AI Educational Technologies: Connecting the Student by Emotional Proxy

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ABSTRACT

The idea for utilising intelligent agents in education is not new (Johnson, Rickel & Lester, 2000) [1], even using videogames (Malone & Lepper, 1987; Shute, 1993) [2-3], and utilising embodied robots (real or virtual) in learning in the near-term is more for research purposes than pedagogical. We do not have in reality the kinds of robots we see in science fiction movies with the capacity for accurate speech recognition, nuanced conversational interaction and emotion perception and expression. Nonetheless, the development and addition of intelligent agents in learning could inspire entrepreneurship in students to create better artificial intelligent systems that motivate and help them learn more creatively. In this abstract we sketch previous and ongoing attempts using artificial intelligence technologies and suggest a pathway to adapt to the modern learner bathing them in an emotionally connected and successful educational experience.

In Mubin et al.'s 2013 review of the applicability of robots in education it lead to questions on what the robot's specific use was for: was it a) to use in teaching of technology subjects like computer science and robotics, or the purpose of letting the robot deliver a science lesson? [4] The examples from case studies in Mubin et al's paper showed robots could be used as i) providing students' with real-time feedback on performance in linguistics' tasks, ii) collaborators in practical exercises building understanding of science in the children, and iii) teach students' such as computer programming (2013, p. 3). We need to affirm that despite attempts, emotional aspects are never at the core of the design process of intelligent systems for educational purposes (Fatahi. & Ghasem-Aghaee, 2010) [5].

ALIZ-E project, funded through the EU's framework 7 programme, included a human-child robot interaction experiment. This involved 45 children aged 7-8 of which 23 were female and 22 male [6]. The purpose of Kennedy et al (2015) study was to find if a social robot increased learning. The robot was designed to simulate a human tutor by adapting itself to the child learner's needs using gestures, gazing between the child and a touch screen and personalisation: referring to the child by their name when guiding them through touch-screen tasks. An unexpected result of the experiment showed that "the boys barely improved with a robot, whilst the girls improved quite substantially" (Kennedy, et al., 2015).

The authors have used conversational systems in university undergraduate courses to engage male and female students in class exercises (Shah et al, 2016) [7]. Students at UAB-Catalonia, Reading University-UK and Jimei-China were asked to interact with the systems, compare them with an online version of Eliza – the first system affording human-machine interaction through natural language, and then score them for conversational ability. The exercise was an effective way to introduce students to natural language processing and appreciate the subtlety of human conversation. A follow-up experiment is being designed to examine the trustability of dialogue systems, especially as they are being increasingly being developed for conversational commerce. However returning to education, commercial enterprises are also involved but in pedagogy-by-AI.

Elzware, a UK-based company who build FAQ systems for a variety of businesses, including for education believe AI should be "people by Proxy" (Elzware, 2015) [8]. The application of systems such as Teachbot in pedagogy is for personalised learning so students "can pace" their goals at their own speed. Using the UK's national curriculum, Teachbot helps to clarify terminology so students can better understand concepts. Will this lead to students using their personal AI-teaching bots to write their assignments? Will this be countered by AI's who are examiners and can distinguish between a human- written essay and one written by a personal learning bot? As Alan Turing (1950) said "We can only see a short distance ahead, but we can see plenty there that needs to be done" (p. 60), this sentiment can also apply to the use of social robots, virtual or embodied in education [9].

From our previous experience involving virtual agents, we would suggest investing in Virtual Teaching Agents (VTA robots) as reliable mechanisms for teaching purposes. However, these agents should be afforded to interact in a wide cognitive spectrum: as content providers, enabling skills acquisition, fostering social interaction among learners (learning is a social process), and, finally, emotionally (Gratch, 2000) [10]. The emotional aspects, obviously previously taken into account (Gorga, & Schneider2009), must be placed highly, in the first position of VTA design. Learning processes are determined by trustability, confidence, expectations fulfilling, and active engagement; all these aspects must be implemented in VTA

implementing all previous knowledge obtained through two decades of affective computing and social robotics (HRI, for example is a great source of studies) [11]. In this talk the authors will summarise several domains by which a VTA should be designed, considering the final and expected result: the improvement of learning processes in virtual environments.

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