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Student-created Independent Learning Modules:

An Easy High-value Addition to Radiology Clerkships

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Rationale and Objectives: Modern radiology clerkships require a rigorous, in-depth curriculum usually involving a variety of educational activities. With increasingly constrained faculty time and departmental resources, finding activities that are easy to implement and of high educational value can be a challenge.

Materials and Methods: We introduced a novel educational activity to our radiology clerkship in which students created independent learning modules (ILMs) that were reviewed by their classmates. Feedback surveys were used to assess the activity and guide a revision to the program. Feedback surveys after the revision were used to assess the overall perceived value of the program.

Results: Twenty-seven students in two successive sessions of our elective radiology clerkship completed the ILM activity and provided feedback. Sixty-four students in five subsequent sessions completed a modified version of the activity and provided feedback. Students in this final group rated the activity's educational value at 8.3/10, with most describing both the creation and reviewing of the ILMs as similarly or more educationally valuable than lectures (41 of 64 [64%], 48 of 64 [75%], respectively). Students indicated the target ILM length of 15 minutes was "about right" (61 of 64 [95%]), and that the overall proportion of the course dedicated to the ILM activity was appropriate (49 of 64 [77%]).

Conclusions: A novel student-created ILM activity was highly reviewed by radiology elective students, both with regard to the educational value of creating and taking the ILMs. Clerkship directors wishing to supplement their curricula with an easy-to-implement high-value activity may consider adding a student-created ILM assignment.

Key Words: Independent learning; modules; clerkships; ILM.

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The need for high-quality, engaging, and rigorous radiology clerkships has never been greater.

First, students demand it. Modern medical students come to medical school with extensive experience with digital resources (1–3). While in the preclinical years of medical school, students are increasingly exposed to nonlecture learning formats, including e-learning, problem-based learning sessions, small-group sessions, and workshop style formats (4–8).

Second, our courses must be high value to support the broader mission of radiology affirming its value within the health care enterprise. A growing trend toward value-based care necessitates greater emphasis and education as to radiology's contribution to efficient patient care (9–11). A well-designed

radiology clerkship that emphasizes the role of radiology, proper ordering of imaging examinations, and a judicious use of imaging, rather than interpretation skills (which are the domain of radiologists), can help achieve this goal.

While the need for engaging and educational clerkships is increasing, the resources available to support these efforts are decreasing (12). Declining reimbursements and strained department finances combined with the ever-present paucity of faculty time make adding time-intensive or financially costly activities near impossible. This leaves the modern radiology clerkship director in a challenging position: how to develop an ever more rigorous curriculum with little faculty time to spare.

Unfortunately, the solutions readily available are limited. Educational resources that do not require direct faculty teaching time often are expensive, are too limited in scope, or are actually more appropriate for future radiologists (eg, radiology residents) than for future referring physicians (eg, most senior medical students). Although resources from outside institutions or vendors may be available, use of these resources can reflect poorly on the course in the eyes of the students, and sometimes, the medical school administration.

Herein, we describe a structured curricular innovation that satisfies a number of desirable criteria. It is (1) educationally

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valuable, (2) requires targeted and predictable faculty time, (3) presents an interactive challenge to students which can integrate and solidify individual student experiences, (4) involves a digital learning format that exercises a student's ability to use these critical systems, and (5) encourages peer-to-peer interaction.

The activity involves students creating independent learning modules (ILMs) designed to be shared with their classmates. Our research describes the learning activity in detail, as well as measured assessment using online feedback surveys for a consecutive 7 months of use. We hypothesized that such an assignment would occupy a substantial portion of the students' nonlecture time and would ultimately be viewed as a valuable educational activity.

MATERIALS AND METHODS

Assessing the Need

Our main radiology clerkship is an elective taken by approximately 90 of our 150 senior medical students each year. The clerkship runs for 4 weeks, enrolls approximately 10–18 students per session, and includes approximately 70 lecture hours. In addition to lectures, students participate in tours, hands-on ultrasound scanning sessions, and ultrasound-guided procedure practice sessions, and with less emphasis on passive reading room observation. There is an end of the course assessment with a 1-hour examination. The course is graded on a pass/fail scale with student-specific comments provided to the dean's office.

Despite this list of varied activities and the wide variety of lectures, we assessed the breadth and depth of the course content, the overall student effort, and time committed and determined that additional activities were required. Initially, we used commercially available CD-ROM-based modules that were available in our department, originally purchased for resident use. These were soundly criticized by our students as being the least valuable activity in the course, with the primary complaint being the material was above their level and focused more on image interpretation than reviewing radiology basics and proper ordering. This static resource was also increasingly criticized for being out of date and seemingly "old".

