

IMPACT OF AN INFORMATION RETRIEVAL AND MANAGEMENT CURRICULUM ON MEDICAL STUDENT CITATIONS

Evidence-based medicine has been increasingly integrated into medical training. However, most efforts have focused on skills, such as critical appraisal of literature, rather than information retrieval and management (IRAM) skills, which first-year medical students often lack. The medical faculty and academic librarians at the University of California San Francisco collaboratively introduced an innovative curriculum to teach and promote information retrieval and management skills within a problem-based learning (PBL) context. In 2006–2007, we implemented an IRAM skills workshop and librarian visits to PBL small groups. In 2007–2008, we continued only the skills workshop. This study was to evaluate the effectiveness and impact of this IRAM curriculum for first-year medical students. We assessed the outcome of student application of IRAM skills to PBL learning issues (LI) across three years: control year, year with workshop only, and year with workshop plus librarian visits. Students participated in five PBL cases, generated six LIs per student, and completed evaluations of the librarian visits. We compared the citations from students' LIs. Results showed that the workshop plus visits group submitted fewer LIs without citations (9.3%) compared to the control group (14.0%) and the workshop only group (11.0%). The full curriculum also had more citations with complete documentation (64.9%) compared to the workshop only group (61.0%) and the control group (14.0%). While the full IRAM curriculum was effective in improving student IRAM skills, faculty and student satisfaction was low for the librarian visits (2.79 and 2.96 on a 5-point scale, 5 being best).

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BACKGROUND

Over the past several years, the availability and volume of medical information has drastically increased and continues to rise. There has also been a growing emphasis on the physician's need to efficiently retrieve and manage scientific evidence to provide optimal patient care.¹ While the teaching of evidence-based medicine has been increasingly integrated into medical training at all levels, most efforts have focused on skills such as the critical appraisal of the literature and do not necessarily provide skills for information retrieval and management (IRAM).² Yet, medical students often lack these skills. When researching learning topics, students at our institution tended to access a limited range of resources, relied on inappropriate sources of information, and cited their sources inadequately. To address this problem, UCSF introduced an IRAM curriculum to first-year medical students in 2006–2007 and integrated it with an existing problem-based learning (PBL) course. In the PBL course, students work in small groups on clinical cases, generate learning issues or topics from the case using self-directed learning, research their individual learning issues, and submit their research reports to the group.

The IRAM curriculum is led by UCSF staff librarians and focuses on the main competencies developed by the Association of American Medical Colleges (AAMC) through the Medical Student Objectives Project (MSOP): knowledge of available information resources and tools; the ability to retrieve, filter, evaluate, and reconcile

information; and the development of good "information habits," such as the use of multiple information sources and citation of these sources.³ In 2006–2007, our curricular intervention consisted of two parts: 1) IRAM skills workshop for the students timed around a PBL case, which included a student orientation to the library and the available resources; 2) one librarian visit to each PBL small group to review submitted learning issues and provide feedback and guidance on information retrieval strategies, resources, and citation documentation. In 2007–2008, we partially implemented the IRAM curriculum, providing only the workshop. The purpose of our study was to evaluate the effectiveness of the new IRAM curriculum and whether a partial curriculum would yield similar outcomes. We assessed the impact of the curriculum on student IRAM habits by measuring the outcome of student application of IRAM skills to PBL learning issues.

METHODS

We conducted a prospective longitudinal study of a curricular intervention at the UCSF School of Medicine. Participants included first year medical students from the academic years of 2005–2006, 2006–2007, and 2007–2008. Students from 2005–2006 served as historical controls. Students from 2006–2007 received the full curriculum, which included workshops and librarian visit. Students from 2007–2008 received a partial curriculum which only included workshops only. This study was approved by the UCSF Committee on Human Research.

Students participated in five PBL cases in their first year; four of the cases unfolded over two sessions and one over three sessions, resulting in six researched learning issues per student. We assessed each learning issue using three measures: 1) the presence of citations, 2) the quality of citation documentation, and 3) number and type of resources cited. All the learning issues submitted were scored using an internally developed scoring rubric. The rubric was piloted and refined by the four study investigators and scoring rules and reliability established prior to implementation. The same investigator scored each learning issue using the developed scoring rubric and rules. In addition, we collected written evaluations from facilitators and students for the librarian visit (2006–2007) and written feedback from students for the workshop (2007–2008).

For our data analysis, we calculated means and percentages within each group of students and compared the two groups using unpaired *t* test and two-tailed Fisher's exact test. All additional analysis was completed with repeated measures ANOVA using SPSS version 15.0.

RESULTS

A total of 739 learning issues from 2007–2008, 849 from 2006–2007 and 827 from 2005–2006 were available for scoring and all 2415 (100%) were

scored. There were 2314 citations in the workshop only group, 2361 in the workshop plus librarian visit, and 2042 in the control group. The workshop plus librarian visit group submitted fewer learning issues without citations (9.3%) compared to workshop only group (11.0%) and the control group (14.0%). This group also had more citations with complete documentation (64.9%) and the number of learning issues with citations (849). The workshop group alone increased the number of citations that were completed (61.0%); however it did not affect the number of learning issues that had no citations. In our analysis of resources used, we found the following results. The workshop plus librarian visit group and the workshop group more often used specific online tools (STAT!Ref, MD Consult, and AccessMedicine). The workshop plus librarian group alone also used primary articles more frequently. In the written evaluations, students found the workshop to be helpful in providing information retrieval skills. However, the feedback evaluations from the librarian visit were low. Two questions were asked. The first asked if the librarians was useful in helping improve student research and information habits, facilitators and students did not find the librarian visit to be helpful. The second question asked if the librarian visit should be repeated for next year's first year students, both facilitators and students disagreed and would rather have just the handouts.

CONCLUSION

We found that the IRAM curriculum was effective in improving the IRAM skills and habits of students. Both intervention groups that received the curriculum had more citations per learning issue and more citations with complete documentation. They also used better sources and when searching online, more often used tools that had been vetted by the school. Although both the facilitators and students found the librarian visit to not be useful, there was a significant difference in the number of learning issues with citations and the percentage of complete citation documentation from the workshop plus librarian visit group compared to the workshop only group. With these promising results, UCSF will continue to implement the full IRAM curriculum including both the workshop and librarian visit next school year.

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