Medical Student Education

Live and Web-based Orientations Are Comparable for a Required Rotation

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Background and Objectives: Studies show equivalency in knowledge when measured following Web-based learning and live lecture. However, the effectiveness of a Web-based orientation for a required clinical rotation is unknown. Methods: Medical students viewed a Web-based orientation and completed a 13-item evaluation before beginning a required 6-week community medicine rotation. Evaluation data from 2007–2008 live orientation sessions were compared to responses from 2008–2009 Web-based orientation sessions. Data were analyzed by two-sample tests of proportion. Results: A total of 169 students completed surveys during the study period—78 following the live and 91 following the Web-based orientation. Response rates were equal in the two groups. The survey tool had a high level of reliability (Cronbach’s alpha=0.96). There was no statistical difference in student evaluations for 12 of 13 orientation evaluation items. Conclusions: Live and Web-based formats are comparable for presenting orientation materials to a required clinical rotation. Students felt the purpose of the rotation, educational goals, course structure, and requirements were clearly presented regardless of format. Transition from a live to Web-based format reduced faculty time required to present at rotation orientations.

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The use of diverse settings in medical student education creates opportunities for students to experience a broad range of cultures, practice styles, and health care delivery and finance systems. Diverse geographical settings, however, create a number of practical challenges. These include travel time for students, coordination of didactic components of the curriculum, and ensuring educational equivalency across sites—all of which are required by the Liaison Committee on Medical Education.

Technological advances have created new opportunities for delivering content previously presented in classroom lecture format. Multiple studies have shown equivalency in knowledge assessment when comparing Web-based learning to live lecture, though one study suggested that students attending a live lecture rated their knowledge and skills higher than students who used computers, despite no measurable difference in knowledge or skill. The advantages of Web-based learning include convenience for the learner, assurance that each student receives the same content, and ability for learners to revisit content when desired. Potential disadvantages of Web-based learning include the ability to skip material, miss important points, and the lack of immediate opportunity to discuss content with faculty or peers.

Results from a study at the University of Nebraska College of Medicine suggested that Web-based pre-matriculation orientation may improve students’ performance on their first course of medical school, but the benefit was minimal and not likely to be of clinical significance for a fourth-year medical student. A study in the nursing literature found Web-based orientation effective, and the authors cited the benefit of increased flexibility in use of faculty time. Given the rapid expansion of medical knowledge and the complexity of the current US health care system, methods to free time for instructors will be valuable to all medical schools.

While there is a large body of literature describing Web-based education in the health professions, two recent reviews highlight the importance of increasing our understanding of when Web-based learning should be used. Little is known about the use of a Web-based format to replace a mandatory live rotation orientation. The orientation differs from a didactic lecture within a rotation in that the orientation introduces the course
director and support personnel, sets the learning expectations for the rotation, defines student responsibilities, and conveys the educational philosophy of the director, in addition to the transfer of factual knowledge. The aim of the study reported here was to compare the effectiveness of (1) an asynchronous Web-based orientation to (2) a live orientation, for a required clinical rotation. The hypothesis being tested was that both methods are comparable for providing students with the information they need to succeed clinically on the rotation and to complete the rotation requirements.

Methods

Our medical school uses a statewide campus that provides students with the opportunity to experience diverse clinical training sites. On average, medical students spend about 16 weeks at rotations outside the community in which the medical school is located. During their third year, students are away from the medical school for 4 weeks of the 8-week internal medicine clerkship and may be away for the entire 8-week primary care clerkship, the 6-week obstetrics and gynecology clerkship, and/or half of the 8-week surgery clerkship.

Approximately 150 fourth-year medical students per year participate in our required fourth year, 6-week community medicine rotation at one of 45 sites in 31 communities geographically distributed throughout the state. The six main goals of the course are for students to (1) understand the complexities of a multidisciplinary health care system, (2) develop proficiency in providing patient care in a community setting, (3) apply principles of preventive medicine to clinical care, (4) recognize the impact of health care and reimbursement systems on the delivery of health care, (5) expand upon their personal and professional growth and development, and (6) recognize the effect of quality measurement and improvement on clinical decision making, cost of care, and patient satisfaction. Detailed course objectives can be found at www.med.wisc.edu/education/md/curriculum/preceptorship/goals-objectives/904.

Historically, students participated in a classroom-based live orientation at the medical school on the first morning of the rotation. The orientation consisted of three 1-hour presentations: a course overview by the course director, a didactic lecture on health care finance, and a didactic lecture reviewing a team approach to health care delivery. During each session, students had opportunities to ask questions and interact with the presenters. Following the orientation, students would travel up to 6 hours to reach their rotation sites. Students had expressed concerns about the length of the rotation interfering with travel to rotation sites, especially during inclement weather or times of the year with limited daylight hours.