Given resource limitations, most notably faculty time constraints, we sought new self-directed activities to improve the course value and potentially increase a given student's ability to target topics of personal meaningful value/interest.

The "Student-Created Independent Learning Modules" Solution

Students creating ILMs was conceived as a way to develop level-appropriate modules, while also providing an educational opportunity in and of itself. The creation of a module not only requires an in-depth understanding of a topic but encourages development of self-directed learning skills and use

of technology, both of which will be needed in their subsequent training. An educational activity whereby students create modules and subsequently review the modules of their classmates seemed to offer a number of potential benefits, listed in the following. The final structure of the assignment (discussed in the next section) was designed to maximize these potential benefits:

- Creating ILMs can be educationally valuable and exercise new learned skills: To create an ILM, a student must first learn a topic well enough to teach it. Further, they must use a multimedia approach in their preparation of the content. Both of these approaches have been shown to improve retention of material, and if the topic is relevant to their future career, this can be highly valuable (13–16). In addition, learning how to teach can be valuable for physicians in many practice environments (17), and a skill required in most postgraduate training programs overseen by the Accreditation Council for Graduate Medical Education (ACGME).
- Reviewing and critiquing ILMs developed by peers can be valuable: Modules created by peers have the advantage of being level appropriate. Experts in a subspecialty typically have a more complex knowledge structure compared to their students. A teacher with a more similar knowledge framework may be able to better anticipate the needs of the learners (18). While not an absolute rule, research has shown peer-to-peer teaching and near-peer teaching (19–21) often offers unique benefits, including "cognitive congruence" (22). In addition, reviewing ILMs made by peers during the same clerkship can ensure relevant and up-to-date topics and information.
- A student-created ILM activity requires less collective faculty time: The course director or other faculty member should introduce this activity and guide students; yet fortunately, a large portion of the instruction can be written and achieved through example ILMs. Faculty time is required in assessing the modules. Although peer grading can be less objective, it has been validated as an assessment technique (23), and asking for peer feedback can provide a great deal of useful information to the faculty as they assess the ILMs.
- Materials required are essentially cost free: if students have access to computers and presentation software (usually Microsoft PowerPoint), the creation of the modules should be without cost. Other less-ubiquitous presentation platforms can also be used, but these are often not free, are less familiar to students, and can limit the ability of the student to use or review their product at a later time.
- "Add-on" activities are possible: After making an ILM and reviewing their classmates' modules, other activities are possible. For example, students can present additional information during in-person presentations, or a "quiz question" session could be added where students try to answer questions from each other's modules. In addition, vetted or faculty-created questions based on module content could be added to an end of rotation examination.

- Well-regarded ILMs can be added to a “permanent” collection: student-created ILMs that are particularly well reviewed can be refined with the help of faculty and can be added to a “permanent” collection of modules. These can be used in the course to fill content gaps or as supplemental material, or can be used in other medical student courses. The use of modules beyond the original activity should of course only be done with the express permission of the student and proper acknowledgment of the student’s contribution. Also, ILMs with images protected by copyright, even if cited, should not be distributed in any way that violates the copyright, unless permitted by the copyright holder. The creation of ILMs used in official medical school courses may have a place on the students’ Curriculum Vitae (CV). It should be noted that a “permanent collection” could easily grow to be quite large; we recommend that very few ILMs be elevated to this level, or that if many modules are added, that the resource be considered optional. A library of ILMs could be cataloged in a database program with content tagging and searching capabilities.

Implementing the “Student-Created ILM” Activity

The following instructions comprised the first iteration of our module activity:

