Borsa di studio attivata ai sensi di quanto disposto dal D.M. n. 1061 del 10/08/2021

Titolo del progetto: Virtual Agent Group Facilitator for a Holistic Student-Centric Approach to Academic and Socio-Emotional Learning

La borsa sarà attivata sul seguente corso di dottorato accreditato per il XXXVII ciclo:
PSICOLOGIA E NEUROSCIENZE SOCIALI

Responsabile scientifico: Laura Di Giunta
Area per la quale si presenta la richiesta: INNOVAZIONE
Numero di mensilità da svolgere in azienda: 6
Numero di mensilità da svolgere all'estero: 6 presso Curiosity Lab, Tel Aviv University, Israele
Azienda: Istituto Santa Maria della Mercede di Padre Luigi Giuliano s.r.l.
Il Dipartimento è disponibile a cofinanziare per un importo pari a euro: 10.000,00
Dipartimento finanziatore: DIPARTIMENTO DI PSICOLOGIA con delibera del 20/09/2021

Progetto di ricerca:
The goal of the current project is to promote school-aged children' Academic and Socio-Emotional Learning (ASEL) through the virtual environment they all learned because of the increase in use of technologies for remote learning in the context of the COVID-19 pandemic. Children will be exposed to online small group activities facilitated by a virtual agent. To promote children's ASEL, online small group discussions focused on children's involvement in such a program, facilitated by the virtual agent, will be implemented also with their caregivers and teachers.
To examine improvements in children's ASEL it will be used a quantitative approach (e.g., administering questionnaires and collecting school records) in a pre-post-follow-up design, as well as a qualitative approach (e.g., conducting semi-structured interviews with teachers to examine the effectiveness of the online small group discussion facilitated by the virtual agent and the full integration of the system, in their perception of children's increase in ASEL). After having demonstrated the validity of such a program, preliminary steps toward its deployment and scalability will be addressed.
This proposal offers an innovative and nuanced use of technology to augment and improve the emerging COVID-19 standards of practice of remote learning among elementary school aged children. The project takes a holistic approach that encompasses the entire eco-system around children, namely, facilitating group activities for content learning for children; experience-sharing and detailed personal discussions for educators; and guidance and information sharing for caregivers. The tool's holistic design enables realtime, relevant and secure information transfer between key stakeholders involved in the child's education.
The tool proposed by this project will not only supply novel and important support for the children's eco-system during the ongoing pandemic, but can also be applied during its aftermath, to enable a smooth transition from completely remote-learning environments to hybrid physical-remote environments.
Method
Participants
A sample of 350 school-aged children (50% females) from second to fifth grade will be recruited in schools with middle socio-economic status.
One caregiver per child that is exposed to the program will be, in turn, exposed to online small group discussions both with and without a virtual agent as facilitator, with other caregivers whose children are also exposed to the program.

Teachers whose pupils will be exposed to such a program will also be exposed to online small group discussions both with and without a virtual agent as facilitator, with other teachers whose pupils are exposed to such a program.

Procedure

This project will be implemented with the collaboration of Prof. Goren Gordon, Curiosity Lab, Department of Industrial Engineering, Tel-Aviv University, Israel.

A pilot study of this project (co-PIs are Prof. Laura Di Giunta, and Prof. Goren Gordon) is in progress, funded by Jacobs Foundation in 2020. Prof. Gordon's expertise with social robots for children's education, and prior experience with project of small group facilitation, puts him in the ideal position

of developing and evaluating such a tool (e.g., Gordon, 2019; Gordon et al., 2015; 2016; Spaulding et al., 2016; Rosenberg-Kima et al., 2019). He has been working with the Ministry of Education in Israel for the last two years in a project about embodied social robots and learning.

The program will consist of 8 online meetings of groups of 5 children belonging to the same class- group, that will discuss about the teacher's posted topic, facilitated by a virtual agent. Four online discussions will address socio-emotional learning-related content, and 4 online discussions will address academic content. Both teachers and caregivers (whose pupils/children will be exposed to the program) will also be exposed to 2 online discussion groups. Teachers and caregivers will be provided with the theoretical background and goals of the intervention, support to recognize and reinforce students' ASEL, and support to understand the intervention procedures (Durlak et al., 2011). Major efforts will be enacted to promote a collaborative climate among all the actors involved in the project. Teachers will be supported by the PI and her team (within which the PhD student will assume a leadership role) in identifying the activities related to academic learning development. In addition, teachers will be trained to create curricular activities integrating elements to promote socio-emotional learning (e.g., Caprara et al., 2014), as well as to adapt such activities into the content of correspondent online discussions. The PhD student will be responsible in providing support to the teachers in uploading such activities into the web-based system.

Virtual Group Facilitator

In the last two years, the tool Prof. Gordon has been designing involves two complementary aspects, namely, content and facilitation (e.g., Rosenberg-Kima et al., 2019). He and his team have designed a website for experts to easily insert the content of the group activity. They are working on an ongoing human-computer interface usability study of this website in two schools in Israel with 8 teachers, each preparing different activities, ranging from math and science, to civil and creative thinking classes. The website is designed in a similar fashion to Google-Forms, and its output is the agent's speech and behaviors, as well as the digital interface for the activity (e.g. tablet images and quizzes). The second major component of the tool is the design of the group facilitation pedagogy. For this purpose, Prof. Gordon has hired an expert group facilitator, who instructs courses in group facilitation. They have started the unique procedure of "having the agent attending the group facilitation course". In other words, they have taken an expert programmer to attend each class in the group facilitation course and, then, program it into the agent, to the best of their abilities. The agent's perception is a crucial component in this design. In a previous project, involving embodied social robots, Prof. Gordon and his team have employed 360-cameras and directional microphones to implement facial expressions and speaker recognition algorithm. However, in the virtual environment of e.g. Zoom, this becomes a much easier task. They have already designed the new perceptual capabilities of the virtual agents (see Figure 1).

The virtual agent may promote students' critical reflection on their own and others' learning and its relation to the norms and goals that are embedded in the discourses of the online group discussion. The virtual agent may also introduce discussion prompts in the form of questions or directions related to the teacher's content.

Expected results and deliverables

The expected results of this project are threefold: (1) to promote children's academic and socioemotional learning in the, hopefully, post COVID-19 era; (2) a better understanding of the value of small group activities and their facilitation for all children's learning; (3) an increased wellbeing, collaboration and involvement of key stakeholders of the child's education.

The project's deliverables for the scientific community will be highly related to the work of the PhD student, who will be fully involved in this project (e.g., his/her dissertation will be focused on this project). Manuscripts will be produced to disseminate the results of this project in several disciplines, namely, Human-Computer Interaction; Education and Learning; Developmental Psychology (via peer reviewed journals, such as Journal of Educational Psychology, Computers & Education; Computers in Human Behaviour); as well as submitting abstracts for conferences such as SRCD (Society for Research in Child Development), ISSBD (International Society for the Study of Behavioural Development), and conferences organized by the Global Science of Learning Education Network, CHI (computer-human interaction), AAAI (Association for the Advancement of Artificial Intelligence), and CELDA (Cognition and Exploratory Learning in Digital Age).
The project's deliverables for teachers and parents are: 1) A fully functional website for experts to insert content for group activities; 2) A fully operational open-sourced system for small group facilitation by a virtual agent; 3) Full documentation and tutorials on how to use the system; 4) Reports on Educators', Parents', and Children's perception and attitudes of the system (e.g., rate of children's right and wrong answers per activity; the time each stakeholder talk during the group discussion).

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