# HANDBOOKS OR MENTORS? THE ROLE OF A RESIDENT PHYSICIAN MANUAL IN RESIDENT EDUCATION

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Teaching hospitals with rotating residents face the challenge of training and orienting new personnel. We studied a pocket-sized resident manual used for meeting these challenges in a leading trauma center. This study examines motivations and barriers associated with adopting the resident manual through structured survey and semi-formal interview. Multiple factors shaped the use and effectiveness of the manual, including learning style, organizational culture, and specific usability issues. Findings suggest that organizational culture was the primary determinant of how the resident manual was used, as residents strongly favor attending physicians, fellows, and other residents as their first source of knowledge. Meanwhile, the small form factor of the resident manual afforded optimal accessibility as a quick reference source, but findings suggest enhanced searchability is necessary to realize the manual's full potential. Recommendations for future implementation strategies are made.

## INTRODUCTION

Continuing medical education (CME) programs play an important role in certification and self-directed learning throughout physician education and training. After graduating from medical schools, nearly all physicians spend several years as resident physicians in different medical specialties ("rotation"). For teaching hospitals, the rotating residents are not only trainees, but also care providers working alongside regular staff. Rapidly orienting and training new residents is therefore a constant challenge to teaching hospitals. With the growing complexity of healthcare and greater pressure to follow practice guidelines, the challenge is ever more difficult and stakes of success higher. To meet the challenge, tools for orientation have been developed, including paper-based, online interactive materials, and software on handheld computers (Dickmann, et al, 2000, Strok, et al., 2003). To understand the tools used for orientation and training and to provide design guidelines for information technology solutions, we conducted a pilot study to outline the factors that shape medical learning. The study site was a leading trauma center, which furnished new residents with a 184-page manual to assist them in rapidly familiarizing themselves with the policies and procedures in the trauma center as well as logistical information. Residents received the manual at the start of each residency rotation. The long-term goal of the study was to improve future design and deployment of learning technologies.

The advantages and shortcoming of paper medium and its possible transition to digital medium have been well studied (Ricci, & Hodak, 2002; Strok, et al., 2003). However, traditional comparative studies between paper-based, web-based, and other formats (such as personal digital assistant, PDA) may provide only a partial understanding of each medium and how it relates to the learning process. Past studies have revealed mixed results, with no consistent advantage to one particular format (Barrett,. et al, 2004, Jantunen, 2002, Bell, 2000, Santer, 1995). A study of CME acquisition among clinicians revealed a stronger tendency to consult other residents or print-based material rather than multimedia sources (Santer, 1995). In some work environments, limited accessibility to electronic medium was the primary reason for slow adoption (Jeannot, et al. 2003). In these cases, product usability may be a secondary consideration.

In this paper, we consider organizational and cultural factors to examine the resident manual's role and contributions to residency learning.

## METHODS

Data was collected from participating residents in the form of a survey and an interview, both of which occurred in a single session either in-person or over the phone to accommodate the residents' schedules. Participation was voluntary. To recruit participants, residents were paged via the hospital paging system. Sixteen survey questions and six interview questions were administered. The surveys focused on three categories: style of learning, utility of the manual, and usage of the manual. Additional informal interview questions probed resident practices including specific sources for trauma-related knowledge and knowledge acquired beyond available educational materials. In addition to the subjective data collected from residents, they were asked to compare the resident manual to the Washington Manual of Medical Therapeutics (Green, et al, 2004) on the basis of functionality and usability.

## FINDINGS

Data was collected from thirteen shock trauma residents (4 surgical and 9 emergency medicine). The average length of time spent at the trauma center was 5.8 weeks (std. dev 4 weeks).

### Knowledge Sources

Interview data and survey data were used to derive resident learning-style preferences and sources for trauma care knowledge. Learning style was classified as either verbal, multimedia, or paper-based. Survey feedback revealed a majority of residents prefer learning by talking to others and demonstrations over other methods such as didactic lecture and textbook. While residents did learn through paper-based approaches, these methods were ranked lower. This corresponded well to their trauma rotation experiences, where residents found their most preferred information sources to be attending physicians, other residents, and fellows over textbook and paper-based reference material (Table 2). Residents cited the ease with which colleagues can be approached and their ability to articulate contextually relevant knowledge and/or provide appropriate references. Further, searching through text or lectures is a time-consuming activity. While not discounting the value of text-based resources, residents acknowledged that sources of knowledge may vary depending on the type of information desired. Our data indicate commonalities between residents as to which type of knowledge source was preferred for a given type of query topic (Table 1).

| Query topic | Preferred source |
|---|---|
| Procedures | Fellows, attendings, and other residents |
| General policy | Nurses and other residents, books |
| Medical care | Fellows, attendings, other residents |
| Specific medical questions | Internet and books |
| Logistics & workflow | Nurses |

**Table 1**: Preferred sources of knowledge by queried topic

| Learning Style | Information Sources |
|---|---|
| 1. Talking to others | 1. Attendings |
| 2. Live demonstration | 2. Other residents |
| 3. Textbooks | 3. Fellows |
| 4. Paper-based quick reference | 4. Textbooks |

**Table 2**: Rankings results

### Utility & Usability

The resident manual is a 184 page soft-cover pocketbook measuring 4" wide by 5 ½" tall and pink in color to match the trauma program theme. The font is Times New Roman at a size of 10.5 lines per inch. It consists of 53 chapters covering policy and procedures. The majority of chapters are devoted to two types of guidelines: practice guidelines detailing symptoms and markers to aid decision making such as "Pelvic Fractures," and procedure guidelines providing detailed task guidance such as in "Insertion of Chest Tube." Chapters follow a consistent format: OBJECTIVE, describing the purpose and goals, DEFINITIONS, which elaborate on terminology used in the chapter, followed by the appropriate set of GUIDELINES.

