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Analyzing a follow-up needs assessment: Increased use of internet-based APSA educational programs by pediatric surgeons☆,☆☆

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ABSTRACT

Purpose: Needs assessment is a critical component of educational program design. Follow-up is important for improvement. Two electronic educational programs, Exam-based Pediatric surgery Educational Reference Tool (ExPERT) and Pediatric Surgery Not a Textbook (NaT), offered by the American Pediatric Surgical Association (APSA) have been functional for over three years, allowing for follow-up assessment.
Methods: A 22-question survey was distributed via email to APSA members. Questions included practice demographics, learning preferences and APSA material use. Mann–Whitney analysis was performed ($p<0.05$).
Results: 294 members responded. 43% were in academic practice with a pediatric surgery fellowship. Top preferences for obtaining/maintaining medical knowledge were national meetings (27%), ExPERT (24%), and the NaT (20%). Comparatively, in a 2014 assessment, electronic programs were less desired (16%). Cost was cited by >1/3 for not subscribing to ExPERT or NaT. Question discussions were often read regardless of response. >86% would subscribe to APSA resources if there were no CME requirement. The most frequently cited knowledge gap was fetal therapy (30%).
Conclusions: This is the first publication documenting increased acceptance of electronic educational platforms for pediatric surgeons. Well-utilized and valued, the data justify and encourage continued development of electronic educational resources. Room for improvement exists in affordability, knowledge gaps, and individualizing curriculum development.
Level of evidence: IV

Needs assessment is a critical component of educational program design. The basis for a needs assessment is to examine the environment with respect to the needs of involved stakeholders, including the issues or concepts deemed most important for a perceived deficit. A well-designed needs assessment should pave the way to a product that will be used with regularity and deemed successful by the stakeholders. After implementation, follow-up assessment is important to evaluate and improve existing programs. The American Pediatric Surgical Association (APSA) is committed to creating and maintaining educational resources of high quality and relevance for surgical trainees and pediatric surgeons in practice. These materials are peer-reviewed and regularly updated. The educational mission involves a network of online resources, at the center of which are the self-assessment program (Exam-based Pediatric surgery Educational Reference Tool; ExPERT) and the education reference platform (Pediatric Surgery Not a Textbook; NaT).

Approximately two decades ago, potential future applications of the Internet for surgical education were described for pediatric surgeons [1]. More recently, a national survey of board-certified physicians in the United States illustrated the desire for using different technologies for continuing education [2]. In APSA, ExPERT was released in 2013 and the NaT in 2016. Since their inception, features have been updated to create a continuously multi-faceted learning experience. The two platforms are now linked to provide "deep-dive" learning opportunities for the users.

APSA's goal is to have online educational offerings that appeal to all levels of experience. As experience with the platforms and the number of subscribers to the learning materials have increased, the ability for the organization to accurately analyze use and obtain feedback is more optimal. Given the time from implementation of ExPERT and

Abbreviations: APSA, American Pediatric Surgical Association; ExPERT, Exam-based Pediatric surgery Educational Reference Tool; NaT, Pediatric Surgery Not a Textbook; CME, continuing medical education.

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Table 1
Demographics of survey respondents ($n = 294$).

	% responses
Length of time in practice	
General surgery trainee	1.4
Pediatric surgery trainee	4.4
Practice ≤5 years	20.4
Practice 6–15 years	25.9
Practice for >15 years	48
Practice setting	
Academic **without** pediatric surgery training program	27.1
Academic **with** pediatric surgery training program	42.8
Private or community practice **without** academic affiliation	7.2
Private or community practice **with** academic affiliation	21.6
Federal government/Military	1.4

NaT, a follow-up needs assessment was performed to determine material use and knowledge gaps.

1. Methods

A 22-question survey approved by the APSA Professional Development Committee was distributed via email to the APSA membership **(Appendix A)**. Participation was voluntary. Identities of survey respondents were not trackable. The survey included questions regarding years out from training, practice demographics, preferences for accessing and maintaining medical knowledge, and use of APSA-supported educational materials. It was developed using a modified Delphi technique through the Professional Development Committee. The survey was not otherwise piloted; it was based on an earlier version used in 2014, now updated to include questions addressing ExPERT and NaT. Multiple choice, Likert scale, and free responses were used. Statistics were performed using Microsoft Excel with the Real Statistics Resource Pack (Release 5.4, copyright 2013–2018; Charles Zaiontz) ($p < 0.05$).

