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Collaboration to Enhance Learning: Students, Faculty and Other Stakeholders Partner to Integrate Third-Party Resources into the Preclerkship Curriculum

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Additional Declarations: Competing interest reported. T.B & C.B were offered compensation by McGraw Hill LLC to act as student-consultants on edits for their software after the writing of the manuscript, data analysis, and figure creation. This responsibility included reviewing "Boards & Beyond" content for proper sectioning of video subheadings, meeting with their administrative team to discuss our project and their resource's role in our school, and meeting with others considering Boards & Beyond to discuss how our school has integrated their resource. In no way has this role impacted the editing or data presentation in our project, and no funding was given towards this paper as all consulting took place after data collection & analysis by TB and CB.

Abstract

US medical students face the challenge of balancing parallel pre-clerkship curriculums: they study for institutional “in-house” exams while also preparing for USMLE Step 1 with third-party resources (3PRs). Additionally, preclinical faculty lack time and familiarity with 3PRs to effectively incorporate them into course work. Our project demonstrates how collaboration between students, faculty, and administrators can optimize learning by integrating 3PRs into our institution’s pre-clinical curriculum. Our approach included a needs assessment, development of Course to Resource Alignment Map (“CRAM”), faculty development, and student-led consultations; a model that can be adapted by other schools.

Background

Medical education in the United States is rapidly changing as students increasingly use third party learning resources (3PRs), with ~ 70%[1,2] reporting daily or weekly use to prepare for USMLE and in-house-exams.[3,4,5] 3PRs are preferred for their efficiency & alignment with exam content, but the volume of available resources is difficult to navigate,[2,3] and using more resources has not been shown to improve performance.[6,7,8] Despite widespread use, 3PRs have not been formally introduced into medical school curricula partly due to cost and faculty hesitancy.[5,9,10,11] This has contributed to students experiencing a “parallel curriculum” that requires balancing USMLE and in-house-exam materials.[12]

There is a critical need for educators to explore how 3PRs can be integrated into the formal curriculum to enhance student learning, cultivate trust, and foster student success on board exams and as future physicians. Our project attempts to address this gap with a multi-pronged intervention to explore and address this problem with systematic and collaborative implementation.[13] This included integration of 3PRs into our formal curriculum, improved faculty awareness of 3PRs with training, and student-tutor training for 3PR selection to align with courses.[3,5,9]

Activity

This IRB-exempted innovation was implemented at one urban medical school using a three-phased approach.

Phase 1: Needs Assessment & Resource Alignment

A student-needs-assessment was distributed to the class of 2027 at a single US medical school. It assessed preferred study resources, challenges in Step 1 preparations, and perspectives on 3PR integration. Based on this survey, a Course to Resource Alignment Map (CRAM) was developed to align the most used video-based 3PRs (Boards & Beyond, Pathoma, Sketchy) to institutional lectures[14] (Fig. 1). The collected presurvey was influential in an institutional subscription to Boards & Beyond, the most utilized 3PR at our institution, as the student survey and CRAM were developed prior to this purchase. The CRAM was distributed to first and second-year students during their orientation and was

endorsed by faculty and staff. Post-implementation surveys were administered to assess intervention's impact.

Phase 2: Faculty Development

Pre-clerkship faculty course directors participated in two Office of Medical Education and student-led sessions that introduced literature on 3PRs and demonstrated their use. Pre- and post-surveys assessed faculty familiarity, attitudes, and perceived feasibility of integration before and after these sessions.

Phase 3: Multi-stakeholder Collaboration to Integrate 3PRs into the Curriculum

Student tutors from the Office of Academic Support and Counseling (OASC) collaborated with course directors, choosing supplementary videos and/or question sets to assign to lectures at faculty discretion. Assignments were chosen from Boards & Beyond, NBME, and UWorld, as all students and faculty had access via institutional subscriptions funded directly through the Dean's Office.[15] Despite faculty not being required to use them, all independently integrated > 1 3PR into their course– utilizing the CRAM to navigate 3PRs.

Results

Phase 1

Of 183 students, 49 responded to the student needs assessment. The most popular learning resources in the pre-clerkship curriculum were in-house lectures, followed by Boards & Beyond videos, Anki, UWorld, and Pathoma (Fig. 2A). The most common challenges reported while studying included time spent organizing study materials, perceived inefficiency of in-house lectures, and feeling torn between 3PRs and in-house content (Fig. 2B). Most students desired a tool mapping institutional curricula to 3PR videos (88%).

