

Implementation of Innovative Lab-Based Compounding Courses to an Online PharmD Pathway

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Introduction

Online programs offer opportunities to a unique student population that may be limited to accessing a professional degree program in person^{1,2}. However, developing online courses, especially lab-based ones, can be challenging. This work demonstrates the planning, development, and execution of lab-based compounding courses for an online PharmD professional degree program.

Objective

To develop and implement innovative lab-based compounding courses for a newly established online PharmD pathway analogous to the courses offered on the campus.

Methods

The PharmD program offers two compounding-based courses for the campus pathway. The components of the compounding courses on campus include a didactic pre-lab session and a hands-on laboratory session. The didactic sessions capture theoretical concepts, script review, calculations, compounding procedures, and labeling. The laboratory session provides hands-on compounding experiences for sterile and non-sterile preparations. For the online pathway, the didactic components were presented as asynchronous recordings, practice questions, and weekly synchronous live discussions. The asynchronous content also included pre-recorded demonstrations of compounding skills and techniques. The hands-on laboratory experiences were offered as week-long summer immersions. The contact hours, syllabus content, and assessments were identical to the campus pathway ensuring parity between the pathways. The student success rate between both pathways was compared.

Table 1: Sequence and tasks involved in course planning, development, and execution for lab-based compounding courses.

Phase	Tasks
Course Planning	Syllabi planning, distribution of asynchronous and synchronous content, creation of content skeleton in a course planner
Course Development	Building asynchronous recorded lectures and compounding videos
Course Execution	One synchronous session (50 mins) per week for the duration of the course. Weekly quizzes for formative assessment, summer immersions for hands-on compounding skills, and summative assessments. Course and Instructor evaluation post-semester.



Figure 1: Asynchronous Pre-Lab Lecture snapshot. The lectures are closed-captioned, include annotations, and can be paced at 0.5-2X playback speed.



Figure 2: Asynchronous compounding preparation demonstration snapshot. The recordings are closed-captioned and can be paced at 0.5-2X playback speed.

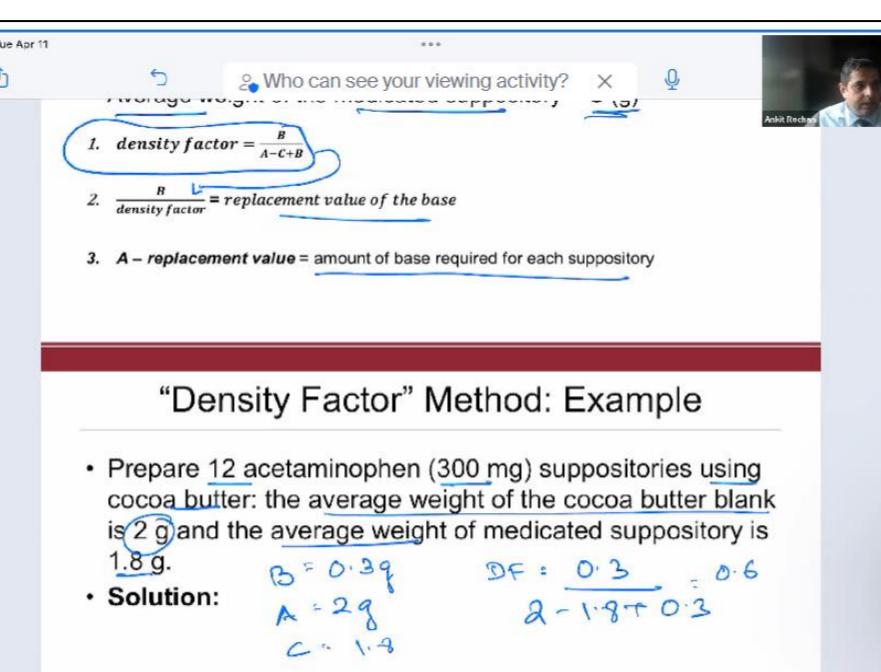


Figure 3: Synchronous compounding live session snapshot. The recordings are closed-captioned and can be paced at 0.5-2X playback speed.

