Supporting Learners in VR with an AI-enabled Non-Player Character (NPC)

#iLRN

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This poster supports the iLRN 2023 practitioner paper outlining the implementation of AI-enabled NPCs in VIRTUAL REALITY.

Introduction: The shift to computer-based Emergency Remote Teaching (ERT) and online learning during the pandemic resulted in a generally negative and an unprecedented student experience. Students were challenged by undesirable study environments, inadequate social connectedness, and increased workloads.

To address these issues a Virtual Reality environment with an Artificial Intelligent Non-Player Character (NPC) acting as a supporting interlocutor is utilized to address the concerns of learner engagement, anxiety and cognitive workload when engaged in remote education.

A particular area of interest in current VR research is the integration of Artificial Intelligence (AI) as a means to enhance the immersive experience and enable human-like intelligence of virtual agents and avatars. At the forefront of AI development is OpenAI.

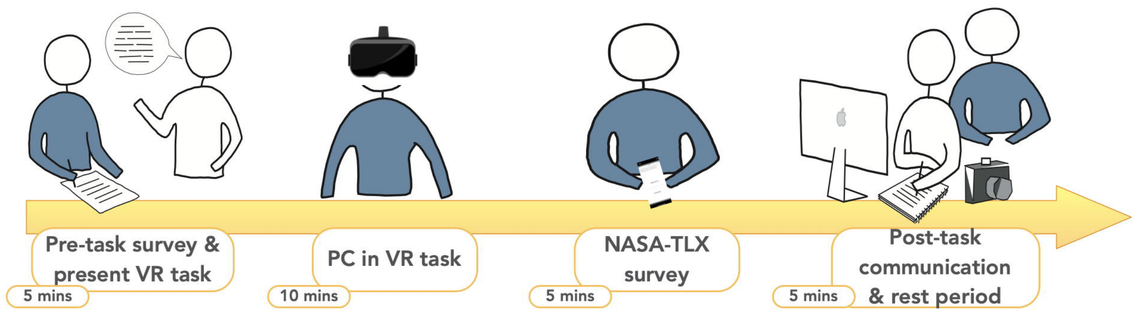
In a survey of 1,002 pro-gamers in USA, AI-enabled NPCs would make gameplay more immersive (62%), interactive (62%), personalized (53%), a realistic experience (54%), and engaging (57%). The evolution of such human-AI interactions will subsequently transcend game environments and be appropriated in the metaverse space (InworldAI, 2022).

Hypothesis: AI-enabled interlocutor interactions with a human learner in Virtual Reality support the acquisition of procedural knowledge.

Method

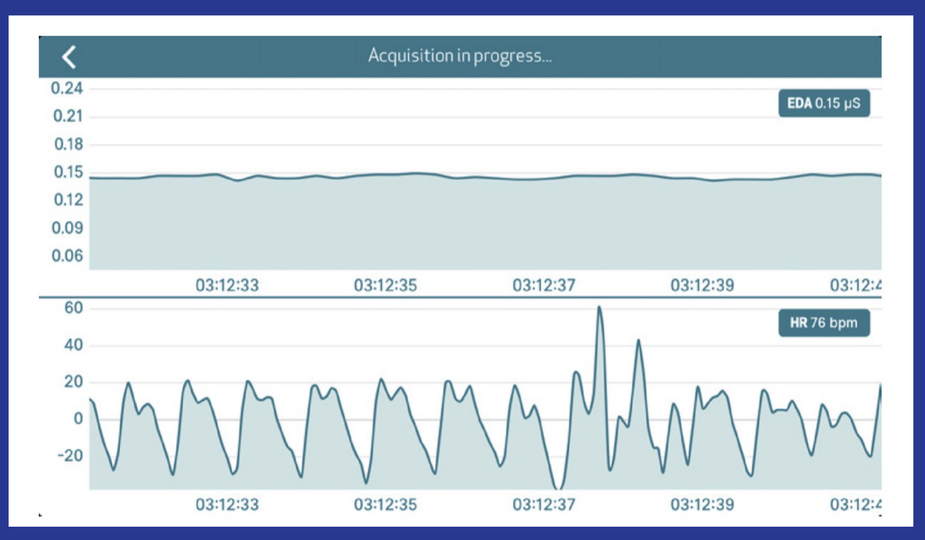
Each participant will have four measures:
(1) time to complete task;
(2) number of interactions with the avatar;
(3) SSAA scores of HR and EDA;
(4) a NASA-TLX cognitive workload score.

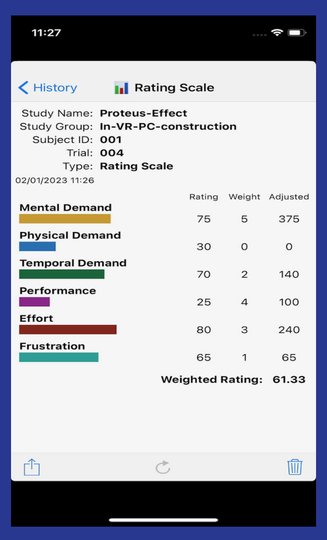
The task objective is to build a Personal Computer with support from a NPC. The basic components of a PC are motherboard, RAM, SSD, CPU, GPU, fan, and power cable.

