

TELMA: AN INNOVATIVE VIDEO-BASED INTERACTIVE E-LEARNING SYSTEM FOR MINIMALLY INVASIVE SURGERY

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Background: Cognitive skills training for minimally invasive surgery (MIS) has traditionally relied upon diverse tools, such as textbooks and multimedia material or in seminars and lectures. Web technologies for e-learning have been adopted to provide ubiquitous training and serve as structured repositories for the vast amount of laparoscopic video sources available. However, surgical videos are not fully exploited for didactic purposes.

Methodology: A new concept of e-learning system has been developed. TELMA is a new technology-enhanced learning (TEL) platform that increases the user's experience using a four-pillared architecture: (1) an authoring tool for the creation of didactic contents; (2) a learning content and knowledge management system that incorporates a modular and scalable system to capture, catalogue, search and retrieve multimedia content; (3) an evaluation module that provides learning feedback to users; and (4) a professional network for collaborative learning between users. Video-based contents are provided to users according to their needs, preferences and experience with the platform, which leads to a personalized and adaptive learning solution. These contents are catalogued into surgical videos, clinical cases and didactic units. Preliminary validation has been performed with 15 expert surgeons at the Jesús Usón Minimally Invasive Surgery Centre and several other Spanish hospitals where the TELMA environment is currently installed and used.

Results: TELMA platform has been built under the principles of user centered design, in close collaboration with expert surgeons. Validation performed ascertains the acceptance and usefulness of this new MIS training environment. It also reflects the importance of providing an easy-to-use, functional authoring tool to create didactic content in order to properly exploit the potential of surgical videos.

Conclusions: This work has presented a collaborative technology-enhanced learning environment that will permit trainees to improve their knowledge and skills anytime and anywhere. The didactic value of surgical videos is better exploited thanks to the

possibility of edition. TELMA is then envisaged as an innovative cognitive learning concept to create, share and reuse scalable didactic content and to adapt the content to learners' individual needs according to validated pedagogical principles.