After distributing the CRAM and integrating 3PRs into the curriculum, a follow-up student survey received 54/183 responses. 96% of respondents used the CRAM, with 92% reporting reduced stress related to studying, but no significant difference in perceived challenges or time spent studying. Table 1 outlines representative student responses.

Phase 2

Faculty familiarity and openness to 3PRs remained similar pre and post-intervention, with no significant change in anonymous unpaired analysis (Fisher's Exact test, $p = 0.91$). Faculty responses did not change significantly between the pre- and post- survey, but successfully identified key reasons students use 3PRs including alignment with Step 1, flexibility in learning types, and time-efficiency. Reported concerns

in surveys included feasibility of integration, misalignment with course objectives, and a lack of information relevant towards clinical experiences.

Notably, faculty estimated students spent 27.42% of study time on in-house materials and 74.58% on 3PRs, while students reported 60% on in-house and 40% on 3PRs (Fig. 2C). Additionally, in the pre-survey, faculty rated the feasibility of integrating 3PRs into the curriculum at a mean of 7.17/10 (SD ± 2.67), with post-survey ratings not significantly different 7.27 (SD ± 1.76) (Fig. 2D)

Phase 3:

For each course, 1–2 student tutors paired video resources and practice questions to lectures with the help of the CRAM.

Despite non-significant changes in faculty attitudes, a behavioral change was seen in 14/14 course directors. After meeting with student tutors, they participated in integration attempts by incorporating at least one video-based 3PR and one question set into their courses as supplementary lecture and active learning session materials for the class of 2028. Student access to these 3PRs was facilitated by institutional subscriptions to Boards & Beyond and UWorld.

Table 1: Student-Reported Ways the CRAM Reduced Study Burden and Stress in the Preclerkship Curriculum. *Themes were identified through qualitative thematic analysis of open-ended responses from the student needs assessment. Representative quotations are presented for each theme.*

Table 1: Student-Reported Ways CRAM Reduced Study Burden and Stress in the Preclerkship Curriculum

Theme	Representative Student Responses
Reduced time spent searching for resources	"Definitely cut down on search time to look for corresponding material from lectures to third party." "So helpful because it cut down my time into finding resources!" "Was a lot of work prior to having CRAM to figure out what third party to watch... CRAM took away that work." "It saved me some time when looking through third party materials to find videos and content to supplement or replace lectures."
Centralization and organization of study materials	"Extremely so, having the information in one place as to which third party resources could help me understand each lecture was a huge time saver." "CRAM centralized all the different resources so I didn't have to go searching... I had all the options in front of me." "Organized content made it easier to know what to study and how useful it would be for in-house exams."
Clear alignment between Einstein lectures and third-party resources	"Helpful to know what third party materials were associated with lecture so I could see the same material presented differently." "It was extremely helpful to use CRAM to know where to look in terms of BnB, Sketchy, and Pathoma videos that corresponded to each lecture." "Organized things nicely in terms of syncing Einstein material with Step 1 content."
Improved efficiency and study workflow	"I used it in every class. It helped me make my studying more efficient by covering both class and boards-relevant content." "Helped navigate the many many videos and resources." "Knowing which BnB videos to watch improved my quality of life and efficiency of studying dramatically."
Increased confidence and reduced anxiety about missing content	"I felt confident that I was learning everything I needed to, both for Step and for Einstein tests." "Didn't have to wonder what resource to use or where to look for extra information related to lectures." "That was an enormous help in streamlining my studying and easing any anxiety that I was missing something."
Boards-focused, high-yield learning	"The third-party stuff is to the point and only covers the relevant material." "Allowed me to efficiently organize exactly which third party resources to watch... ~90% of material necessary for NBME exams." "I could save so much time by not watching hours of inconcise lectures and get the info I needed to succeed from third party."
Use of CRAM as a checklist or study guide	"Used CRAM as a checklist to watch relevant board content corresponding to Einstein lectures." "Good as a checklist." "Was very nice to use CRAM to make sure I was following along with lecture."
Limitations or imperfect alignment	"CRAM is not always perfect... sometimes suggests third-party videos that have little overlapping content." "It helped but does not always align well with Einstein exams."