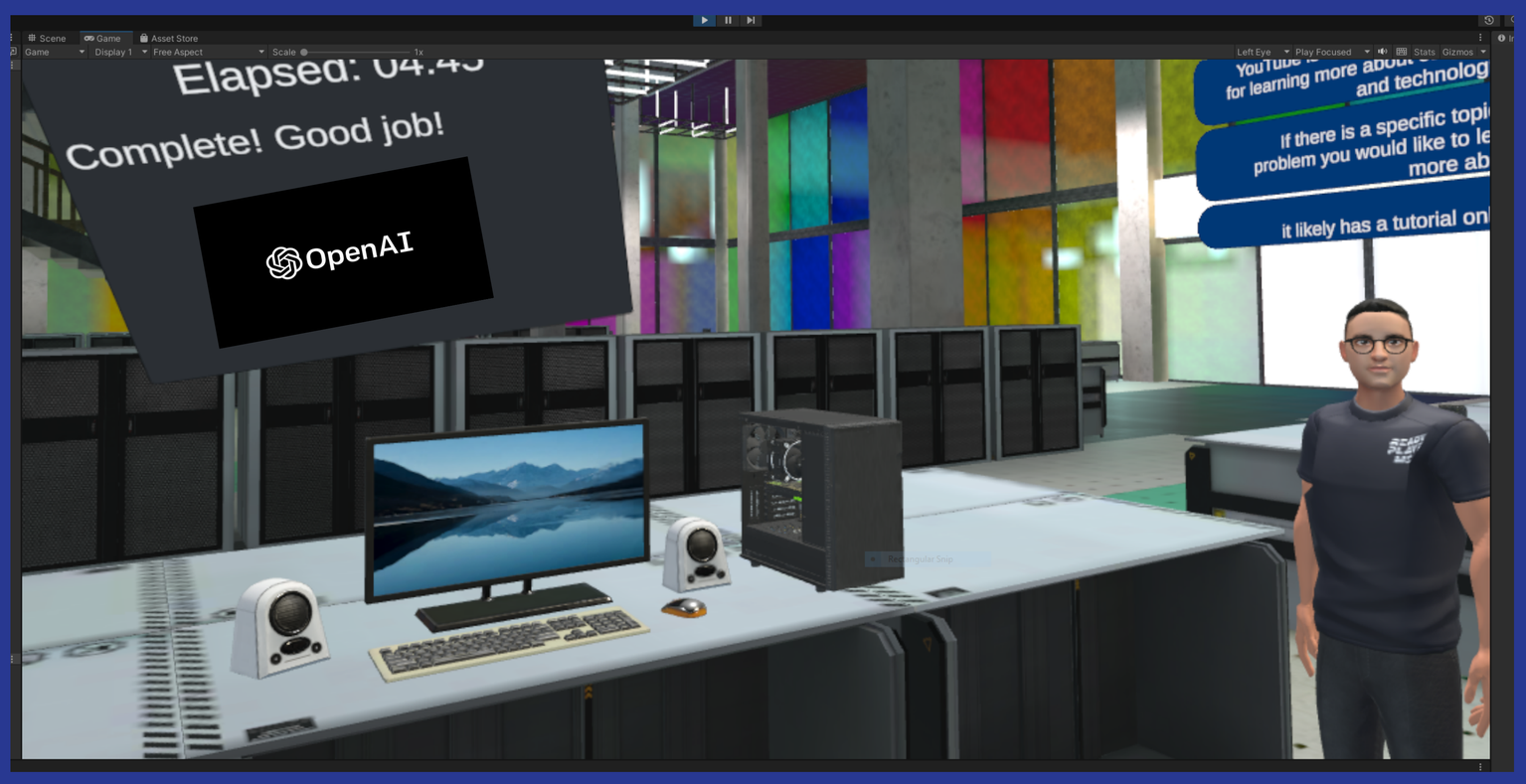


Physiological scores of HR and EDA are recorded using the Empatica biodata device throughout the duration of the experiment. The peak EDA score will be used in the analysis.

A person's subjective experience of workload is influenced by the requirements of the task, the circumstances, skills, behaviors and perception (Hart & Staveland, 1988). Workload is operationalized using six dimensions: Mental, Physical, Temporal Demands, Frustration, Effort and Performance. The NASA-TLX App provides a workload score based upon participant's responses to pairwise data.







Expected Outcome: It is proposed AI-enabled Non-Player Character (NPC) interactions with a human learner in Virtual Reality (VR) alleviates learner anxiety and cognitive workload to subsequently engage in successful learning.