It may also be defined as the exchanges of information and action between humans and robots to perform a task by means of a user interface. For instance, through vocal, visual, and tactile means (International Organization for Standardization, 2012).

Social Robots. A robot designed to interact with humans, with the ability to explicitly engage on a social and emotional level (Campa, 2016; p.106): for this reason, it should follow social rules and interact in a socially acceptable fashion. For example, a robotic butler for humans would have to comply with established rules of good service. It should be anticipating, reliable, and most of all discreet.

A social robot is typically characterized by some (or full) autonomy when communicating and cooperating with humans, eventually making decisions. Social robots usually have a human-like appearance or at least some typical characteristics of humans: a human-like embodiment may signal to users that the agent affords social interactions, hence usually increasing the robot's acceptability. Zoomorphic and pet-like robots are also considered social robots. They may be used in different fields based on their capabilities: social robots are mainly used as educators for children and assistants for the elderly.

One of the most well-known social robots is Sophia, developed by Hanson Robotics. Sophia is a social humanoid robot that can display more than 50 facial expressions. Other popular social robots are NAO and Pepper by SoftBank Robotics.

Social robots such as NAO, Pepper, Paro, Huggable, Tega, and Pleo have been increasingly used in healthcare settings. Other notable examples of social robots include ASIMO by Honda, Jibo, Moxi, and Kaspar, designed by the University of Hertfordshire to help children with autism learn responses from the robot through games and interactive play have. Individuals with cognitive impairments, such as dementia and Alzheimer's disease, may also benefit from social robots. Because of their supportive element in health care settings, some social robots are labelled as "assistive," giving birth to the term Socially Assistive Robot (SAR).

What the research says

- **Mavridis, Nikolaos (2014) A Review of Verbal and Non-Verbal Human-Robot Interactive Communication, Robotics and Autonomous Systems 63(1).** The article proposes **a**n overview of research in human-robot interactive communication, covering verbal and non-verbal aspects. Ten desiderata are explained and relevant research examined in detail, as a good starting point for discussing state of the art: (D1) Breaking the "simple commands only" barrier. (D2) Multiple speech acts. (D3) Mixed initiative dialogue. (D4) Situated language and the symbol grounding problem. (D5) Affective interaction. (D6) Motor correlates and Non-Verbal Communication. (D7) Purposeful speech and planning. (D8) Multi-level learning. (D9) Utilization of online resources and services. (D10) Miscellaneous abilities. The conclusion is that "many sub-problems towards fluid verbal and non-verbal human-robot communication remain yet unsolved, and present highly promising and exciting avenues towards research in the near future." Available here.
- **Iroju O, Ojerinde OA, Ikono R (2017) , State of the art: a study of human-robot interaction in healthcare, I.J. Information Engineering and Electronic Business, 2017, 3, 43-55.** Human-robot interaction (HRI) is fast becoming popular in healthcare due to the increase in the number of vulnerable populations, rising cost of healthcare, and the shortage of qualified healthcare professionals. HRI has been used to provide companionship, surgical operations, rehabilitative care, and entertainment to humans within the context of healthcare. Despite the numerous benefits of social robots in healthcare, the interactions between humans and robots are bedevilled by numerous challenges. These include privacy, safety, the form of the robot, trust, emotions,

deception, and culture. The article explores HRI in health care and the challenges associated with the interaction between humans and social robots, from ethical challenges and design issues to safety, usefulness, acceptability, and appropriateness. Various social robots in healthcare are described, such as surgical robots, rehabilitation robots, behavioural therapy robots, companion robots, assistive robots, physician surrogates, telepresence robots, and vital signs monitoring robots. Available here.