Discussion

This intervention surveyed multiple stakeholders in our pre-clinical curriculum to compare attitudes towards 3PR and openness to integration. Our three-pronged approach included a student-needs assessment and creation of the CRAM, faculty education on 3PRs, and student-tutor-led support for course directors. We partnered faculty and students together to simultaneously give students a feeling of greater agency over their curriculum, and give faculty more understanding of how students study for

their boards.[16,17] Our intervention also addressed the extensive time and difficulty involved in juggling Step 1 and in-house curricula, a key barrier identified by the literature.[2,3,12] Students reported high utilization of the CRAM with resultant stress reduction, while faculty also exhibited behavioral changes despite no changes in reported attitudes.[18] Early guidance on using 3PRs with the CRAM at first-year student orientation was introduced by OASC which may help future classes identify how and when to study–another common student concern.[2,3]

With the progressive integration of practice questions & videos in subsequent years, the percentage of students extending their test date beyond the standard 6-week dedicated period has declined from ~ 33% (class of 2026), to ~ 25% (class of 2027), and finally 15% (class of 2028).[12] Post-intervention, Step 1 pass rates increased from 92% (class of 2026) to 95% (class of 2027).[17,19] While this may suggest this intervention benefited student preparation, it is important to note these are uncontrolled correlational trends that do not prove causation. Longitudinal data is needed to assess definitive impact as other changes (free tuition and learning communities) were imposed around the same time.

Faculty development sessions on 3PR use and the CRAM did not change faculty attitudes, but successfully changed behavior. 14/14 faculty met with student tutors, explored 3PRs, & ultimately integrated 3PRs once it was clear that it was valuable to students, while new faculty met in a standardized process to edit pre-existing 3PR assignments. Faculty concerns about students utilizing too many 3PRs and hesitancy towards integration are consistent with findings in literature,[5,11] but organizing how 3PRs are used may address this. Revealing to faculty that students spent more time on in-house lectures than expected was a surprise to faculty, and is hypothesized to have built mutual trust which could contribute to behavioral change. Lastly, mapping 3PRs may help identify content gaps in institutional curricula that are necessary for board exams, providing opportunity for curricular refinement.

The study has several limitations, including response bias and small sample size of student survey respondents. Furthermore, 3PR integration was implemented after the Dean's Office purchased institutional subscriptions to Boards & Beyond and UWorld, improving equity for students who could not afford these resources, but limiting generalizability for institutions unable to afford 3PRs.[10,20] Additionally, student impact is only partially captured in the post-survey as the CRAM was developed halfway through the class of 2027 pre-clerkship curriculum. Ever-evolving institutional curricula requires continual updating of the CRAM, which is performed by student medical education representatives. Future directions include examining the impact of 3PR integration on our institution by trending Step 1 pass rates and in-house exam performance, and continued assessment of student and faculty attitudes.

In summary, collaboration between faculty, administration, and students is essential for curricular reform and for students to feel empowered in their education.[5,13,16,17] Through multi-departmental collaboration, a previously separate Step 1 and "in house" curricula began to cohere into a singular, less stressful pre-clinical curriculum that prepares students simultaneously for the wards and boards. The CRAM reduced

parallel efforts of students independently organizing resources for themselves by linking 3PRs to lecture content directly. Further, equity concerns were addressed by funding 3PR for low income students who could not afford them and may be left behind.[10,11,20] We trust that this quality improvement process will elevate student learning at our institution, serving as a model that can contribute to curricular reform at other institutions and improving student-faculty collaboration.

Declarations

Competing Interests

T.B & C.B were offered compensation by McGraw Hill LLC to act as student-consultants on edits for their software after the writing of the manuscript, data analysis, and figure creation. This responsibility included reviewing "Boards & Beyond" content for proper sectioning of video subheadings, meeting with their administrative team to discuss our project and their resource's role in our school, and meeting with others considering Boards & Beyond to discuss how our school has integrated their resource. In no way has this role impacted the editing or data presentation in our project, and no funding was given towards this paper as all consulting took place after data collection & analysis by TB and CB.