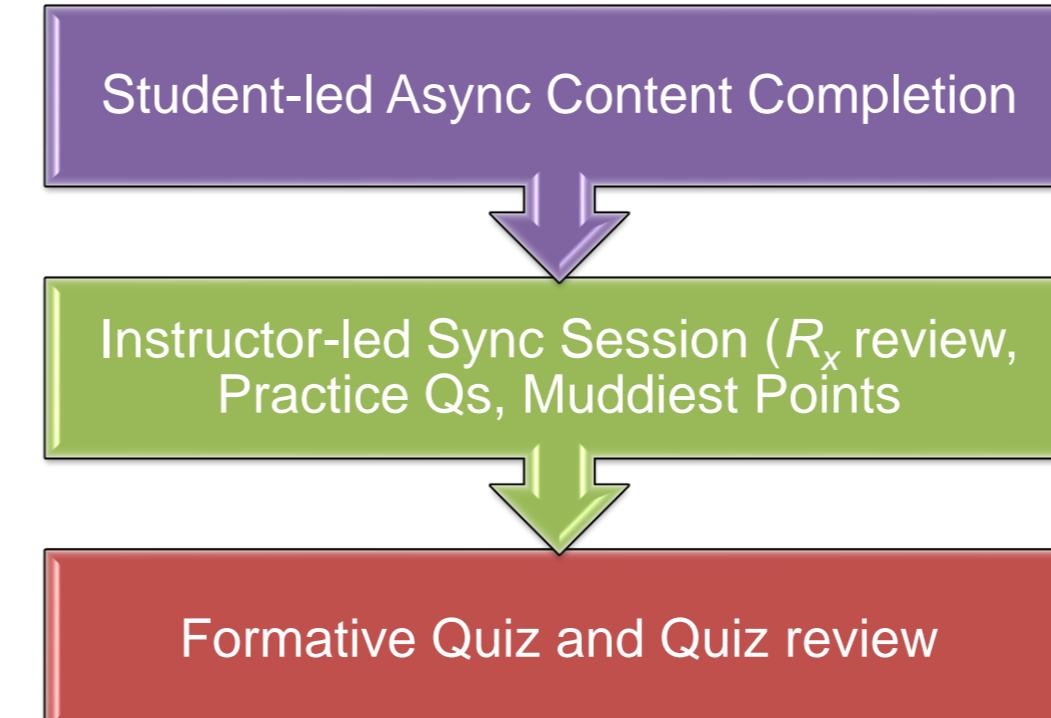


Figure 4: Workflow of weekly course content

Table 2: Assessments, timelines, and respective percent grade contributions.

Assessment and Timeline	Percent Grade Contribution
Eight Formative Quizzes/ Remote; during semester	40% (5% each)
Block 1 Lab Practical/ In person summer immersion	15%
Block 2 Lab Practical/ In person summer immersion	15%
Cumulative Final Lab Practical/ In person summer immersion	25%
Good Lab Practices/ Professionalism	5%

Results

The students in the online pathway successfully completed two lab-based compounding courses during their second year of the PharmD program. A 100% student success rate was achieved for both the courses in each pathway. The innovative approach allowed us to engage online students in a hands-on, lab-based course to meet ACPE curricular outcomes.

Conclusions

The newly developed and implemented innovative compounding courses were on par with those offered on the campus. The students in the online pathway courses were equally engaged with the courses and gained compounding skills for sterile and non-sterile preparations, as evidenced by similar assessment outcomes compared to the campus pathway.

References

1. Hamilton LA, Suda KJ, Heidel RE, McDonough SLK, Hunt ME, Franks AS. The role of online learning in pharmacy education: A nationwide survey of student pharmacists. *Curr Pharm Teach Learn.* 2020 Jun;12(6):614-625. doi: 10.1016/j.cptl.2020.01.026. Epub 2020 Feb 18. PMID: 32482262.
2. Sutherland K, Brock G, de Villiers Scheepers MJ, Millear PM, Norman S, Strohfeldt T, Downer T, Masters N, Black AL. Non-traditional students' preferences for learning technologies and impacts on academic self-efficacy. *J Comput High Educ.* 2023 Jan 24:1-22. doi: 10.1007/s12528-023-09354-5. Epub ahead of print. PMID: 36714819; PMCID: PMC9872746.