Looking Beyond Model Fidelity

To the Editor—We read with interest the article by Chandra et al. in which the authors address the cost-effectiveness of simulation-based teaching of procedural skills.1 The authors compared an inexpensive low-fidelity simulator to a relatively expensive high-fidelity simulator for learning a complex psychomotor skill: Fiberoptic orotracheal intubation. They found that the high-fidelity simulator had no additional educational benefit.

These findings are consistent with the results of other research that has found low-fidelity models to be as effective as high-fidelity models for learning a complex psychomotor skill.1 The authors also noted that individuals have some form of right to return to the scene of the crime. We note that “out” could easily mean out of clinical medicine entirely, but even this scenario allows for alternative careers. However, we are also acutely aware of individuals who were treated for substance abuse who have been successfully practicing anesthesiology for 20 or more years without a relapse. Unfortunately, these cases are rare. The suggestion made by Berge et al. is a simple solution without ambiguity, but each case of addiction and recovery has its own narrative that we believe merits consideration. We applaud the assertion made by Dr. Katz that if, as a society, we are going to adopt a “one strike, you’re out” policy, it should be based on evidence. However, we add with some resignation that the lack of appropriate evidence does not diminish the imperative to make decisions when confronted with an addicted colleague.

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References

in early skill acquisition although there is some evidence that high-fidelity models may have an advantage later in the learning curve supporting a graduated approach through models of increasing fidelity. However, we would like to suggest an alternative factor that affects the analysis of Chandra's findings. In addition to differences in fidelity, the models used can also be differentiated according to the part task training theory.

Part task training is defined as the deconstruction of multicomponent tasks into several single-component tasks. When each skill is learned separately, the single-task format allows a more rapid development of automatization, reducing processing demands during subsequent integration into the performance of the whole procedure. Fiberoptic orotracheal intubation is a complex psychomotor task which requires the association of two component skills: The manipulation of the fiberoptic bronchoscope and the appreciation of the endoscopic view of the upper airway anatomy.

The AccuTouch Flexible Bronchoscopy Simulator (Immersion Medical, Gaithersburg, MD) can be considered a full task trainer model, whereas the “choose-the-hole” model can be classified as a single task trainer dedicated to learn specifically the manipulation of the bronchoscope. The other component skill of identifying the endoscopic appearance of the airway anatomy can be achieved through other simulators such as the virtual fiberoptic intubation part task trainer. The virtual fiberoptic intubation software (Institut de Recherche contre les Cancers de l’Appareil Digestif, Strasbourg, France) is a free screen-based simulator that focuses on learning normal and altered endoscopic view of the airway anatomy. Using only the computer’s mouse or keyboard, this virtual progression helps the learner to mentally integrate the schema of the correct airway route. The difference between the groups in Chandra’s study is not only one of fidelity, but also the difference between a full-task and a part-task simulation. It is interesting that there was no difference between the groups, and we can only speculate whether there would have been a difference if the part-task group had in addition used another part-task trainer such as the virtual fiberoptic intubation part task trainer to enable deliberate practice of both component skills.

We suspect that each type of simulator has a specific role. Part task trainers may be used for learning each component of a complex task, whereas full task trainers may be used to integrate those skills before working in the clinical setting. Given that Chandra et al. found a single part task trainer to be equivalent to a full task trainer, we hypothesize that the use of complementary single task trainers has the potential to be more effective than a full task trainer in early skill acquisition for fiberoptic orotracheal intubation.

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