Residents were asked if they felt the manual provided essential knowledge to shock trauma residents and served as a valuable personal resource. Responses indicated a generally positive feeling of value. However, residents reported that it was not practical enough to be used for daily reference. Two common reasons cited included difficulty in finding desired topics and relatively few illustrations and examples (Table 3). In spite of infrequent usage, the manual's compact size afforded easy storage in the resident's pocket. In one interview, the resident claimed only 1% of the manual was read and quickly retrieved it from her pocket to show how it was instead

used as a convenient note-taking tool. 77% of respondents, all of which had less than 9 weeks of Trauma service, preferred storing the manual in their pocket. The remaining 23% respondents had more than 9 weeks of service, and chose backpack as preferred choice. This discovery suggests that portability had a large influence on initial adoption, while the perceived utility and accessibility of the content will determine its ultimate usage over the longer term (Figure 1).

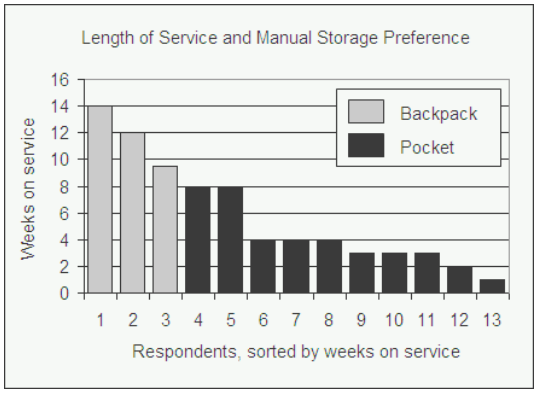


**Figure 1**: A possible migration from pocket to backpack

| **Questionnaire**<br>**5 = Disagree ←→ 1 = Agree** | |
|---|---|
| The manual covers essential knowledge for STC residents | 1.9 |
| The manual is readable despite its compact physical size | 2.0 |
| I would like to see more illustrations | 2.2 |
| The manual is a valuable resource for me | 2.7 |
| The manual is practical for daily reference | 2.9 |
| The manual is well organized | 2.7 |
| I would like to see more case examples | 3.0 |
| I can easily find what I'm looking for | 3.2 |
| I use the manual everyday | 3.9 |

**Table 3**: 5-point grading of manual utility

### The Washington Manual

In contrast to the resident manual's specialized focus of trauma care interventions, the 688-page Washington Manual of Medical Therapeutics provides a broad treatment of acute inpatient medical care categorized over 25 chapters. A discount-usability comparison of content structure with the resident manual revealed that while the Washington Manual may resemble a medical dictionary, it also contains prescriptive algorithms and medical procedures. Both the Resident Manual and the Washington Manual are functionally similar. However, the most striking difference between the two is an extensive 77-page index located in the last section of the Washington Manual. The resident manual on the other hand does not contain an index of topics.

## DISCUSSION

From the results of utility and usability data, acknowledgement of infrequent use of the manual in spite of high perceived educational value may suggest that residents either seek information not located in the manual, or that the usability of the manual does not afford desired levels of accessibility. The concerns of searchability and lack of illustrations have challenged other tools in the digital medium. The Washington Manual for Medical Therapeutics was converted to PDA format and suffered from lack of pictures in order to minimize disk storage space, and limited searchability of the manual contents (Jantunen, 2002). Furthermore, while the resident manual shows widespread initial adoption, our analysis suggests opportunities to further involve organizational stakeholders such as attending physicians and fellows in design of future teaching material. For example, a context-driven index system based on keywords, events that leverage past experiences, and intervention algorithms may provide improved searching capabilities of the manual.

Both qualitative and quantitative feedback from residents in this study suggests a strong tendency to approach mentors and colleagues to solve everyday problems for reasons of convenience and a generalized mental model of matched query topics and knowledge sources. This echoes findings from a previous study where a survey was conducted with the entire population of licensed Advanced Practitioners of Nursing (APNs) in Nevada to assess practices, preferences, and barriers to use of various CME delivery modes (Charles, PA., et al, 2002). In-person conferences and live satellite conferences were the most frequently used methods. The top three preferences, in rank order, were in-person conference, print-based self-study, and interactive video conference. Since residents place large importance on input from colleagues, a manual or training tool that highlights unique past experiences with synopses made by attendings, fellows, or residents would be more contextually relevant to the learner. For example, future

web-based implementations may also include text search to increase accessibility to information, and anecdotal entries by attendings, fellows and other residents to share critical incidents, noteworthy experiences, and success stories.

Although this study has revealed both micro- and macro-ergonomic concerns for the resident manual, findings suggest that future development of resident training tools, whether paper- or web-based, may face adoption challenges unrelated to traditional microergonomic considerations. Furthermore, should the resident manual be adapted into hypertext applications such as a resident manual website, the context, relevance, and sheer volume of the data must be considered to ensure searchability and accessibility of content. (Frisse, 1988). While this study shows that majority of resident learning occurs in the presence of residents and colleagues, residents and attendings may not always agree as to what facilitates resident learning. Thus, recognizing actions that residents believe facilitate learning may help faculty more effectively promote resident learning (White, 1995). Future studies are recommended to investigate the teaching goals of the educators and their perceived role of the resident manual as it pertains to resident learning in the shock trauma center.

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