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Are the kids alright? Review books and the internet as the most common study resources for the general surgery clerkship

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ABSTRACT

Background: To define resources deemed most important to medical students on their general surgery clerkship, we evaluated their material utilization.

Methods: A prospective study was conducted amongst third-year medical students using a 20-item survey. Descriptive statistics were performed on the demographics. Kruskal-Wallis and Mann-Whitney analyses were performed on the Likert responses ($\alpha = 0.05$).

Results: Survey response was 69.2%. Use of review books and Internet was significantly higher compared to all other resources ($p < 0.05$). Wikipedia was the most used Internet source (39.1%). 56% never used textbooks. Analyses of surgery subject exam (NBME) results or intended specialty with resources used showed no statistical relationship (all $p > 0.05$).

Conclusions: Resources used by students reflect access to high-yield material and increased Internet use. The Internet and review books were used more than the recommended textbook; NBME results were not affected. Understanding study habits and resource use will help guide curricular development and students' self-regulated learning.

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1. Introduction

There is an extensive amount of learning resources available to medical students now. University medical libraries and clinical departments, such as those at the main authors' institution, University of Florida (UF), have free access to e-books, databases, and various educational websites. General Internet sources are also accessible without subscription, such as practice guidelines established by professional societies. Two examples of these are the National Cancer Institute webpage about cancer types, where health professionals can look up specific information regarding disease background, staging, and management (<https://www.cancer.gov/types>), and the Eastern Association for the Surgery of Trauma practice management guideline page (<http://www.east.org/resources/treatment-guidelines>).

Informal conversations amongst the authors and rotating students have revealed that the medical students can become

overwhelmed by available study material, and while not novice learners overall, they are novice learners in medicine. Clerkship directors will often have textbook recommendations. At UF, the text is *Essentials of General Surgery* by Peter F. Lawrence. It is available on loan to all the students in paper and electronic format. The third-year students are on their surgical clerkship for 8 weeks total, divided into 3 rotations (2 3-week "core" services, 1 2-week "specialty" service). During this time, they also attend lectures, simulation labs, and weekly 2-h small group discussion groups.

There is an associated question of what materials students are using for their self-learning. Guiding them to better sources may not only improve their knowledge base, but serve as an opportunity to make the learning process more meaningful and even lead them to choose a profession that they did not originally anticipate pursuing. While there have been factors identified in students' decisions to pursue various specialties such as surgery, they have not focused on the influence of study resource use.^{1–3}

Previous research looking at study habits of medical students during their surgery clerkship is not extensive. There have been evaluations of surgery residents in relation to in-service exam performance, and the validated instruments used for these studies served as the basis for this study's survey.^{4,5} There is one recent

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large-scale work that specifically concentrated on resident resource use.⁶ There are studies that look at student use of simulators focusing on preceptor feedback, technique evolution, and technology, but less so studying.^{7–13} The gradual introduction of e-books, web-based education infrastructure, and the gaining popularity of the flipped-classroom concept have trickled over into medical student teaching in an effort to make better use of students' time, as these issues have been modeled after needs that need to be met in relation to resident work-hour and work-force constraints. Interrogation of medical students regarding use of e-books and e-readers has been performed to assess potential use and finances within academic institutions, with results showing that while there is enthusiasm for the technology, cost is a strong consideration for students.⁴ This gives weight to considerations of improving student access to study materials so that they make efficient use of their time and institutional money spent, working to their strengths and weaknesses, and in turn continuously evaluating student study habits.¹⁴ Additionally, emphasizing the use of reputable educational sources in turn promotes a more thorough understanding of a subject.

We strove to understand what the third-year medical students found important to study for the surgical clerkship. To assist in optimizing learning and resources for medical student education, we evaluated their utilization of available material. We suspected Internet use to be substantial. The goal of this study was to perform a needs-assessment, and use this data to improve the experience and self-regulated learning of students during their core surgical clerkship.