- Format: a PowerPoint slide presentation intended to be reviewed by learners on their own. Four to seven multiple-choice questions were required, although other question formats could be used as well. Questions could either be “consolidative,” meaning they ask the student to apply information just learned, or they could be “engaging” meaning they ask questions for which the student may not know the answer but is intended to stimulate interest. Slides were encouraged to be image-rich, with the use of sufficient annotations and animations.
- Length: the ILM length was targeted so that a student unfamiliar with the topic would complete the module in 25 minutes. The estimated number of required slides was approximately 25–50, depending on the information density.
- Topic: any imaging-focused topic of interest to the learner that would also be broadly useful to a senior medical student audience. Given nearly all senior medical students are soon-to-be interns (including those destined for radiology and nonradiology fields), an overall theme of the “Radiology Intern Toolbox” was selected. Students were specifically instructed to not focus on image interpretation but rather on proper ordering and the role of imaging in clinical decision making. General information topics in radiology were also considered acceptable, including issues of radiation exposure, the use of contrast, and safety. Students were instructed to avoid topics already covered in the lecture series (the complete list of lecture topics was provided at the start of the course).
- Sources: peer-reviewed journal articles were to comprise at least 75% of the resources used, and all resources were to be properly cited. Images could be used from imaging journals with proper citations for each image. The most relevant or broadly useful peer-reviewed journal article discovered was to be turned in with the presentation. The student had access to a wide variety of journal articles through the campus library.
- Due dates: a completed ILM was due from each student 1 week and 4 days into the course. The complete set of modules was to be reviewed by the last day of the 4-week elective, which was 2 weeks after the modules were posted and available for review.
- Online portal: an online portal was used for submission of each student’s ILM, downloading of the complete set of modules, and for recording completion of the modules.
- Evaluations: for the initial iteration, the course director evaluated the ILMs and provided feedback during the end-of-elective feedback session. Students provided informal verbal feedback about each other’s modules during the end-of-elective “add-on” activity with the course director present (which probably helped maintain decorum but may have limited frankness).
- “Add-on” activity: each student created two multiple-choice questions based on the material in their ILM. The questions had to be different from those used in the ILM and were intended to be “gettable”, that is, the students should know the answer if they learned the material of the ILM. The questions were aggregated and then presented at the end of the course during a dedicated 1–2 hour session proctored by the course director. Each question and answer was presented by the student who covered the topic in their ILM. The students were not graded on their answers during this session (1) to maintain an informal atmosphere, (2) to allow the answers to be discussed immediately after the question without worries about test security, and (3) to nullify complaints regarding the fairness or appropriateness of the student-generated questions. The session was an opportunity for students to present orally and allowed for an interactive discussion of the material in the modules.

After two clerkship sessions, the student feedback clearly identified two areas requiring modification:

- Topic preapproval: topics selected entirely by students were sometimes too esoteric, redundant to topics reviewed elsewhere in the course or in other ILMs, or were too image interpretation focused (despite explicit instructions to the contrary). As suggested specifically by a number of students, a preapproval step for each topic was added. Students emailed the course director with their idea which was refined or redirected if necessary.
- Length: the target length of each module was reduced to 15 minutes.

Activity Assessment

Completion of an anonymous end-of-course feedback survey was required of all students. The survey was online and was

primarily comprised of questions pertaining to the course as a whole. Questions specifically asking about the student-created ILM activity were added after the activity began.

Our institutional review board approved this retrospective study of the survey data originally intended for providing feedback for course improvement.

The questions asked of the students are listed in [Table 1](#).

Statistical Analysis

Stata version 12.0 (College Station, TX) was used for statistical tabulation and analysis. The tabular feedback data were summarized, and 10-point scale data were presented as a mean with an interquartile range. Statistical differences between groups were assessed with a rank sum test for 10-point scale data and using a chi-squared (or Fischer's Exact test in cases in which at least one cell in a table had fewer than five observations) was used to analyze tabulated data. A *P* value of .05 was considered statistically significant.

RESULTS

Twenty-seven students in two successive sessions (with 18 and 9 students, respectively) completed the ILM activity under its first iteration, which included instructions to make a 25-minute long module and to select a topic without getting preapproval. The feedback from these sessions is presented in [Table 1](#), column 3.

Sixty-four students completed the module activity under the second iteration of the instructions, namely they were asked to create 15-minute modules (rather than 25 minutes), and they were asked to have their selected topic preapproved by the course director. Five sessions of students completed the activity under this set of instructions (with enrollments of 14, 7, 14, 15, and 14 students, respectively). Aggregated student feedback is presented [Table 1](#), column 4.

One hundred percent of the student completed the (required) end-of-elective survey. The responses from students experiencing the first versus the second iteration of the instructions were compared; the *P*-values of the comparison are presented in the final column of [Table 1](#). The perceived educational value of making the modules did not differ between the two groups. However, one of the questions regarding the value of taking the modules, and all questions about the appropriateness of the time commitment, resulted in statistically significantly different answers; significantly more students indicated positive answers with the modified instructions.

