Adaptive Learning of the EHR

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What might the attendee be able to do after being in your session?

Evaluate if adaptive learning systems, which use computer algorithms to analyze a student's performance in real-time and deliver customized content based on individual learner's needs, can be used at your health system to train physicians on EHR more efficiently and effectively.

Description of the Problem or Gap

At our institution, training team resources mobilized to train EHR workflows to over 400 new interns and fellows as they arrived on campus for orientation in June/July. Training consisted of in-person, 6-hour long classroom sessions. No access to the EHR was granted until all training was completed. Survey-based and unsolicited, anecdotal feedback on the training program was negative. Specifically, end-users felt the training was too long and lacking in high-yield content. The training team similarly felt the content needed refinement and some of the content was better suited to electronic presentation formats. Lastly, due to the large numbers of incoming trainees each June/July, the internal training team was supplemented with expensive contractors unfamiliar with our health system's workflows. Incremental improvements were attempted such as refinement of classroom content with seasoned trainees and the addition of high-yield, non-EHR content (e.g. voice recognition software training, mobile device management software install, etc), but these efforts were unsuccessful in changing the feedback. Key outcome measures we sought to address included:

1. Greater overall end-user satisfaction with the EHR learning experience,
2. Agile development and efficient delivery of key content via eLearning modules,
3. Rapid identification of end-users needing 1:1 in-person support,
4. Free training resources for additional 1:1 in-person support and optimization work

Methods: What did you do to address the problem or gap?

In Jan 2019, in close partnership with adaptive learning platform vendor Amplifire, we embarked on a journey to develop adaptive eLearnings to train providers on our Epic-based EHR. A multi-disciplinary team consisting of the senior manager for Information System training, 1 lead Epic trainer, the hospital CMIO, and 1 provider informaticist met regularly with medical and surgical residents, fellows, and physician assistants to develop and iterate content. Over the course of 4 months, 4 robust modules were developed for:

1. Ambulatory Medical Providers,
2. Ambulatory Surgical/Procedural Providers,
3. Inpatient Medical Providers,
4. Inpatient Surgical Providers.

The modules were loaded into the enterprise eLearning management system (HealthStream) and paired with short (1-2 hours) "skills labs" organized by sub-specialty in which specific content was reinforced, sub-specialty-specific content and build was detailed, and important non-EHR mobile applications were installed and reviewed (e.g. Mobile Device Management, voice recognition, and electronic soft token to enable electronic prescribing of controlled substances).

Results: What was the outcome(s) of what you did to address the problem or gap?

Outcomes were measured via the adaptive learning vendor's analytics platform, end-user satisfaction surveys, and pre-post training team resource use and end-user training time. At the start of the 2019-2020 academic year, 441 trainees who have used Epic at other health systems took the adaptive learning modules. The number of learners and mean completion time by module are as follows:

1. Ambulatory Medical Providers: N=167, 26 mins
2. Ambulatory Surgical/Procedural Providers: N=59, 29 mins
3. Inpatient Medical Providers: N=152, 22 mins
4. Inpatient Surgical Providers: N=63, 18 mins

High levels of answer uncertainty (e.g. 41% of answers to the Ambulatory Medical Provider module were uncertain) indicated the training content appeared valuable. Learners with the highest percentage of confidently held misinformation (indicated they were sure about an answer but actually were incorrect) were challenged with additional questions and thus took 10-18 mins longer to complete the modules when compared to those with the least confidently held misinformation. Overall, rates of struggle (repeated incorrect answers to related questions) were low (4-8%) across all modules indicating learners were acquiring and retaining information. 2% of learners were identified as needing 1:1 in-person intervention. Overall, physician training time was reduced from 6.5 hours in 2018 to 2.5 hours in 2019. The number of classroom hours conducted by the training team reduced from 168 in 2018 to 44 in 2019, freeing the team for other work. No contractors were hired to supplement the training team. Surveys (n=31) were overall positive with several respondents requesting more questions, longer explanations, and more learning in this format.

Discussion of Results

Preliminary results from our year 1 experience indicate a small team with limited time and resources were able to develop highly relevant, engaging content for adaptive eLearning modules to train providers on our Epic-based EHR. Training providers with the adaptive eLearning modules cut overall training time down 61.5% and eliminated the need for in-person contract trainers. Several users needing intense 1:1 training were identified before starting clinical work. Surveys indicate high provider satisfaction with this training program, but additional analysis needs to be performed to determine if providers were equally prepared to accomplish their clinical work.

Conclusion

Adaptive eLearning modules present a novel means to cut training time and engage users, while still delivering key content, when training clinicians on how to use the EHR.

Attendee's Take-away Tool
Project plan / process map develop adaptive eLearning modules for EHR training.