- **Tegmark MC, Scheutz M. (2021). Assistive Robots for the Social Management of Health: A Framework for Robot Design and Human-Robot Interaction Research. International Journal of Social Robotics volume 13, pages 197–217 (2021).** Five types of functions that SARs could perform are identified : (a) changing how the person is perceived, (b) enhancing the social behavior of the person, (c) modifying the social behavior of others, (d) providing structure for interactions, and (e) changing how the person feels. Available here.
- **Tanioka T, Yokotani T, Tanioka R, Betriana F, Matsumoto K, Locsin R, Zhao Y, Osaka K, Miyagawa M, Schoenhofer s (2021), Development Issues of Healthcare Robots: Compassionate Communication for Older Adults with Dementia , International Journal of Environmental Research and Public Health 18 (9), 4538.** This article explores four development issues of Health Compassionate Robots (HCRs) regarding compassionate communication with older adults with dementia: (1) accurate sensing behaviour to “hear” voices appropriately to interact with subjects; (2) inefficiency in “listening” and “gazing” behaviours; (3) fidelity of the behavioral response; and (4) deficiency in natural language processing (NLP), i.e., the ability to respond actively to situations that were not pre-programmed by the developer. The authors conclude that for HCRs to have a “heart/mind” capable of compassionate communication, the robot needs the ability to observe the patient’s needs, correctly evaluate them, and communicate its findings to the patient in appropriate words. For example, a series of actions that integrate not only words but also “knowledge, judgment, technical skills, and care” are expected of these robots. When these robots can “express” themselves with human-like emotive behaviours, they will be able "to convey empathic understanding to the patients and their families." Available here.
- **Giger J C, Piçarra N, Alves-Oliveira P, Oliveira R, Arriaga P (2019) Humanization of robots: Is it really such a good idea?** This review examines the pros and cons of humanizing social robots from a psychological perspective. A review of empirical results of the positive and negative effects of humanization on human–robot interaction (HRI) is conducted. Some of the political and ethical problems raised by the humanization of social robots are presented by discussing the overall effects of the humanization of robots in HRI and suggesting new avenues of research and development. The literature reviewed in this paper showed mixed opinions at the physical and psychological levels. On the one hand, humanization seems to lead to positive relational outcomes (such as increased transparency and more natural HRI). On the other hand, excessive humanization can lead to feelings of eeriness and discomfort towards social robots. Available here.

What do national legislation and international/European treaties and conventions say on the topic?

- **European Commission, 2020, White Paper on Artificial Intelligence. A European approach focused on excellence and trust.** Through this White Paper, the European Commission launches a wide-ranging consultation of civil society, industry, and academia in the Member States, with concrete proposals on a European approach to AI. The document argues that AI is a strategic technology that offers many benefits to citizens, businesses, and society, provided that it is human-centered, ethical, and sustainable and respects fundamental rights and values. Available here.

PRACTICAL COMPONENT

Practical Activities

Activity 1: Robots teach communication to kids with autism

- Watch a video on Youtube.com about using the robot to teach children with autism (available here, 3.59 minutes).
- Reflect on how communication, social skills, and emotion are developed by interacting with the robot.
- Share your findings with colleagues in the discussion area of the social platform for collaborative learning. Write a post about the benefits of bringing robotics into the classroom for children on the autism spectrum. Read answers from other participants and compare them with your thoughts, and then pick at least 1-2 posts to reply to.
- Resources needed: video on YouTube, social platform for collaborative learning.
- Duration: 15 minutes.

Activity 2: How robots can communicate autonomously

- Watch a video (CARESSES, A robot for the elderly that knows about different cultures, 6.10 minutes) showing how the Caresses robot interacts with humans in a natural, unpredictable way.
- Discuss with your colleagues the abilities that SARs could have to engage and sustain a conversation with people autonomously, i.e., not being operated by a person. Then, share your thoughts in the discussion area of the social platform for collaborative learning: write a post, read other participants' posts, and reply to at least 1-2 of them.
- Resources: video on YouTube; social platform for collaborative learning.
- Duration of activity: 20 minutes.

ASSESSMENT COMPONENT

Assessment Activities

Activity 1: multiple-choice questions.

- You are presented with the following questions: select all the answers that you think to be correct.
- Resources needed: Word or similar software for writing, pen or pencil.
- Duration of activity: 3 minutes.

Questions

- SARs could perform functions for the children with autism spectrum disorder (ASD):
  a) enhance their communication skills
  b) change their social behaviour
  c) recover the delay in their development
- What means the robot is able to engage and sustain a conversation?
  a) start up a conversation and keep chatting with a person
  b) learn more and make conversation more natural
  c) express with human-like emotive behaviours
- What are the specific functions of a compassionate robot?

  a) evaluate the patient's needs and communicate the findings
  b) learn about people cultural habits and tastes
  c) express empathy and compassion to patients and their families

EVALUATION COMPONENT

Participants to evaluation

The online evaluation questionnaire of each Learning unit is completed by the MOOC participants (students and student/facilitators) on Survey Monkey

What to evaluate

The Learning Unit's evaluation criteria are: coverage of the identified learning needs, innovation, quality of the content and training materials, intuitive and friendly presentation, relevance of learning activities, and efficiency for achieving established learning outputs.

Please, complete this online evaluation of the learning unit by clicking on this link:

https://www.surveymonkey.com/r/LWYKQQC