



Original Contribution

With directed study before a 4-day operating room management course, trust in the content did not change progressively during the classroom time ☆☆☆☆☆



Franklin Dexter, MD, PhD ^{a,*,1}, Richard H. Epstein, MD ^{b,2},
Brenda G. Fahy, MD, MCCM ^{c,3}, Lyn M. Van Swol, PhD ^{d,4}

^a Division of Management Consulting, Department of Anesthesia, University of Iowa, 200 Hawkins Drive, 6JCP, Iowa City, IA 52242, United States

^b Department of Anesthesiology, University of Miami, Miller School of Medicine, 1400 NW 12th Ave, Suite 3028, Miami, FL 33136, United States

^c Department of Anesthesiology, University of Florida, College of Medicine, Department of Anesthesiology, 1600 SW Archer Road, PO Box 100254, Gainesville, FL 32610, United States

^d Department of Communication Science, University of Wisconsin – Madison, Vilas Hall, Rm. 6152, 821 University Avenue, Madison, WI 53706, United States

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ABSTRACT

Study objective: A 4-day course in operating room (OR) management is sufficient to provide anesthesiologists with the knowledge and problem solving skills needed to participate in projects of the systems-based-practice competency. Anesthesiologists may need to learn fewer topics when the objective is, instead, limited to comprehension of decision-making on the day of surgery. We tested the hypothesis that trust in course content would not increase further after completion of topics related to OR decision-making on the day of surgery.

Design: Panel survey.

Setting: A 4-day 35 hour course in OR management. Mandatory assignments before classes were: 1) review of statistics at a level slightly less than required of anesthesiology residents by the American Board of Anesthesiology; and 2) reading of peer-reviewed published articles while learning the scientific vocabulary.

Subjects: N = 31 course participants who each attended 1 of 4 identical courses.

Measurements: At the end of each of the 4 days, course participants completed a 9-item scale assessing trust in the course content, namely, its quality, usefulness, and reliability.

Main results: Cronbach alpha for the 1 to 7 trust scale was 0.94. The means \pm SD of scores were 5.86 ± 0.80 after day #1, 5.81 ± 0.76 after day #2, 5.80 ± 0.77 after day #3, and 5.97 ± 0.76 after day #4. Multiple methods of statistical analysis all found that there was no significant effect of the number of days of the course on trust in the content (all $P \geq 0.30$).

Conclusions: Trust in the course content did not increase after the end of the 1st day. Therefore, statistics review, reading, and the 1st day of the course appear sufficient when the objective of teaching OR management is not that participants will learn how to make the decisions, but will comprehend them and trust in the information underlying knowledgeable decision-making.

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* Corresponding author.

E-mail addresses: franklin-dexter@uiowa.edu (F. Dexter), repstein@med.miami.edu (R.H. Epstein), bfahy@anest.ufl.edu (B.G. Fahy), vanswol@wisc.edu (L.M. Van Swol).

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² This author helped design the study and write the manuscript. Conflicts of interest: Richard Epstein is the president of MDA, Ltd., which is paid by the University of Iowa to help maintain the website www.FranklinDexter.net used during the operating room management course.

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1. Introduction

Anesthesia department faculty can expend as much time doing systems-based practice as they devote to education and research [1]. Many clinical faculty and practicing anesthesiologists have backgrounds suitable for their non-clinical contributions being to systems-based practice [2]. Projects are an integral component of physicians' systems-based-practice [3,4]. However, the suitability of performing projects depends on prerequisite knowledge [5]. We previously showed that a 35 hour course in operating room (OR) management (Table 1) is sufficient to provide anesthesiologists and anesthesiology residents with the problem solving skills needed to participate in systems-based-practice projects [5].

Currently at most departments, only a handful of anesthesiologists at each hospital are involved in OR management [6,7,8]. The objective of teaching most or all OR anesthesiologists about OR management can be focused on their comprehension of OR management decisions on the day of surgery (e.g., staff scheduling or moving surgical cases from one OR to another). For such informational purposes, the anesthesiologists may need to learn only about decision-making on the day of surgery, rather than learning about all facets of OR management as needed for systems-based-practice projects [3,5]. Managerial problem solving on the day of surgery is a topic of concern to anesthesiologists because those decisions reduce the hours that they and other personnel work late [9,10,11].

