Integrative Review

Advancing Pharmacy Education by Moving From Sequenced “Integration” to True Curricular Integration

Dianqing Sun a,⁎, Justin Kinney b, Alexandra Hintz c, Melissa Beck c, Aleda M.H. Chen c

a Department of Pharmaceutical Sciences, The Daniel K. Inouye College of Pharmacy, University of Hawaii at Hilo, Hilo, HI, USA
b School of Pharmacy, Loma Linda University, Loma Linda, CA, USA
c School of Pharmacy, Cedarville University, Cedarville, OH, USA

ARTICLE INFO

Keywords:
Pharmacy curricular integration
Curriculum overload
Foundational sciences
Pharmacy practice
Social and administrative sciences

ABSTRACT

Objectives: Traditional pharmacy education focuses on teaching content, which is affectionately known as “silos”. Each topic area or discipline includes a course or an individual class session designed to impart knowledge, skills, or abilities needed for the student pharmacist to become a practice-ready, team-ready pharmacist. With expanding content and educational standards, there have been calls to simplify and streamline content. Truly “integrated” curricula (sequenced, coordinated, and collaboratively taught) where silos are removed to foster student integrative learning and build connections across disciplines (foundational, clinical, and social or administrative sciences) could be one such approach.

Thus, the objectives of this integrative review are to provide recommendations for decreasing curriculum overload by moving to truly integrated curricula, explore integrated approaches, discuss challenges and barriers, and propose next steps for creating integrated curricula that decrease content overload.

Findings: Although there are different approaches to curricular integration, most curricular integration occurs through sequenced courses or integrated cases. In order to truly streamline content and foster connections across disciplines, integration must move beyond simply sequencing of content to content that includes all the disciplines taught seamlessly. When taught together, curricular integration offers the opportunity to cover medication classes quickly and efficiently with multiple opportunities for reinforcement.

Summary: There remains limited data and examples of these types of true integration approaches. Thus, it is important for the Academy to determine if the integration of content improves curricular outcomes, positively affects students’ learning, and addresses curriculum overload by increasing efficiency and streamlining curricula.

Background

In traditional curricular models, where students learn one content area at a time in individual courses, several challenges affect the institution’s ability to cover content effectively, including difficulty to connect content across courses and among disciplines, as well as expanding content requirements. For example, in traditional curricula, students must make their own connections between courses and disciplines. Students may also perceive concepts as not aligning among disciplines or fail to realize the value of non-clinical content. Additionally, pharmacy curricula are struggling to address continually expanding content across limited classroom time with adequate repetition to promote long-term retention. Reasons for content expansion include the doubling of new medication approvals, removal or modification of medications due to safety concerns, and evolving clinical practice guidelines. Ever-changing medications, guidelines, and practice can make it difficult to determine the necessary content to include or remove from the curricula, underscoring the complexity of content delivery faced when creating curricula.

Faculty also can contribute to curricular challenges, particularly when working individually instead of collectively or clinging to content they view as meaningful when it may no longer be clinically relevant. Close working relationships between practice and science faculty are vital to ensure the delivered pharmacotherapy knowledge remains up to date and nonessential information is removed. Educational standards have also become increasingly complex; the most recent Accreditation Council for Pharmacy Education standards included expanded content despite reductions in number, increasing the emphasis on the affective domain and interprofessional education and adding the cocurriculum. Many other professional organizations have released supplemental

⁎ Corresponding author.
E-mail address: dianqing@hawaii.edu (D. Sun).

https://doi.org/10.1016/j.ajpe.2023.100056
Received 30 June 2022; Received in revised form 10 January 2023; Accepted 13 January 2023
Available online 15 March 2023

0002-9459/© 2023 American Association of Colleges of Pharmacy. Published by Elsevier Inc. All rights reserved.
competencies, recommendations, and guidelines for a school’s curriculum leading to recent calls to simplify pharmacy education as a result of rising complexity and content. Content toolkits, such as the American College of Clinical Pharmacy Didactic Curriculum Toolkit, is a valuable guide and resource for determining disease state inclusion and depth of coverage but it does not cover all disciplines included within pharmacy curricula. Thus, the Academy is suffering from curriculum overload, because faculty and students perceive the curriculum has too much. In particular, content overload is an issue, ie, content continues to be added to curriculum without removal of nonessential content because faculty struggle to limit content from their respective disciplines.