2. Results

There was a 24% survey response (294/1215 APSA members who were emailed) **(**Table 1**)**. The experience levels of respondents, in decreasing order of frequency, were >15 years in practice (11.6%), 6–15 years (6.3%), 0–5 years (5%), and trainees (1.4%). Of the attending respondents, 43% were in academic practice with a pediatric surgery training program; this was the largest group of respondents. Only 8% were in a nonacademic practice.

The top three preferences for obtaining and maintaining medical knowledge were national meetings (27%), ExPERT (24%), and the NaT (20%) **(**Fig. 1**)**. The top three least preferred sources for obtaining medical knowledge, based on Likert response, were podcasts (30%), department/division meetings (18%), and review courses (14%). 12% had never subscribed to ExPERT. Of those who did subscribe, 42% paid for the materials with personal funds. 18% had never subscribed to the NaT. 37% of those who used it paid for it with personal funds. Cost was cited by more than one-third of those who did not subscribe to ExPERT or the NaT (Table 2).

The top responses that ExPERT was considered a useful resource were to keep up with pediatric surgery literature (37%) and for CME (36%) **(**Fig. 2**)**. Use of ExPERT for exam preparation was the least common reason from the respondents. More than 86% would still subscribe to ExPERT if there were no CME requirement. More than 50% of the respondents claimed they always read the question discussion in ExPERT regardless of whether their answer was correct. 84% stated they would always read the discussion if they missed the question. Overall, there was a 99% read rate of discussions of more than half the respondents who missed a test question. Although evidence-based, reference links were infrequently followed.

The major utility of the NaT for respondents was to review a topic (64%) **(**Fig. 3**)**. The second highest reason for NaT use was to support the curriculum for trainees (17.5%). Reviewing a specific topic was more frequently cited than all of the other reasons combined. References provided by the NaT were accessed less than half the time by 63% and never by 18%.

The most frequently cited knowledge gap was fetal therapy (30%), followed by endocrine disorders (17%), then critical care (13%) and oncology (12.5%) **(**Fig. 4**)**. When broken down by experience, the knowledge gaps were felt to be greatest in fetal therapy for all groups. The trainees and junior attendings (0–5 years from training) felt more comfortable with trauma compared to attendings more than 6 years out from training. Critical and perioperative care was a knowledge gap

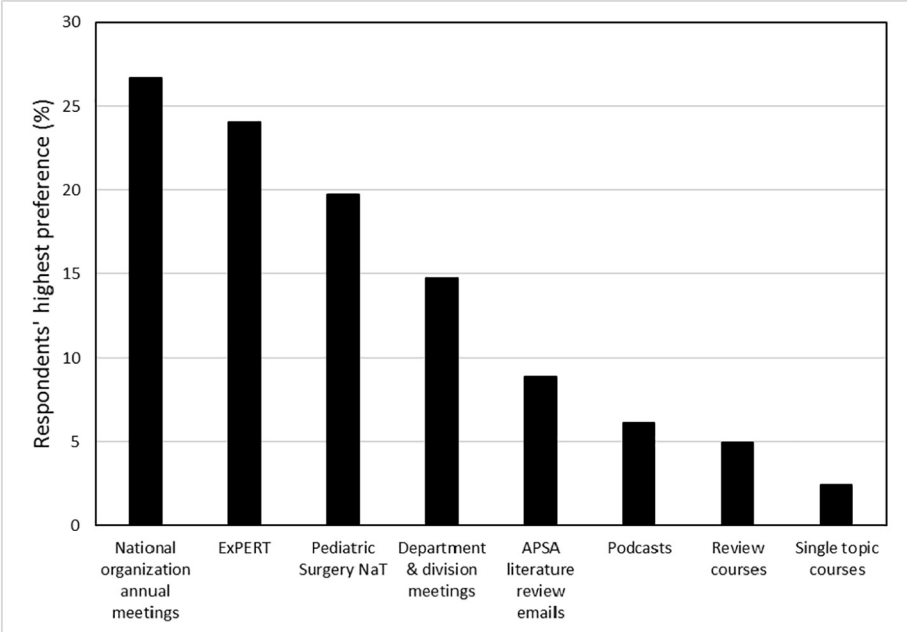

Fig. 1. Survey respondents' overall material preference for obtaining and maintaining medical knowledge (ExPERT, Exam-based Pediatric surgery Educational Reference Tool; NaT, Not a Textbook; APSA, American Pediatric Surgical Association).