Free text feedback was elicited as to how the activity could be modified to be more valuable. A representative sample of the comments is presented in the [Appendix](#), including comments provided before and after the modification to the instructions. Comments from iteration 1 repeatedly suggested shortening the target length for the ILMs, and multiple students indicated the module topics were too esoteric and/or

redundant. Comments from iteration 2 were generally much more positive about the length of the modules. A small number of negative comments included complaints of variable ILM quality and difficulty in picking a topic.

DISCUSSION

Modern medical students have high expectations from their medical school curricula. In the era of digital resources and declining emphasis on lectures, the demand for high-value, interactive, and varied educational activities has never been higher. In addition, the perceived value of radiology and medical imaging must continue to increase as radiologists strive to demonstrate the immense value that medical imagers bring to the health care team.

At present, there are few widely available resources to support this effort. Organizations such as the American College of Radiology and the Alliance of Medical Student Educators in Radiology have recognized the need for national set of shared digital resources. However, collection and creation of a comprehensive digital curriculum is still a work in progress (24). The continual pressure on faculty time combined with financial pressures facing departments across the country has resulted in less time and fewer monetary resources than before. As educators struggle to "do more with less", activities that can be added to curricula with ease, but bring high educational value, are sorely needed.

Herein, we described a novel student-created, learner-directed ILM activity in which students developed educational products that were immediately used by their peers. Both the creation of the ILM and the reviewing of others' ILMs were felt to be educational. In addition, the activity has added benefits unique to peer-peer or near-peer teaching designs: the materials were created by teachers with a similar knowledge construct to the learners, making content more level and focus appropriate (18–22).

The feedback from our first iteration of the activity was generally positive, although comments clearly indicated areas for improvement. Specifically, the students indicated the module length was too long (25 minutes) which resulted in too great a time requirement to review the entire set of modules. In addition, students indicated that the module topics were sometimes low yield, redundant, or esoteric. A second iteration of the activity's instructions included a shorter target length (15 minutes) and the addition of a preapproval step for the module topics. The approval process did appear to reduce redundancy between ILMs and with lectures in the course; in addition, the course director was able to direct students more pointedly toward topics pertaining to proper ordering and utilization of imaging in a clinical decision making. Postmodification student feedback was overwhelmingly positive.

The ILM activity is now routinely evaluated as one of the best parts of the elective. We estimate the time required to be 4 hours for reviewing ILMs (~15 minutes × 15 student-created modules), and 4–6 hours to create the ILM (data

TABLE 1. Student Feedback Regarding the First and Second Iterations of the Student-created ILM Activity

Question	Answer Options	First Iteration (N = 27)	Second Iteration (N = 64)	P value
How educationally useful was MAKING your online module?	1 = very not useful 10 = very useful	7.5 (6–9)	8.3 (8–9)	.17
Hour for hour, was MAKING your online module less, similar, or more educationally useful than lectures?	Less Similar More	15 (55) 8 (30) 4 (15)	23 (36) 26 (41) 15 (23)	.24
How educationally useful was TAKING all of the online modules?	1 = very not useful 10 = very useful	6.9 (6–8)	8.3 (8–9)	.004
Hour for hour, was TAKING the other online modules less, similar, or more educationally useful than lectures?	Less Similar More	10 (37) 11 (41) 6 (22)	16 (25) 30 (47) 18 (28)	.51
Was a target length of the modules too short, about right, or too long for an online module such as this?	Too little time About right Too much time	0 (0) 16 (59) 11 (41)	1 (2) 59 (92) 4 (6)	<.001
Was the amount of time that was dedicated to completing your classmate's modules not enough, about right, or too much time?	Too little time About right Too much time	1 (4) 16 (59) 10 (37)	1 (2) 61 (95) 2 (3)	<.001
If you could change the course, would you decrease, keep the same, or increase the amount of time dedicated to the online module educational activity? (Assume that the overall amount of work in the course stayed the same, i.e. spending more or less time on the modules would result in fewer or more other assignments)	Decrease Keep the same Increase	12 (44) 15 (56) 0 (0)	12 (19) 49 (77) 3 (5)	.04

Data are presented as mean (interquartile range) or *n* (%).

not obtained as part of the original survey, although students have individually reported dedicating time in this range). This activity can be adapted to clerkships with different parameters. For example, for large clerkships, we recommend students to review only a portion of the ILMs created, or we recommend the class to be divided into sections in which students review all the ILMs in their section. For clerkships with relatively few students, the course can rely more heavily on ILMs in a “permanent collection” to supplement the ones made each session. For short clerkships (eg, 2 weeks), comparatively shorter ILMs may be considered or the ILM activity could be used to cover essential, rather than self-generated, topics (which would need to be assigned or selected from a preapproved list).