Truly “integrated” curricula (where concepts across disciplines are sequenced, coordinated, and collaboratively taught) are proposed as a solution to siloed courses and concepts as well as a potential resolution to ever increasing content that is delivered under the same, fixed timeline (resulting in overstuffed curricula). More commonly used in medical education, integrated curricula are designed to foster connections within and across courses; improve student perceptions of the relationship between science and practice; and allow for the time, repetition, and reinforcement needed to master knowledge. Within pharmacy, it is commonly believed to foster connections. A recent survey found that pharmacy faculty believe that curricular integration enriched students’ learning experiences with relevancy and engagement; facilitated content integration and skill and mindset building; enhanced ability to provide effective patient care; and built problem-solving skills needed in pharmacy practice. Additionally, integration efforts have resulted in a significant improvement in student written explanations describing the relationship between pharmacetics and pharmacy practice as well as a better understanding of the clinical application of a pharmacetics laboratory.

When content from foundational sciences, clinical sciences/pharmacy practice, and social and administrative sciences is truly integrated, it can greatly facilitate students’ learning in addition to sharpening their clinical and application skills, illustrated in Fig. 1. Examples of discipline integration approaches include teaching simultaneously, demonstrating relevance of all disciplines, recognizing and emphasizing the importance of all disciplines in the Pharmacists’ Patient Care Process (PPCP), and focusing on more commonly used medications in clinical practice. All disciplines, as part of the PPCP, contribute toward patient care. Students must possess skill sets that include the ability to evaluate data and evidence as well as be able to critically think, solve problems, and apply information clinically. These skills are paramount to train doctor of pharmacy (PharmD) students as competent pharmacotherapy experts, health care practitioners, and effective lifelong learners. Having a strong foundational science and social and administrative sciences underpinning is key to developing more advanced clinical reasoning skills. If students understand and apply foundational knowledge effectively, they can engage in understanding more complex clinical reasoning because they know the “why” behind medication-related outcomes. Appropriate repetition of concepts will enhance this, and over time, the habits, application skills, and critical thinking necessary to become a practice-ready pharmacist will develop and grow.

Further, a fundamental understanding of foundational sciences, social and administrative sciences, and clinical practice is key to providing optimal patient care. Faculty should strive to create various training opportunities in an active learning atmosphere for students to relate clinical reasoning, apply foundational science knowledge, and evaluate social and administrative sciences considerations to solve a clinical problem. These are excellent integration opportunities to provide repetition of foundational concepts while linking to clinical decision-making as part of the PPCP. Some useful approaches and strategies have been reported by Greene and colleagues, along with using the structure activity relationship map tool to teach medicinal chemistry in integrated pharmacotherapy courses, implementing the PPCP in a medicinal chemistry course, and integrating the PPCP across disciplines. However, communication among faculty of different disciplines is crucial when implementing high-level pharmacotherapy integration, as noted by Hambuchen and Clay.

It is crucial for students to understand how to utilize all disciplines to provide effective patient care as part of the PPCP. Faculty must also communicate clearly when designing curriculum to promote true integration and reduce overstuffed curricula. For students to gain the needed skills and faculty to provide integrated content, it is important to define true curricular integration and determine how it can be used to address content volume. Thus, the objectives of this integrative review are to provide recommendations for decreasing curriculum overload by moving to truly integrated curricula, explore integrated approaches, discuss challenges and barriers to true integration, and propose next steps for creating integrated curricula that decrease content overload.