Table 2
Survey responses to questions regarding reasons for not subscribing to APSA online learning material.

	% responses	
	ExPERT	NaT
I have other ways to get the same material	35.9	27.3
Too expensive	35.9	38.2
Too time consuming	7.6	NA
Content not relevant to my practice	1.9	0
Haven't gotten around to it	28.3	43.6
Other	22.6	10.9

ExPERT, Exam-based Pediatric surgery Educational Reference Tool; NaT, Pediatric Surgery Not a Textbook.

cited more by the most senior attendings compared to the younger groups. The most senior group was generally more comfortable with vascular, genitourinary, and hepatic/biliary/pancreatic/splenic disorders compared to their junior counterparts. Trainee preference for obtaining and maintaining knowledge was for the NaT, practice 0–5 years preference was for national meetings, practice 6–15 years was for ExPERT, and practice >15 years was for ExPERT. The least-preferred method by the two older groups was podcast learning. Least preferred by the two younger experience groups were review courses (single topic or broad topics).

While not statistically significant in regards to frequency of grouped responses, free text responses regarding practice gaps that could be better addressed by APSA's educational programs were a variety: treatment pathways for nonurgent problems, postoperative pathways (ie, feeding schedules), financial/partner management, emerging/controversial clinical standards, anesthesia, wound care, and operative videos.

3. Discussion

Incorporating the Internet as a major part of an educational curriculum is evolving to the norm; certainly, the ability to update material and to reach the learner audience with an online platform is easily implemented with Internet-based resources [3,4]. Online learning for adult learners allows the users to proceed at their own pace, focusing on their own real or perceived deficits. APSA has been able to harness this forum for continuing education and has previously shown that email blasts of curated pediatric surgery peer-reviewed publications are a valued and well-utilized offering [5]. In 2013, APSA's first formal continuing educational program, ExPERT, went live. It continues to be updated regularly, based on user comments sent from the site. Specifically, the spaced learning questions are modified and repeated on a 1–2 month cycle, with new questions added. Email blasts and articles of interest questions are added monthly. Biannual meetings of the APSA leadership are held during which 60–70 questions are added or revised; some new questions are created de novo, and questions deemed too easy/too hard/outdated are revised. Questions are also updated or revised in response to user critiques. Regarding the NaT, releases are quarterly with incremental topic content upgrades as suggested by both authors and user feedback. Comprehensive topic updates are done every 3 years. Aside of the current NaT and ExPERT resources, APSA also provides resident- and student-focused learning modules and patient education material. These may all be found at pedsurglibrary.com.

This study is the first documentation of the increasing acceptance of electronic educational resources specifically by pediatric surgeons. Increased preference to online learning material in the medical field has been shown previously [6,7]. WeBSurg is an example of a wide-reaching online surgical education site that focuses on continuing medical education, not only undergraduate/graduate medical education [8]. The online material developed by APSA also includes spaced learning via weekly quiz emails; spaced learning has been shown to improve knowledge retention and other long-term educational benefits [9,10]. While a significant amount of educational material on the APSA website is free of charge, materials such as ExPERT, NaT, and the spaced learning curriculum require a paid subscription although discounts are available for trainees and surgeons in underserved areas. Based on survey feedback regarding cost and reasons for not subscribing, opportunities may exist for reconsidering the subscription fees to increase the learning audience while still being able to uphold the website's quality and maintenance.

Vascular surgeons involved in a needs-assessment survey for online learning desired more online resources [11]. When looking at this study's survey results regarding preference for learning forums, ExPERT and NaT were two of the top three most-preferred materials. This compares to an unpublished assessment performed by APSA in 2014 of 222 respondents, who indicated that electronic programs were less desired (16%) for continuing medical education. When looking at this survey's response patterns based on surgeon seniority, online materials were still highly used. This across-the-board use may have roots in the ability for the learner to have control over what they use, tailoring their learning experience based on their needs within the website's offerings. This is effective because the educational offerings are provided within a