The course director and statewide preceptors discussed the idea of a Web-based orientation and found broad support for this curricular change. Beginning with the 2008–2009 academic year, the course director eliminated the traditional live orientation at the medical school. In its place, students were directed to online course materials and orientation videos in a letter welcoming them to the rotation. In contrast to the traditional live, or synchronous orientation, where all students viewed the orientation together at one time, the videos could be viewed asynchronously, with each student choosing when to view the video. Students were responsible for viewing the online course orientation videos at their leisure and were instructed in the welcome letter to contact the course director or administrator with questions or concerns. They did not have an opportunity to interact live with instructors during the online videos.

For our transition to a Web-based orientation, we videotaped each faculty member’s orientation presentation. No substantial changes were made to the two didactic lectures. The course director’s overview was modified slightly to reflect changes to the course curriculum and other than this distinction, the content did not vary from the 2007–2008 to 2008–2009 academic years. After viewing the orientation, students completed a 13-item orientation evaluation that used a 5-point Likert scale (strongly disagree, disagree, neutral, agree, strongly agree) to assess their understanding of the content presented during the orientation. Items 1 to 7 were written by the course director, and items 8 to 13 were written by the faculty instructors of the two didactic presentations. The items were chosen to assess student perceptions of their understanding the main points of each element of the orientation and do not directly assess students’ knowledge. The evaluation also contained a box for comments. The course has seven rotation blocks in each academic year. We had collected orientation evaluation data for the final four rotation blocks of the 2007–2008 academic year and collected data for all of the 2008–2009 academic year.

Students were able to view the orientation video online by accessing it through our course management software or through our public Web site. While all students clicked on the link to view the video, we did not track whether or not they viewed the video in its entirety.

Data Analysis

Responses to each of the 13 items from 2007–2008 live orientation sessions were compared to responses to the same items from the Web-based orientation sessions of the same four rotation blocks during the 2008–2009 academic year. The reliability of the survey data were analyzed by Cronbach’s alpha using SPSS in Excel (SPSS 16.0.2). The proportions of students who
either agreed or strongly agreed with each statement were compared using a two-sample test of proportion using Intercooled Stata 8.0 for Windows (Stata Corporation, College Station, TX). This project was deemed exempt from full human subjects protection review by the University of Wisconsin Education Institutional Review Board.

Results

A total of 169 students completed surveys during the study period. Seventy-eight of 89 students (79.6%) completed surveys following the live orientation in the 2007–2008 academic year, and 91 of 113 students (80.5%) completed surveys following the Web-based orientation in the 2008–2009 academic year. There was no difference in the response rates ($P=0.86$) between groups. The survey tool had a high level of reliability, with Cronbach's alpha=.96.

The proportions of students selecting agree or strongly agree in response to each orientation evaluation item are shown in Table 1. Twenty-one of the 78 students (27%) who completed evaluations following the live orientation sessions left comments on their evaluations. There were seven comments critical of the orientation length. The other comments were positive reviews of the presenters or comments about the rotation itself.

Fifty of the 91 students (55%) who completed evaluations following the Web-based orientation sessions left comments on the orientation evaluation. There were four comments critical of the video length, four students had either technical or logistical problems viewing the videos, and 11 students expressed appreciation or preference for the Web-based format. The remainders of the comments were positive reviews of the presenters or comments regarding the rotation.

In the entire 2007–2008 academic year, 18 hours of faculty time were devoted solely to presenting material at orientation sessions. In the 2008–2009 academic year, less than 3 hours were required to record the presentations.

Discussion

The results of this study suggest that the two orientation formats are comparable for presenting the purpose of the rotation, educational goals, course structure, and requirements. Our findings are in keeping with multiple studies that have shown equivalency in knowledge assessment when comparing Web-based learning to live lecture.1-6 This study adds to the current medical literature in that it supports the use of Web-based technology for the purposes of orienting students to a required clinical rotation.

