

Getting started procedure of a NC machine simplified by the use of a mixed-reality training scenario

Philippe Seitier¹, Patrick Gilles¹, Valérie Boudier²,
Michel Galaup³, Pierre Lagarrigue⁴

1 ICA, Institut National des Sciences Appliquées de Toulouse, 31400 Toulouse, FRANCE

2 SGRL, Institut National Universitaire Champollion, Pl. de Verdun, 81000 Albi, France

3 EFTS, Institut National Universitaire Champollion, Pl. de Verdun, 81000 Albi, FRANCE

4 ICA, Institut National Universitaire Champollion, Pl. de Verdun, 81000 Albi, FRANCE

Abstract. To allow increased manufacturing quality and integration in Industry 4.0, machines have become increasingly complex, resulting in increasingly difficult operating procedures and therefore a longer and more expensive operator-training period. Moreover, to be competitive in a global market where competition is sometimes distorted by local aid, European companies must be innovative and flexible. They must therefore be able to count on competent and responsive staff capable of adapting to the various workstations. The initial and continuous training of personnel is therefore a crucial need today. The arrival on the market of AR and VR technologies makes it possible to imagine new training models generally taking into account the technical possibilities, without rethinking the educational scenarios. The work carried out in this study consists of offering novice users a set of educational scenarios and an augmented reality device for handling a 3D printer. A first work carried out on a small group of students tests the autonomy of the users with this new material. A second experiment carried out on 80 first-year engineering school students made it possible to quantify usability using a standardized SUS questionnaire. The results show that the level of usability varies from good to excellent, regardless of whether the user has used a VR headset before. They also validate the transmission of technical skills. To obtain this result, the observed criterion is the effective printing of a part in an autonomous manner. The global work in progress aims at providing relevant training scenarios for the use of machine tools.

Keywords: mixed-reality training, NC machine, technical skills

The full paper is published in MATEC Web of Conferences, Volume 368 (2022):

DOI: <https://doi.org/10.1051/mateconf/202236801018>