Current Approaches for Integration

Curricular integration can be horizontal (between disciplines), vertical (across courses and connected to practice), or spiral (including both horizontal and vertical integration that increases in complexity). These approaches have been posited as a way to allow for the repetition needed to master clinical content as well as connect it across courses and disciplines. Rather than simply reteaching content each time, this repetition allows for students to resear prior content in a new application. Thus, integration within these definitions is focused on introducing content early and then fostering connections throughout the remainder of the curriculum. Rockich-Winston and colleagues posited that a spirally integrated curriculum would include fully teaching initial medication knowledge within foundational coursework in preparation for reinforcement, application, and expansion of learning in later clinical coursework. If carefully designed, this intentional repetition is frequently enough to minimize the need to reintroduce concepts (because students will not have forgotten them) and adds greater connections between concepts, promoting retention. As such, curricular integration could offer the opportunity to cover medication classes quickly and efficiently, addressing content overload.

The most recent national assessment of curricular integration efforts in 2016 found that approximately 51% of respondents integrated foundational sciences within therapeutics courses, whereas only 7.4% had no curricular integration. Newer programs (accredited for less than 10 years) were more likely to have positive perceptions of the value of curricular integration, which may increase the likelihood of integration efforts. However, many programs also were in the midst of making changes to therapeutics courses, so integration efforts likely have furthered in the past few years given the encouragement in the accreditation standards for application and reinforcement of foundational sciences in clinical sciences and practice. Yet, the majority of these integration efforts miss the mark and still keep the disciplines in silos rather than teaching content simultaneously. Curricular integration commonly occurs through course sequences or themed arrangement of content, skills laboratories, or case-based learning. When used in course sequencing or themed arrangement, topics are taught individually within a course that is often disease-based and still separated by discipline. This is the typical approach used to teach foundational sciences, clinical pharmacokinetics, physical assessment, self-care, affective domain skills, and social and administrative sciences. Examples of this approach are common in the literature, including vertically integrated skills and experiential courses, redesigned course series with integrated cases and discussions, and several redesigned curricula that allow for sequenced horizontal and vertical integration.

However, are the approaches seen in the pharmacy literature at the highest and most effective level of integration when faculty are still teaching by discipline? Although spiral integration is optimal for much
content, it does not necessarily mean that content is taught together. According to Harden, sequenced integration, depending on how it is done, can be the lowest level of curricular integration where content is taught in isolation. With enhanced integration efforts, disciplines fade away, and the content is taught in the context of clinical care. Thus, the middle levels of curricular integration should demonstrate the linkages between foundational and clinical sciences, while allowing students to see how social and administrative sciences considerations can affect patient care. The idea is not to include more content but to allow students to see, learn, and apply everything holistically as part of patient care in the highest integration efforts—true curricular integration.

In other health professions, true curricular integration examples exist. Within the field of medical education, faculty have used case-based learning to integrate and build upon multiple foundational science courses into later foundational science and clinical courses, near-peer learning with biochemistry and clinical applications, and vertical integration of foundational science coursework to aid in clinical application. Case/problem-based learning, case presentations, and clinical examples have been used in dentistry, whereas nursing has used collaboration, problem-solving, and in-class activities designed to diffuse concepts. Some examples of true integration approaches within pharmacy also exist, often including integration outside the classroom. For example, one research team brought class concepts into experiential settings to foster learning, critical thinking skills, and comprehension. Chen and colleagues integrated health literacy and cultural competency topics across multiple courses, skills laboratories, and experiential learning to foster connections and appropriate repetition for retention. These examples reflect concepts taught together rather than sequenced.