Once set up, the faculty time needed to administer this activity, per 15-student session, was as follows: 10 minutes introducing the activity during the orientation, 45 minutes individually discussing with students their topic selection, 2 hours reviewing the ILMs, and 1.5 hours moderating the optional “add-on” session at the end of the course.

We have found the “add-on” activity at the end of the course, where students quizzed each other and retaught some of the material, was well liked and considered “fun”. Indeed, the entire ILM assignment, from module creation to the “add-on” activity, seems well suited to the current generation of learners given it involves student contributions to the curriculum and collaborative education. Many authors have highlighted such traits as valuable in educational activities intended for the “millennial” generation learners (25,26).

Of note, we did not grade students during the “add-on” session, in part because of the difficulty students face in creating fair, appropriate, and useful questions. Should questions be created from module content as part of any *graded* activity, the questions should be vetted by, or created by, faculty versed in crafting solid questions, an endeavor that can be quite time intensive.

One persistent concern from some students, even after the addition of a topic preapproval step, was feeling uncertain about their selection of a topic. More than one student suggested creating a list of topics from which to choose. While we considered this option, we have continued to ask students to derive a topic on their own. We value the student's reflection on what they have not learned but feel they should, and we believe it keeps the students invested in their topics. Self-selected learning or “student-selected components” encourage retention of material by permitting students to study an area of interest or personal relevance. For example, a student planning a career in orthopedic surgery could explore a musculoskeletal imaging topic relevant to their future career. As an added benefit, they have the opportunity to explore this medical imaging material under the supervision of a radiologist; an opportunity that likely would not exist in their future residency training. In fact, these benefits of self-selected learning have been well documented in the medical education literature with some authors suggesting student-directed topics should comprise up to a third of educational content (27,28). This exercise has also resulted in students proposing novel topics which had never been previously

included as part of our course. For clerkships in which gaps are identified in the curriculum, course directors can consider assigning ILM topics or having student select from a “preapproved” list as a means to ensure the material is covered; we strove to cover core topics via the other sessions in the course, leaving students free to pick ILM topics of personal interest.

The use of ILMs in radiology education has not been thoroughly evaluated in the medical education literature. Most studies have focused on digital resources designed to improve image interpretation and their use among radiology residents, not medical students (29–31). At least one study in the English literature has reported the value of using a digital module to teach medical students radiation safety (32).

In the nonradiology literature, the value of ILMs has been more extensively studied and has proven useful in a variety of settings from the basic sciences to anatomy learning to advanced clinical topics (33–35). Although ILMs appear to be commonly used in medical education, few studies have evaluated the educational value of having students create ILMs to be used by their peers (36).

A number of limitations should be discussed. Our experience with this activity is based out of a single institution. The nature of students’ experiences with ILMs will be very institution specific. Their appraisal of this activity is also likely highly dependent on the other activities in the course, which in our case already contains a large number of lectures and direct teaching by radiologists. Our survey questions were embedded in the end of rotation anonymous feedback exercise, which could have altered the results compared to a stand-alone survey. Finally, we did not measure the students learning quantitatively nor did we compare the amount of learned material obtained from this activity to any other; given that the topics selected varied widely (intentionally so), reliably assessing and comparing the amount of material learned would have been challenging.

CONCLUSIONS

Our experience with this student-created ILM activity was overwhelmingly positive. It appears to offer high educational value for relatively little “cost”; we plan to continue including this activity in all future sessions of the course and may expand to include this opportunity in other electives as well. We strongly recommend this activity to course directors looking to vary and expand the format of their educational offerings. We find the keys to success are (1) a detailed description of what is expected with a number of example modules provided, (2) a preapproval process for the topics selected, and (3) a strong emphasis on topics of broad interest to all senior medical students, nearly all of whom will become interns but very few of whom will become radiologists. Specifically, we encourage a focus on the role of imaging in clinical decision-making and an emphasis on the fundamentals of radiology, which must be understood by all physicians,

including issues of radiation and patient safety. Having an anonymous feedback system and modifying the program as needed allow for continual assessment and improvement of the activity to ensure long-term success.

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APPENDIX. FREE TEXT ANSWERS

Free text answers to the question, “How could the educational value of the online module exercise (both making and taking them) be improved?”