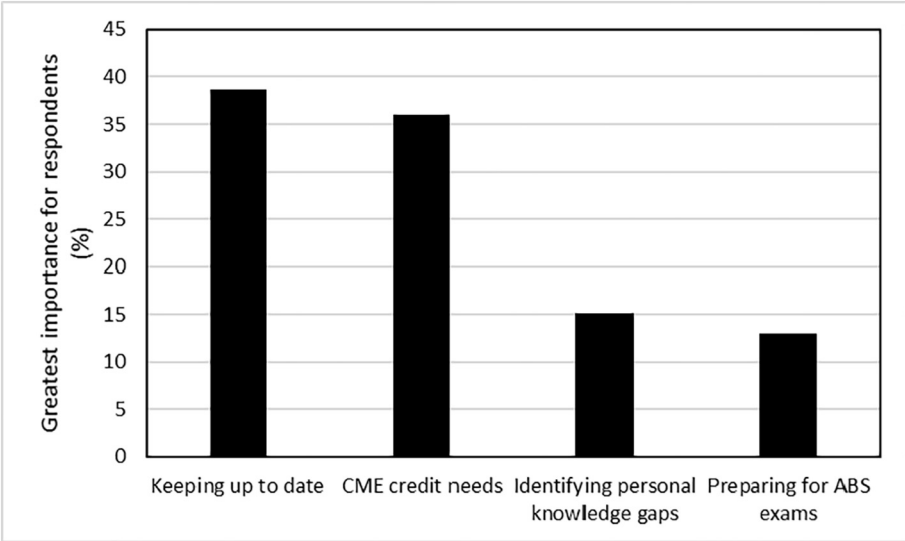

Fig. 2. Survey respondents' top reasons for using ExPERT, in order of what was deemed greatest importance to them (ExPERT, Exam-based Pediatric surgery Educational Reference Tool; CME, continuing medical education; ABS, American Board of Surgery).

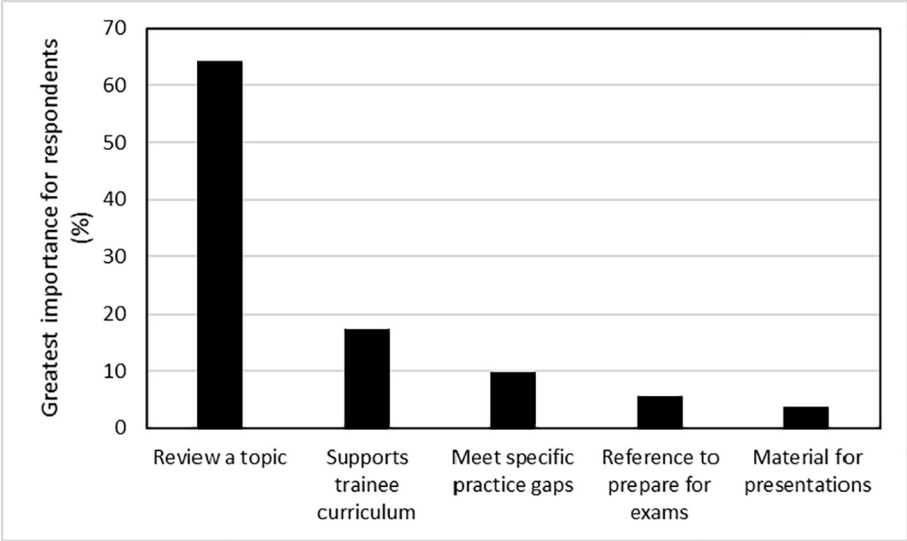

Fig. 3. Survey respondents' top reasons for using the NaT, in order of what was deemed greatest importance to them (NaT, Not a Textbook).

structured platform. The interactive nature of online learning has been shown in both the health profession and the educational literature to be an effective way of learner-driven education [12–15].

There are pros and cons of online learning, which have been debated and investigated extensively in the medical and nonmedical literature [13,16–20]. Internet-based education allows for efficient means to use multimedia and to keep material updated. The materials are accessible in different modes (desktop, laptop, tablet, handheld, mobile phones). Conversely, the lack of tangible material on which to notate and the tactile sense of using a textbook can hinder individual learning styles. Online learning in the strictest sense relies heavily on the educational maturity of the learner to be able to apply learner material appropriately, and this was not a point analyzed in the study survey. A concerted effort is needed to keep online material updated and to keep platforms compatible with changing technology. There is a perceived high cumulative cost of annual subscriptions, but this tends to be comparable with textbook costs, with the benefits of access to multiple resources on the APSA site that are regularly updated. Looking at the progress made in online general surgical education by SCORE (Surgical Council on Resident Education) shows how continued usage analysis and attention to the learner audience will promote the evolution of materials like those provided by APSA [21,22].