Ideally, integration that focuses on connecting disciplines, ie, true integration, rather than each discipline focusing on their individual content (and potentially including more content than needed) should allow programs to streamline the complexity and volume of content. It provides a framework for programs to focus their content during curricular redesigns to link concepts together. The mechanism that drives true curricular integration as a solution to curriculum overload is multifactorial. First, when content is taught simultaneously rather than in silos, faculty are given the opportunity to decide, through collaborative preparation, which aspects of that content are most pertinent to each respective discipline and to adjust their teaching accordingly. Second, when the content is presented in the context of clinical care rather than focused on a particular discipline, faculty are compelled to focus on the most contemporary aspects of their discipline that contribute to patient care, rather than being tempted to include all aspects of their discipline. These key characteristics of true curricular integration should lead to both streamlining and reducing content. However, the rationale for curricular integration as a solution to curriculum overload is currently based primarily on theory rather than evidence, because further research is needed to determine the impact of true integration. For example, a program in the United Kingdom modified coursework into an integrated model and focused on the care of patients, utilizing foundational sciences to underpin clinical content, linking and reinforcing prior learning as the material became increasingly complex. Nevertheless, there is limited data on whether programs successfully streamlined content or simply added more to fill the gaps.
What approaches can programs take if they want to move to true integration? Frameworks suggested include the following: organizing around themes (eg, diseases, organs, the continuum of aging, or problems), organizational threads (link materials from separate disciplines), or around the PPCP.11,41,42 Disease-based integration can allow faculty to integrate multiple disciplines in caring for the patient, whether presenting, learning together through the lens of each perspective (multidisciplinary integration), meshing the commonalities across disciplines into unified content (interdisciplinary integration), or fusing the disciplines and immersing the student into a real-world, authentic learning experience (transdisciplinary).12,13 Together, true integration can occur in all settings but the focus of this manuscript is in the classroom. Similarly, the PPCP can be used as a framework for faculty to integrate multiple disciplines because all disciplines contribute to patient care.14 Multidisciplinary and interdisciplinary approaches can be used to progress toward true integration of learning, ultimately translating into later real-world experience.15

Case Studies for Curricular Integration

Although the concept of true curricular integration appears to be ideal, it is important to discuss what this may look like practically and how curricular integration lends to the successful streamlining of content. Examples are presented here from Cedarville University School of Pharmacy’s integration structure. Rather than including multiple siloed social and administrative sciences courses, foundational social and administrative sciences concepts are introduced across several first professional year (P1) courses and spirally reinforced throughout the therapeutic modules using the PPCP as a framework for linking social and administrative sciences and practice. This has reduced curricular content and allowed for enhanced reinforcement. Initially, this integration focused on topics such as health disparities, cultural competency, communication, and health literacy,40,43 but it has now expanded to encompass the social determinants of health for identifying social and administrative sciences concepts. Practice and social and administrative sciences concepts are taught simultaneously, often by using patient cases to address clinical and social and administrative sciences components. Social and administrative sciences concepts are also reinforced throughout the Introductory Pharmacy Practice Experiences and Advanced Pharmacy Practice Experiences. Key elements that foster this integration include communication between faculty in different disciplines, faculty training on the PPCP and interdisciplinary teaching using the framework, and social and administrative sciences faculty who are also licensed pharmacists.

Another approach to address curriculum overload involves course-level integration. For example, using a sequenced integration approach, content on glucagon-like peptide-1 agonists and sodium-glucose co-transporter-2 inhibitors would typically be covered across at least 2 different class sessions to address the continually expanding research and indications for these medication classes—one session to cover pharmaceutical sciences content and one to address pharmacotherapy. Instead, the sessions were combined into a single session in which 3 faculty members from 3 different disciplines (pharmacology, medicinal chemistry, and pharmacy practice) simultaneously led students through integrated case studies. This approach fosters connections between disciplines from a student perspective, streamlines the delivery of content, reduces content volume, and can continue to be modified as practice changes. Table 1 outlines some key questions answered during the session, along with suggested assessment approaches to capture student competency. At this time, social and administrative sciences content is not integrated into this session, so we have added suggestions for integrating social and administrative sciences content in Table 1 and will consider implementing ourselves in the future.

A third example is in medicinal biochemistry regarding the diagnosis and treatment of diabetes. A significant portion of the course involves understanding the regulation of key energy metabolic pathways, with only limited opportunity to discuss dysregulation and mechanisms of action for antidiabetic agents. The case used in the course describes a patient suffering from uncontrolled diabetes and allows biochemistry, toxicology, and practice faculty to cover foundational biochemical pathways, dysregulation, and the mechanisms by which key clinical findings in diabetes manifest, and treatment selection. Since this course is taught during the P1 year when students do not have a significant depth in clinical knowledge, the focus of the integrated case is to illustrate the interconnectedness of the foundational sciences with practice, showing value and laying the foundation for future reinforcement. Clinical practice faculty discuss treatment options as they relate to metabolic regulation and introduce novel treatments such as nasal glucagon powder. Introduction of this material in P1 minimizes the need for repeating the information in such detail during the endocrine module in P2. It also offers the opportunity to reinforce material that has already been taught and promote knowledge retention. Similarly, future integration efforts can incorporate social and administrative sciences considerations for choosing treatment options, particularly in light of the social determinants of health.