Iteration 1

- The online modules were great! My classmates did a great job, and were in general very focused on the main point.
- I think having more help picking out topics would have made this more useful. The topics that were interesting were great but a lot of the more random lectures on some particular disease were less helpful.
- As mentioned before, taking the modules was great, but it would be nice if we didn't have to provide formal feedback for all of them.
- Help guide us a little more in picking our topic.
- Decreasing the time to do the modules to 10 minutes because I think that is more doable.
- No changes, that was a fun part of the course overall, provided us with some expertise and ownership.
- Less basic review topics of pathophysiology with more emphasis on imaging
- Taking 18 of them was a lot... I'd suggest aiming for a 10-15 minute time frame.
- Other peoples modules were actually shorter than 25 minutes but I found it to be perfect.
- ...Very educational experience overall. I think they should be shorter, however, especially if it's a class of 20...Perhaps direct a 15 min presentation...
- Its hard - I think maybe having a day where people pick topics together so that a) they don't overlap with each other b) they don't overlap with lectures c) we can get a sense for what folks want to learn
- I really enjoyed them - especially how it was primarily driven by questions.
- ... I think having someone either review all topics or assign them would be useful.
- Request that students do their modules on relevant topics - topics that will be helpful to me as an intern.
- Some were not high yield topics, some overlapped with content already covered.
- Perhaps have a list of topics to choose from so that its more focused, or have more guidelines.

Iteration 2

- Doing the modules as pairs? It's a lot more work than I expected to complete and it takes a LONG time to do everyone else's.
- Some of them were really specific topics that won't be helpful for those of us not going into very specific fields.
- I thought everyone did a good job on their modules.

- Time consuming to make the module, but educational valuable taking other people's. No suggestions for change.
- The modules were a great way for students to further their own learning by focusing on a topic of their own interest. However, this sometimes meant that some modules were tailored towards a general audience vs more specialized group. I liked that there was no significant overlap among the modules. The embedded questions were a good way of keeping students engaged with the module. I think the module exercise could be improved by making sure each module has a specific question that it is trying to answer (instead of giving a broad overview of a topic, since this can't as easily be done in a 15 minute module).
- Not sure, they were an excellent part of the course
- I don't know it was so great!
- No comments - this was useful and fun
- No improvement needed
- I think the modules held plenty of educational value and since they were screened prior to us making them, there was not significant overlap between the modules.
- Tell students to limit the number of slides to ... say 30, or even less, stress that it should be for absolutely no more than 15 minutes
- I thought the modules were great--some overlap with current lectures, but overall high-yield and interesting. Would be helpful to see an example of previous student's topics to help gauge length and type of questions.
- The quiz could also be submitted online. Topics could be chosen in group format to maximize interest.
- Perhaps having a prepared list of “good topics” to choose from would help focus people's time and energy in the most useful directions. Students could still do a topic of their own choosing if they felt strongly about it, but I think most students would be happy to pick from a list of topics that have proven to “high yield” in the past.
- There was a lot of disparity in the modules....some people clearly spent 10x the amount of time vs other people, and you could really tell in the amount of learning I received from each, and the level of attention I could maintain towards each ... I understand people are busy, but this is SUCH a high-yield opportunity to learn (as I learned SO MUCH from the good modules), you should be able to put together something halfway decent.
- ...I believe the success of these modules depends strongly on [the course director] micromanagement [of the topics], without close guidance these modules would likely not have been so practically useful.
- Loved them. Just at our level and lots of fun.
- Loved researching my topic. Will reuse my module for teaching other students and in my residency.
- I thought that the modules added a lot to my learning. Making my module made me research and better understand my particular subject. Taking the other students modules was also helpful but it varied depending on the quality of the module.

- I think the module time should be shortened, this pushes students to talk only about the main points. Instead of 15 minutes i think it should be made 5-10 minutes max.
- The usefulness really varied, but generally the modules were great. I think most of them (though not all) were right on in terms of amount of information to learn. I loved the variety of topics.

EXAMPLE ILM

Topic: "When to Order Imaging for Eye Symptoms"

Slide 1: Objectives of the ILM: to review findings that warrant imaging studies, and to review the appropriateness of various imaging studies for various complaints.

Slides 2-5: A quick review of the globe and orbital anatomy relevant to the subsequent diagnoses discussed.

Slide 6: An interactive multiple-choice question meant to engage the learner. The question asks about the appropriate workup of patient presenting with periorbital swelling.

Slides 7-10: A discussion of the correct answer, with a review of orbital vs preseptal cellulitis and how imaging can be used to distinguish.

Slides 11-14: An interactive question with answer slides regarding a patient presenting with vision loss and the appropriate workup, including imaging.

Etc.

Total length: 40 slides.