Table 1

<table>
<thead>
<tr>
<th>Statement</th>
<th>Format</th>
<th>P Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The content was appropriate for a course orientation.</td>
<td>Live</td>
<td>84.4%</td>
</tr>
<tr>
<td>2. The purpose of doing a community preceptorship was clearly presented.</td>
<td>Web</td>
<td>86.8%</td>
</tr>
<tr>
<td>3. The importance of professionalism was clearly presented.</td>
<td></td>
<td>92.3%</td>
</tr>
<tr>
<td>4. I know who to contact in the event of an occupational exposure.</td>
<td></td>
<td>96.2%</td>
</tr>
<tr>
<td>5. The educational goals of this rotation were clearly presented.</td>
<td></td>
<td>96.2%</td>
</tr>
<tr>
<td>6. I understand the course structure including clinical experiences and learning modules.</td>
<td></td>
<td>93.6%</td>
</tr>
<tr>
<td>7. I can discuss how community medicine is different from clinical medicine and public health.</td>
<td></td>
<td>82.1%</td>
</tr>
<tr>
<td>8. I can list at least three factors associated with rising US health care costs.</td>
<td></td>
<td>98.7%</td>
</tr>
<tr>
<td>9. I can list at least three ways in which health care economics affects patient care.</td>
<td></td>
<td>94.8%</td>
</tr>
<tr>
<td>10. I can list at least three typical practice barriers to providing preventive services.</td>
<td></td>
<td>89.7%</td>
</tr>
<tr>
<td>11. I can list at least three elements of a practice system that helps support patient lifestyle change.</td>
<td></td>
<td>85.7%</td>
</tr>
<tr>
<td>12. I am aware of how nutritional issues have a major role in medical practice affecting the most common diseases.</td>
<td></td>
<td>97.4%</td>
</tr>
<tr>
<td>13. I have an increased understanding of the importance of interdisciplinary teams contributing to medical care.</td>
<td></td>
<td>89.6%</td>
</tr>
</tbody>
</table>

* Rating scale: strongly disagree, disagree, neutral, agree, strongly agree
n=78 for live, n=91 for Web
Web-based learning has been used in other settings to address some of the challenges of distance learning. With the transition to a Web-based orientation, students have more flexibility on the first day of their rotation with respect to travel. Because our orientation is accessible at all times, students may view the orientation at a time of their own choosing. Students can view the material at their own pace, pause the presentation, or replay material that they may have missed due to distraction or other factors.

A much greater percentage of students left comments on the Web-based evaluations than following live lectures. These additional comments are valuable for the course director to guide modifications to the orientation. This time flexibility may have contributed to greater numbers of students who elected to leave comments following the Web-based orientation. Students may also have perceived greater anonymity with the Web interface than with handwritten comments.

Our transition to a Web-based orientation resulted in 15 hours of faculty time previously dedicated to the orientation now available for other tasks. This time saving would be reduced if faculty had been required to substantially modify or develop new presentations or materials for the online orientation.

Study Limitations

One limitation of this study is the lack of direct comparison of student performance on the rotation based on orientation format. For seven items in the evaluation, we asked students’ perception of understanding but did not directly test their knowledge. For example, following the orientation, students may believe they can list at least three ways in which health care economics affects patient care, but we did not directly measure their ability to do so, nor do we measure long-term retention or ability to integrate material presented in the orientation with existing knowledge.

Another limitation is that although we included all students, we did not account for student demographics. But, at least one study has suggested that knowledge evaluation following live or online lecture is unrelated to age, level of computer skill, attitudes toward computer tasks, beliefs in the role of computers in medical education, or time between the intervention and posttest.

We also had technical difficulties. Specifically, seven students had problems viewing the online materials, though they were all able to overcome these difficulties and successfully complete the rotation. Solomon suggests that these technical difficulties are not of major importance. Indeed, most students agreed or strongly agreed that asynchronously delivered computer-based modules could serve as adequate replacement for live lectures.

Another concern was that despite reduction in the amount of time required for the orientation (eg, the course director’s 60-minute live lecture became a 25-minute online video that could be viewed in 12.5 minutes when watched at 2x speed), several students maintained that the presentation was too long. In response to this feedback, the presentation slides were uploaded to the course management software and are available for students to download. This again highlights the necessity of devoting future attention to optimizing the Web-based orientation and understanding what factors of the orientation add or detract to educational value. A study by Kerfot et al suggests that interactive features may improve learning, and Wiecha and colleagues suggest a well-designed interactive curriculum delivered online may be superior to the traditional classroom.

Finally, our current data is limited to the video presentations. It does not take into account the entire curriculum and offerings presented on the Web-based course management software.

Conclusions

Live and Web-based formats are comparable for presenting orientation materials to a required clinical rotation. Students felt the purpose of the rotation, educational goals, course structure, and requirements were clearly presented regardless of format. Few students encountered technical difficulties, and the Web-based format gives students additional flexibility for time management. More learner comments with the Web-based format may provide the course director with additional information to optimize the rotation. In addition, transition from a live to Web-based format reduced faculty time required to present at rotation orientations.

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REFERENCES