Limitations of this survey and its applications initially lie in its low response rate. Email reminders to complete the survey were distributed to help alleviate this. Nonetheless, there may be a positive or negative bias to these survey results with the low response rate, making the true response distribution elusive. Survey fatigue may have also contributed to the response rate, as APSA members tend to receive multiple society-based surveys from this and other professional associations. Respondents tended to be more in the older age range, so interpretation and application of material changes should be made with this in mind. Needs of younger members of our specialty may not have been as vigorously represented but likely trend even more toward electronic resources. It is not possible to determine from this survey how APSA material was used to address personal knowledge gaps that were cited. Any focus on developing material related to the most cited knowledge gaps (for example, fetal therapy and endocrine disorders), should also involve determining what material is currently lacking and desired. Multimedia offerings may help attend to this. With the privacy terms of ExPERT, it is not possible to correlate individual responses of knowledge gaps with ExPERT question performance. Thus, the self-reported knowledge gaps may be based on respondent perception. Finally, this survey did not capture non-APSA members who may be subscribers of ExPERT and NaT, or users of the free material on the APSA website. Non-APSA

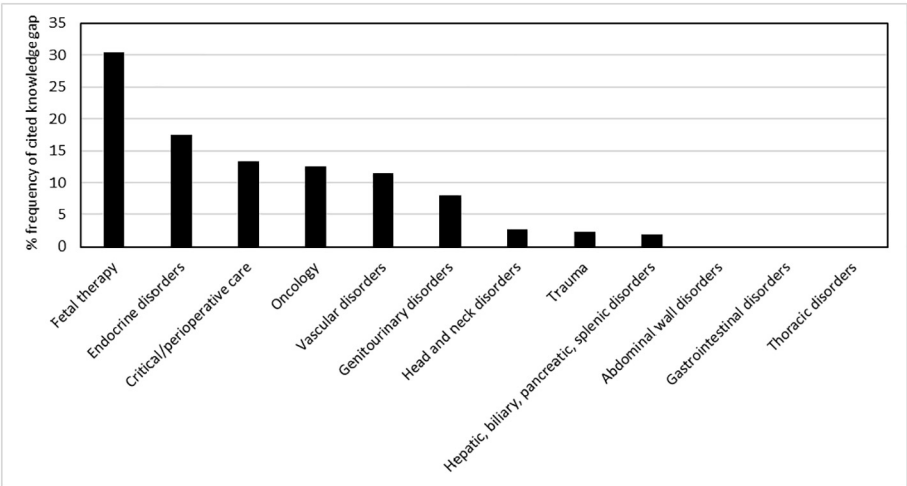

Fig. 4. Survey respondents' self-assessment of knowledge gaps in their practice. Responses are based on choices provided by the survey and via free text response.

members were presumed to be in the minority of online-curriculum users for the purposes of this follow-up assessment.

The APSA online NaT and ExPERT materials directly address the needs of members, and tools such as this follow-up assessment survey allow for specific updating based on response trends. In turn, NaT and ExPERT may then be edited and the content uploaded and accessible with a short turnaround time. Based on this most recent survey, although the development of these resources represents a positive return on the initial investment, a challenge for the organization may be managing the cost burden for those who cannot use the materials based on the subscription. While free text responses were not high volume, the suggestions offered give APSA the opportunity to pursue material development on a granular level, and if there is a low development risk/high user yield opportunity, then that makes these free text responses all the more meaningful. For example, two users commented on their use of YouTube to watch videos for self-education of procedures.

4. Conclusions

APSA's online educational resources are well-utilized and valued. The utilization and preference of electronic programs have increased since initial release in 2013. Although annual association meetings continue to be the most popular method for keeping up-to-date, more surgeons prefer ExPERT and the NaT. The survey data give insight into material use based on surgeon experience. Room for improvement exists in affordability and prioritizing knowledge gaps. This follow-up assessment will help guide continued curriculum development to provide APSA members and website users with high quality, detailed, and current material to treat all manners of pediatric surgical patients.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.jpedsurg.2020.01.057.

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