Finally, the authors developed a template for a case integration that demonstrates how medication classes may be taught from the perspective of multiple disciplines as well as provided examples of assessment approaches (Table 2). Taking note of the fact that the connections that should be fostered among disciplines will likely vary depending on the condition or disease state discussed, this template showcases examples of close collaboration and integration of foundational science principles and concepts into clinical applications and how different disciplines such as medicinal chemistry, pharmaceutics, pharmacology, therapeutics, and social and administrative sciences are connected and intertwined in order to engage true integration learning as part of the PPCP. If most medication classes were taught in such an integrated fashion rather than in the silos of foundational sciences, clinical sciences/pharmacy practice, and social and administrative sciences, the content could be streamlined (eg, single integrated session vs multiple individual sessions) in such a way that would benefit both student learning and curriculum overload.

Future Outlook, Challenges, and Considerations

These examples and approaches to curricular integration are meant to merely foster discussion and collaborative efforts within the Academy, among various disciplines, prioritize patient care, and address the rising complexity of PharmD curricula. Yet, these improvements may not be without concerns. Barriers to true integration efforts have been highlighted, such as increased faculty workload and decreased research productivity because of extra time/effort spent toward the integration; lack of consistency among foundational, social and administrative sciences, and clinical content because of different perspectives of concepts (eg, the importance of adverse events or variability in mechanisms); lack of coordination and collaboration among faculty in different disciplines; and/or lack of faculty support and professional development to foster integration.17 Nonpractice faculty in particular also have the potential to feel marginalized as their content and/or courses become more integrated with clinicians and therapists. Furthermore, it can be challenging for faculty to release control of “their” course/material to shift to a shared role or guest lecturer appearance. Faculty interest and appreciation of the importance of foundational, social and administrative sciences, and clinical sciences also remain a hurdle to implementing true curricular and content integration.

True curricular integration may allow for appropriate repetition, foster connections among disciplines, and promote the development of team-ready, practice-ready pharmacists. However, it is not known whether or not this integration enhances learning outcomes. One research group, performing an interim evaluation of a curricular change, found no significant differences in student performance when
<table>
<thead>
<tr>
<th>Endocrine case</th>
<th>Foundational sciences</th>
<th>Clinical sciences</th>
<th>Social and administrative sciences ideas</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Pharmacology/</td>
<td>Pharmacy</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Pharmacokinetics</td>
<td>Pharmacotherapy</td>
<td></td>
</tr>
<tr>
<td>EL is a 52-year-old African American female with a PMH significant for T2DM, CKD, acid reflux, dyslipidemia, and obesity. She has been hospitalized with acute pancreatitis but is being discharged today. You are reviewing her medications with her before she goes home when she asks you about a medication called semaglutide for her diabetes. She says her sister is taking it and has had positive results. In her chart, you find the following information: Current medications: Metformin 1000 mg BID, Lantus 22 units nightly, atorvastatin 80 mg daily, omeprazole 40 mg daily, losartan 50 mg daily Allergies/intolerances: None Laboratory values: A1c (2 days ago) 8.8%; eGFR 53 mL/min; ACR 65 mg/g; all other laboratory values WNL Vitals: BP 143/77, HR 74, Ht 5'3'', Wt 195 lbs</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>What are the brand names of semaglutide (SUBQ and PO) for T2DM? What is semaglutide's mechanism of action? What are common adverse effects of semaglutide? How often is semaglutide SUBQ or PO administered?</td>
<td>What are the differences in the chemistry of semaglutide SUBQ and PO forms? Why can this peptide agent be administered in both SUBQ and PO routes? How does the structure of semaglutide (SUBQ) influence its PK parameters (eg, duration of action and dosing frequency)? What are key structural differences among the GLP-1 class (eg, short acting and long acting)?</td>
<td>Describe the glycemic effects of semaglutide. What are precautions and contraindications for use of a GLP-1 agonist? Based on EL’s PMH, what precautions and benefits should be considered? Based on EL’s PMH, major outcomes trials, and the ADA algorithm, what would you recommend to her?</td>
</tr>
<tr>
<td></td>
<td>Current approach: clicker questions (formative) and exam questions (summative) Alternate idea: clinical case notes with rubrics that include scoring on each discipline</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Abbreviations: A1c, glycated hemoglobin; ACR, albumin-to-creatinine ratio; ADA, American Diabetes Association; BID, twice daily; BP, blood pressure; CKD, chronic kidney disease; eGFR, estimated glomerular filtration rate; GLP-1, glucagon-like peptide-1; HR, heart rate; Ht, height; PK, pharmacokinetics; PMH, past medical history; PO, by mouth; SDOH, social determinants of health; SUBQ, subcutaneous; T2DM, type 2 diabetes mellitus; WNL, within normal limits; Wt, weight.
### Table 2