Analytical decisions in OR management are challenging to teach, in part because such tasks are intellectual^a yet generally not highly demonstrable (i.e., decision-making can be judged as being the best possible only after one has attained appropriate knowledge) [5,12,13,14,15]. The quality of such decisions is consistently better when the decisions are made by a knowledgeable leader, rather than in a participative group (e.g., an OR committee) [15]. The autocratic approach leads to better decisions because it is difficult to demonstrate to a group that a decision is intellectual^a unless the group has the necessary knowledge upon which the decision was based [15]. Nevertheless, despite the improved decision quality, autocratic leaders are often unappreciated by those they lead and their superiors [15]. Thus, organizations and the leaders have an incentive for the larger team to have sufficient formal education in OR management science for trust to develop in the leader's evidence-based decisions [15]. Such "trust indicates a positive belief about the perceived reliability of, dependability of, and confidence in a process" [16]. In part, since education increases the demonstrability of decisions, education increases trust and skill at evaluating when a recommendation may be based on incomplete information [5,17,18,19].

In a previous study of the OR management analytics course, [5] we demonstrated that, among the peer-reviewed manuscripts used as course readings, formulas were cues associated with significantly increased trust ($P = 0.0019$) [19]. Presence of numerical data (i.e., from "real-world" examples and observations) had no effect ($P = 0.15$) [19]. Since the course classroom time does not include the presentation of new formulas, but rather their application in problem solving, trust in the content might be achieved through exposure to the formulas beforehand and/or after brief periods of classroom time. We tested the hypothesis that trust in the content would not increase progressively between the end of day #1 (i.e., completion of topics related to OR decision-making on the day of surgery) and the end of the 35 hour course. If this hypothesis were supported, the implication would be that a 1-day OR management course with preparation ahead would be sufficient training for anesthesiologists, and anesthesiology residents, to understand the reliability, quality, and usefulness of trained leaders' decisions.

^a An "intellectual task" is "a project, problem, or other type of task with results that can be evaluated objectively using some normative criterion, such as a mathematics problem [12]."

Such training might be especially relevant for anesthesiologists not previously exposed to such knowledge.

2. Methods

The University of Iowa IRB declared that this investigation did not meet the regulatory definition of human subjects research.

2.1. OR management course curriculum

The course curriculum (Table 1) provides the knowledge and problem-solving skills needed for participation in projects that satisfy the Accreditation Council for Graduate Medical Education's competency in systems-based-practice [5]. Although the course curriculum has not changed since it was validated, [5] the prerequisite review to be completed by participants before class was updated in 2013 to focus on vocabulary, based on the 2013 paper from the course [14]. The discussions of OR management leadership were revised in 2013 to focus on autocratic decision-making, based on the results of another 2013 paper motivated by course discussions [15].

The course has two types of prerequisite knowledge. First, there is a review of statistics at a level slightly less than required of anesthesiology residents by the American Board of Anesthesiology (ABA)'s BASIC examination [14,18,20]^b (The statistics review online at the web site [20] includes the material for the course and, at the end, the additional material required by the ABA, such as power analysis, meta-analysis, and Bland-Altman plots). Second, the vocabulary needed to read the scientific literature related to OR management is defined [14]. Articles are read to provide context to the use of the vocabulary [14]. Quizzing oneself in the vocabulary (e.g., using the provided annotated bibliography [10,14]) is recommended. Multiple instructions repeat that acquiring the requisite knowledge before attending the course is mandatory.^c Depending on the attendee's prior education in topics related to the material, review of the prerequisite material takes 5 to 20 h.

The classroom portion of the course comprises 35 h of lectures and many managerial problem-solving cases (Table 1) [5]. These are completed over 3.5 days while participants work in teams, typically of 3 participants. The teams are created based on registration questions, ideally with at least one analyst and one anesthesiologist per team. Each team answers questions using an Excel workbook (Microsoft, Redmond, WA) that provides adaptive feedback, through the use of >10,000 binary statements, until each question is answered correctly [18]. An example of what participants see is shown in Figure 2 of Reference [18]; how the feedback is produced using the Excel binary statements is shown in the Appendix of that article.

There was one instructor (FD) for all 4 classes over the 1-year studied period, from March 2016 through February 2017.

2.2. Trust scales

Trust is the willingness to rely on information with the expectation that the information is important, accurate, and useful [21]. In our previous study, we found that although the 3 scales shown in Table 2 each assessed what would potentially be a different facet of trust (quality, usefulness, and reliability), the 9 items together provided a unidimensional

^b American Board of Anesthesiology's BASIC examination, section A (basic sciences), 3 (mathematics), b (statistics), page 6 of the January 2017 content outline.

^c Among a separate cohort of 12 course participants (i.e., no overlap of those in the current study), the trust scale (Table 2) and survey questions were completed at the end of day #1. The Spearman rank correlation was 0.846 (SE 0.069) between the quality subscale and subject's "estimate of how many total hours you spent reading the articles and learning the vocabulary for the course;" two-sided exact $P = 0.0020$. Based on this preliminary observation, for future courses, but not those included in this paper, after the directed learning before the classroom time, participants quiz themselves on the vocabulary to test their knowledge.

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