Interaction Between Task Complexity and Collaborative Learning on Virtual Patient Design: The Effects on Students' Performance, Cognitive Load, and Task Time

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Abstract : Medical and dental education increasingly emphasizes the acquisition, integration, and coordination of complex knowledge, skills, and attitudes that can be applied in practical situations. Instructional design approaches have focused on using real-life tasks in order to facilitate complex learning in both real and simulated environments. The Four component instructional design (4C/ID) model has become a useful guideline for designing instructional materials that improve learning transfer, especially in health profession education. The objective of this study was to apply the 4C/ID model in the creation of virtual patients (VPs) that dental students can use to practice their clinical management and clinical reasoning skills. The study first explored the context and concept of complication factors and common errors for novices and how they can affect the design of a virtual patient program. The study then selected key dental information and considered the content needs of dental students. The design of virtual patients was based on the 4C/ID model's fundamental principles, which included: Designing learning tasks that reflect real patient scenarios and applying different levels of task complexity to challenge students to apply their knowledge and skills in different contexts. Creating varied learning materials that support students during the VP program and are closely integrated with the learning tasks and students' curricula. Cognitive feedback was provided at different levels of the program. Providing procedural information where students followed a step-by-step process from history taking to writing a comprehensive treatment plan. Four virtual patients were designed using the 4C/ID model's principles, and an experimental design was used to test the effectiveness of the principles in achieving the intended educational outcomes. The 4C/ID model provides an effective framework for designing engaging and successful virtual patients that support the transfer of knowledge and skills for dental students. However, there are some challenges and pitfalls that instructional designers should take into account when developing these educational tools.

Keywords : 4C/ID model, virtual patients, education, dental, instructional design

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