<table>
<thead>
<tr>
<th>Case</th>
<th>Condition/Disease</th>
<th>Pharmacology/Pharmacokinetics</th>
<th>Medicinal Chemistry</th>
<th>Pharmaceutical Sciences</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>Describe the mechanism of action of the first-line therapeutic class and go over their PK profiles.</td>
<td>Explain how the potency and/or specificity of the medication affects their therapeutic doses, on-target, and off-target effects (eg, differences in binding affinity with the target).</td>
<td>Compare and contrast the half-life of different medications based on efficacy, safety, and pharmacoeconomic considerations.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Discuss the physicochemical properties and structural differences among the class and how they affect their PK properties and clinical applications.</td>
<td>Discuss how the class works on the molecular level and key binding interactions with the target (eg, receptor).</td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
<td>Describe the timing of therapy related to the first-line therapeutic class and go over their PK profiles.</td>
</tr>
</tbody>
</table>

### Teaching and assessment ideas

- Pedagogic (open-ended questions, case-based learning, feedback on writing drafts)
- PBL: patient care write-up with an associated rubric
- Structured exam questions, patient case write-up with an associated rubric
- Reflection on how the concepts work together as part of the PPCP with an associated rubric

### Abbreviations

- ADRs: adverse drug reactions
- CYP: cytochrome P450
- PK: pharmacokinetics
- PPCP: Pharmacists’ Patient Care Process
- SDOH: social determinants of health
- APPE: Advanced Pharmacy Practice Experience
- SAS: Social and Administrative Sciences
- PPCP: Pharmacists’ Patient Care Process

### Funding/Support

There was no funding to support this project.

### CRediT authorship contribution statement

- **Dianqing Sun**: Conceptualization, Methodology, Writing – original draft preparation, Writing – reviewing & editing, Project administration.
- **Justin Kinney**: Methodology, Writing – original draft preparation, Writing – reviewing & editing.
- **Alexandra Hintz**: Methodology, Writing – original draft preparation, Writing – reviewing & editing.
- **Melissa Beck**: Methodology, Writing – original draft preparation, Writing – reviewing & editing.
reviewing & editing. Aleda M. H. Chen: Conceptualization, Methodology, Writing – original draft preparation, Writing – reviewing & editing, Project administration.

Declaration of Competing Interest

None declared.

Acknowledgments

We would like to acknowledge the work done by the 2021–2022 AACP Council of Faculties Faculty Affairs Standing Committee as inspiration for the research shared. We would also like to thank Miriam Mobley Smith and Jon E. Sprague for providing their thoughtful comments for this manuscript.

References

5. Rockich-Winston N. Toward a pharmacy curriculum theory: spiral integration for pharmacy leading to the doctor of pharmacy degree. Accreditation Council for Pharmacy Education. 2022;86(8):ajpe8931. https://doi.org/10.5688/ajpe8931