Chapter 5
Medical Simulation as an Instructional Tool in Health Education:
A Worked Example for Clinical Training

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ABSTRACT

The purpose of this chapter is to provide a background and a worked example of using the Instructional Design System (ISD) as applied to a complex real life example. Specifically, the authors demonstrate the use of ADDIE (Analysis, Design, Development, Implementation, and Evaluation) for building the instruction curriculum of the skills of intubation. The majority of the planning time should be spent on the Needs Analysis and Design. The Learning Objectives, prepared during the Design phase, should be written as Objective Observable Behaviors, which can then serve as the assessments for Evaluation. The content includes two examples of the application of ADDIE: firstly a task that requires a large cognitive component and where simulators and mannequins are readily available. Secondly, a task that requires a high level of psychomotor skills where suitably realistic mannequins are not available, and virtual reality needs to be used as an additional educational modality.

INTRODUCTION

Simulation has been recommended as a valuable addition to health care training (Kohn 2000). To gain the maximum value from simulation training, a rigorous educational underpinning is required. These principles are encapsulated in the concepts of ADDIE: Analysis, Design, Development, Implement, and Evaluation, which is an example of Instructional Systems Design (ISD) (Dick 2009, Causer 2014, Steinert 2012).

Building a curriculum starts with a thorough Analysis (diagnosis) of who the learners are, what are the learners' current conditions, what are the learners' goals for change for which they seek our help; Design training interventions and Develop (prescribe) the interventions most likely to succeed; Implement the intervention and Evaluate the results. The evaluation phase ties back to the analysis phase, i.e., the observable learning objectives which were written in the design phase become the points for evaluation. Revisit this spiral cycle of analysis, design, development, implementation and evaluation, and adjust as needed until the learners' results are good enough to assert that the training program has met established expectations.

The work is shown as an instructional example applied for teaching airway intubation. Figure 1 demonstrates the process of intubation.[1] Intubation is not only a skill that is required by many disciplines and professions, but also, like so many other interventional skills, is a risky (Cormack 1984, Knill 1993, Mallampati 1985) and time-consuming procedure to teach in the clinical setting. Therefore, intubation should be taught for the first time in simulation and not on real patients. The examples given will be applicable to a wide range of health care training programs responsible for intubation, and readily adaptable for training programs responsible for tasks with inherent patient risks.

The goal of this chapter is therefore to reveal the value of deliberately designed instruction by providing a worked example suitable for adaption to most clinical training needs.

Figure 1. The figure shows an intubation training mannequin with the laryngoscope already inserted into the airway. The endotracheal tube ("breathing tube") is shown outside the airway to demonstrate the curved pathway required for the insertion through the airway.

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