Augmented Reality Enhanced Order Picking: The Potential for Gamification

Authors : Stavros T. Ponis, George D. Plakas-Koumadorakis, Sotiris P. Gayialis

Abstract : Augmented Reality (AR) can be defined as a technology, which takes the capabilities of computer-generated display, sound, text and effects to enhance the user's real-world experience by overlaying virtual objects into the real world. By doing that, AR is capable of providing a vast array of work support tools, which can significantly increase employee productivity, enhance existing job training programs by making them more realistic and in some cases introduce completely new forms of work and task executions. One of the most promising AR industrial applications, as literature shows, is the use of Head Worn, monocular or binocular Displays (HWD) to support logistics and production operations, such as order picking, part assembly and maintenance. This paper presents the initial results of an ongoing research project for the introduction of a dedicated AR-HWD solution to the picking process of a Distribution Center (DC) in Greece operated by a large Telecommunication Service Provider (TSP). In that context, the proposed research aims to determine whether gamification elements should be integrated in the functional requirements of the AR solution, such as providing points for reaching objectives and creating leaderboards and awards (e.g. badges) for general achievements. Up to now, there is a an ambiguity on the impact of gamification in logistics operations since gamification literature mostly focuses on non-industrial organizational contexts such as education and customer/citizen facing applications, such as tourism and health. To the contrary, the gamification efforts described in this study focus in one of the most labor- intensive and workflow dependent logistics processes, i.e. Customer Order Picking (COP). Although introducing AR in COP, undoubtedly, creates significant opportunities for workload reduction and increased process performance the added value of gamification is far from certain. This paper aims to provide insights on the suitability and usefulness of AR-enhanced gamification in the hard and very demanding environment of a logistics center. In doing so, it will utilize a review of the current state-of-the art regarding gamification of production and logistics processes coupled with the results of questionnaire guided interviews with industry experts, i.e. logisticians, warehouse workers (pickers) and AR software developers. The findings of the proposed research aim to contribute towards a better understanding of AR-enhanced gamification, the organizational change it entails and the consequences it potentially has for all implicated entities in the often highly standardized and structured work required in the logistics setting. The interpretation of these findings will support the decision of logisticians regarding the introduction of gamification in their logistics processes by providing them useful insights and guidelines originating from a real life case study of a large DC operating more than 300 retail outlets in Greece.

Keywords : augmented reality, technology acceptance, warehouse management, vision picking, new forms of work, gamification

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