Author Contribution

T.B, C.B, M.P all contributed equally to primary writing, figure creation, editing. They are first authors. M.P is the sole author responsible for data analysis.J.B, B.F, R.H were responsible for final reading for edits.R.H was involved in literature review.J.J and M.B are co-faculty principle investigators, involved in departmental coordination and approval as well as final manuscript approval.All authors reviewed the manuscript.

Data Availability

Student & faculty survey data was collected through qualtrics (available upon request), whereas data on pass rates and rates of pushing their Step 1 exam were collected from the Office of Student Affairs (not available for distribution).

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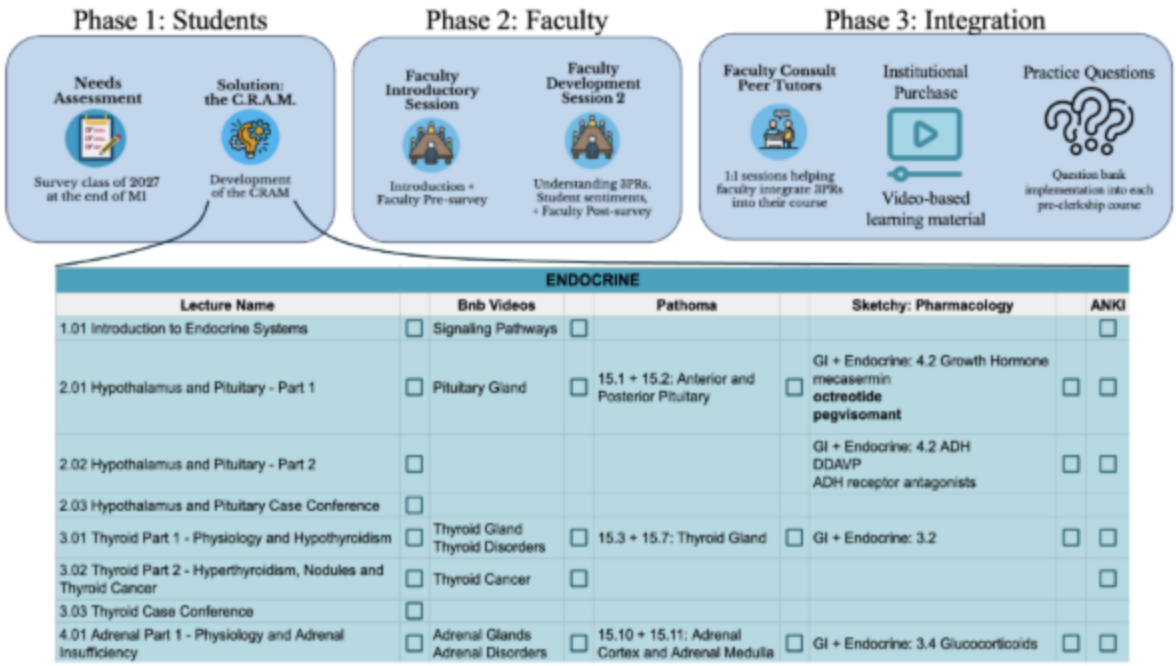
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Figures



ENDOCRINE								
Lecture Name		Bnb Videos		Pathoma		Sketchy: Pharmacology		ANKI
1.01 Introduction to Endocrine Systems	☐	Signaling Pathways	☐					☐
2.01 Hypothalamus and Pituitary - Part 1	☐	Pituitary Gland	☐	15.1 + 15.2: Anterior and Posterior Pituitary	☐	GI + Endocrine: 4.2 Growth Hormone mecasermin **octreotide** **pegvisomant**	☐	☐
2.02 Hypothalamus and Pituitary - Part 2	☐					GI + Endocrine: 4.2 ADH DDAVP ADH receptor antagonists	☐	☐
2.03 Hypothalamus and Pituitary Case Conference	☐							
3.01 Thyroid Part 1 - Physiology and Hypothyroidism	☐	Thyroid Gland Thyroid Disorders	☐	15.3 + 15.7: Thyroid Gland	☐	GI + Endocrine: 3.2	☐	☐
3.02 Thyroid Part 2 - Hyperthyroidism, Nodules and Thyroid Cancer	☐	Thyroid Cancer	☐					☐
3.03 Thyroid Case Conference	☐							
4.01 Adrenal Part 1 - Physiology and Adrenal Insufficiency	☐	Adrenal Glands Adrenal Disorders	☐	15.10 + 15.11: Adrenal Cortex and Adrenal Medulla	☐	GI + Endocrine: 3.4 Glucocorticoids	☐	☐