2. Methods

This was a prospective observational survey-based study of third year medical students at a single institution, at the end of their required surgical clerkship. A 20-item survey was designed by the authors, utilizing a modified Delphi technique in two rounds. It is based off of a survey developed in a resident study habit publication which had been created and validated with a survey expert.¹⁵ The survey included demographic items, Likert-based attitudes, items on study habits, and resources used during the clerkship (Appendix 1.) This survey was pilot tested with the rising fourth year medical students. It was distributed to the third year medical students at the University of Florida during the 2014–2015 academic year, at the end of the core rotation.

The study was IRB approved and exempt. Participation was voluntary. The results were blinded by the study's gatekeeper, so that survey results could be tracked with subject exam scores. The gatekeeper was an office administrator who kept the surveys secured and tracked the de-identification of the surveys once the students completed them. When the survey was administered at the feedback session, the authors were not present so as not to influence the students' responses. The data was directly entered into a database, de-identified, by the study gatekeeper. The authors do not have access to the student de-identification key.

Descriptive statistics were performed on the student demographic data. Two-sample t-tests evaluated for differences between groups. Mann-Whitney and Kruskal-Wallis tests were performed to evaluate for statistically significant relationships between Likert responses and subject exam results. All statistics were performed using a defined $\alpha = 0.05$.

3. Results

The survey response rate was 69.2% (92/133) (Table 1). The average respondent age was 25.7 ± 3.8 years. 39.1% were female.

The median number of students per rotation block was 23 (IQR 23–24).

Review books were the most commonly used study material by the medical student respondents, followed by use of the Internet, then textbooks, journals, and lastly, personal notes (Fig. 1). Use of review books and Internet sources was significantly higher compared to all other resources ($p < 0.05$). Review books were used to a statistically significantly greater degree than the Internet ($p < 0.001$).

Overall, review books were the most-used resource based on “usually” and “always” responses. Additionally, they were used to a statistically significantly greater degree than any other material. Use of Internet resources, including that developed by the department, were the next most-used materials, also based on “usually” and “always” responses. 56% of students responded they never used a textbook to study. No statistically significant difference was found with use of textbooks, peer-reviewed journals, and personal notes (all $p > 0.05$).

Regarding resource use, students were asked how often they used specific types of study material, then also asked them to list the actual material names they used. There were 340 total free-text responses from 92 students (Fig. 2). The two most-used resources were review books. *Dr. Pestana's Surgery Notes*, a review book, was the primarily-used source (74% used), which students purchased independently. Wikipedia was the most commonly used Internet source (39.1% of respondents). StudyCore, the University of Florida intranet in which the surgery faculty place materials they have written or curated, was the third-most used online source (29.3%), after UpToDate. 19.6% of students used what would typically be considered residency-level textbooks: *Greenfield's Surgery*, *Zollinger's Atlas of Surgical Operations*, *Sabiston Textbook of Surgery*, and *Schwartz's Principles of Surgery*. The recommended textbook, *Essentials of Surgery*, was used by 8.7% of students.

Kruskal-Wallis analysis of NBME surgery subject exam results with all categories of resources used showed no statistically significant relationship ($p > 0.05$). Evaluating whether high performers (>80thile) used certain materials at a different frequency compared to their peers, there were no statistically significant increases. Similarly, poor performers (<35thile) did not utilize resources differently based on their survey responses, compared to their peers. There was no significant difference between NBME Surgery Subject Exam performance when comparing UF third year medical students with the national average ($74.4 \pm 8.1\%$ vs. $72.8 \pm 8.7\%$, $p > 0.05$). When evaluating for relationships between study material use and students' intended career choice, there was no statistical significance. A two-sample T-test comparing NBME scores between the first half and second half of the year showed no statistical significance ($p = 0.45$).

Table 1

Demographics of the 92/133 students who completed the end-of-clerkship survey. Age results presented as mean \pm standard deviation.

Medical Student Demographics	
Age	
Did not respond	5 (5.4%)
20–29	24.7 ± 1.28 (80.4%)
30–39	32.2 ± 2.2 (13%)
40–49	48 (1.1%)
Female	$n = 36$ (39.1%)
Intended career choice (permitted to have more than 1 response)	
Did not respond/undecided	$n = 30$
General surgery or surgical subspecialty	$n = 24$
Non-surgical subspecialty, not primary care	$n = 25$
Primary care	$n = 22$

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