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Editorial article

AR-Based-Assessment in Dental Education

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In not much time, all students who are "digital natives" (students who were born in the digital era) would prefer a more real but imaginary life. In fact, digital transformation in life aspects is ongoing, it's an easy lifestyle. When looking at the enthusiasm and criticality of importance, educators have considered "being digital" [1].As a must, and have worked to cope with it. This era should require them to build a digitally-based standard setting. Traditionally, standard setting is a method used to determine the levels of achievement or proficiency and the corresponding scores to those levels [2].

Many computerised software that are now applied for learning, like the augmented reality (AR). AR can be defined as thetechnology that superimposes a computer-generated virtual scenario atop an existing reality in order to create a sensory perception through the ability to interact with it.1In fact, These applications in various educational events have shown encouraging outcomes with great accuracy in tracking users' performances resulting in improved competency with easier and professional interventions by instructors in real-time. AR can improve students' cognitive abilities which, theoretically, follows the Cognitive Theory of Multimedia Learning [3,4]. This theory stands for the influence of using printed or virtual texts with presence of quick response mechanism in AR to improve the performance of learners [5].

The development of virtual and augmented reality in dentistry ensures a safe treatment tool [1]. Therefore, AR have promising results in dental education [6]. In Oral Surgery, for example, AR has approved its efficiency in learning as well as treatment.Reports also shows that in Operative Dentistry, AR have been approved as a successful practical tool in some schools [1,7]. Especially with the Objective Structured Clinical Examination (OSCE), and "AR-Based-OSCE" is now a reliable tool in teaching and assessing in Operative Dentistry [8,9]. However, to date, no reports on AR-Based learning have been published in Removable-Prosthodontics, although, computerised technology, and 3D printing, started to master dental applications of protheses since no short time. Many causes can be thought of. The first is attributed to the cost of implementation in educational setting, the second and foremost is the international differences of educational systems and applied standards [1,7,8]. The author thinks the reasons require further investigation. This will help to build a framework for future technology implementation in prosthodontic education. So,

can Prosthodontics use AR for OSCE?

By applying a mixed methodology of quantitative-qualitative approach, we can build an educational protocol that could find out. 3 stages will be required: creation, implementation, and evaluation.

During the creation level, we need to first:

- Agree on the software for the process.
- Selecting one practical curriculum.
- Digital transformation of the curriculum is next [10].
- Finally, AR environment will be created.
- During all, a standard-based learning to be achieved (this to be tested in the second stage).

During the implementation period, a utility check for the standards could be used:

- This will be done by identifying specific items-check for each parameter (Validity, Reliability, Feasibility, and Educational Impact).11
- Participants training and self-assessment.

This stage would require longer time than others depending on the check average period (e.g. before application, after one month, 3 months, 6 months, and maybe 1 year and so on).

During evaluation stage,

- Students will be tested using (Formative + summative) assessments, and the quantitative results of these tests can be collected for comparison (maybe a cross-sectional study).
- Comparison (if the curriculum has been accepted to be applied in another dental school).
- Students also may be asked to participate in surveys all along the study.

- Faculty members are also considered to participate in focus group intervention to qualitatively reflect on the experience.

Significance

As noted above, this project can be used to build a framework for efficient digital curriculum in Prosthodontics. In addition, AR compatibility for Prosthodontics learning can be checked as well, and as a main aim of such work, the adoption of what can serve as anaccredited international standard setting. Finally, a digital transformation tool to be applied in different dental education that may help reshaping the (pre)clinical assessment practices in dentistry, this include the digital estimation of proper time for AR training sessions to master the acquired skills.

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