Figure 1

CRAM development process and representative excerpt. *The figure illustrates the three phases used to integrate third-party resources (3PRs) into the preclerkship curriculum and provides a representative excerpt from the CRAM. *Boards & Beyond was the only video-based 3PR incorporated into the curriculum because it was the only resource available to all students and faculty through an institutional subscription that was purchased after the student needs assessment was conducted. **Institutionally subscribed practice-question resources included the UWorld question banks and NBME examinations.*

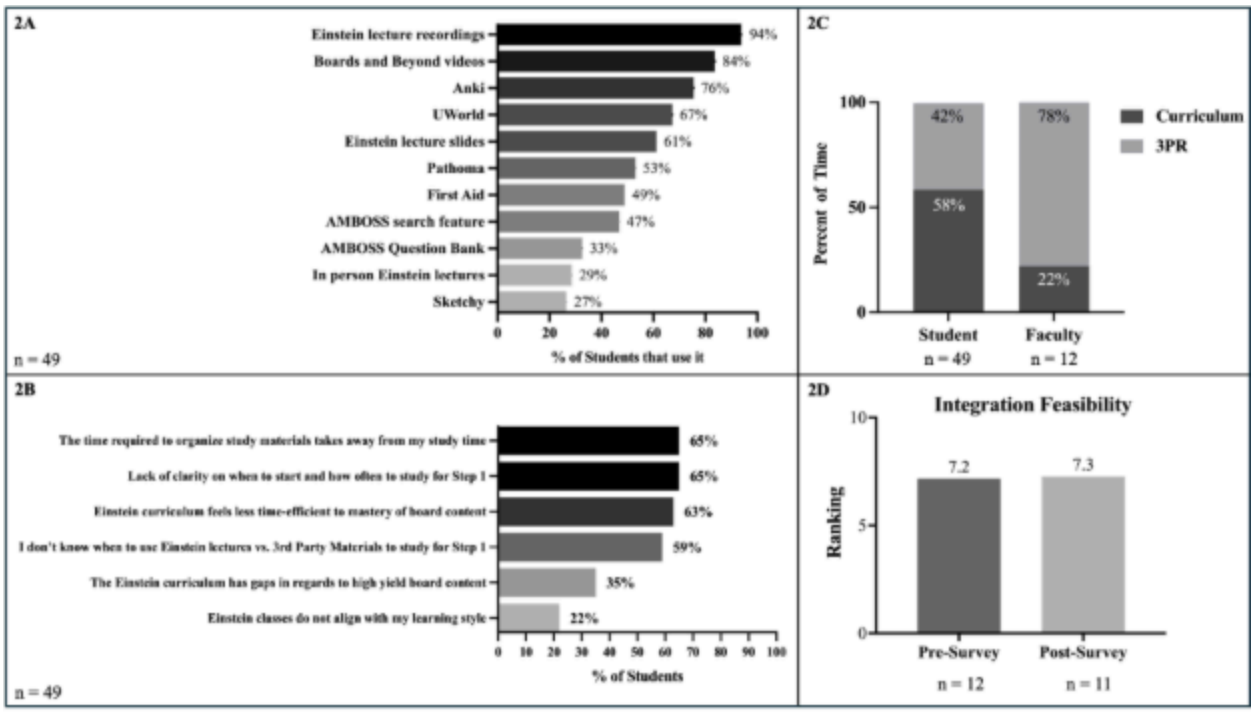


Figure 2

Student and Faculty Perspectives on Third-Party Resources (3PRs) in the Preclerkship Curriculum. *(A) 3PRs used by students, as reported in the student needs assessment (n = 49). (B) Challenges students experienced while studying in the preclerkship curriculum (n = 49). (C) Percentage of study time students reported spending on 3PRs versus in-house curricular materials (n = 49), compared with faculty estimates of students' time allocation (n = 12). (D) Faculty ratings of the feasibility of integrating 3PRs into the preclerkship curriculum before (n = 12) and after (n = 11) the second faculty development session.*