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RESEARCH ARTICLE

Examining pharmacy students' utilisation of an online curricular resource platform

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Abstract

Objective: To evaluate how Doctor of Pharmacy Students (PharmD) at one school of pharmacy use an online curricular resource platform, explicitly identifying the most frequently used resources and potential barriers to their usage. **Methods:** An anonymous, voluntary electronic survey using Qualtrics was administered to all PharmD students at a single institution in spring 2023. The survey included demographic questions and items on platform usage frequency, resource utilisation, and reasons for using or not using the platform and its resources. Descriptive statistics characterised the study population. Chi-square tests examined the impact of professional year and GPA on platform utilisation. **Results:** A survey of 180 students revealed that 37.8% were in Year 4, 52.2% occasionally used the online curricular resource platform, and 49.2% did not use any multimedia available. The most utilised tool was the Top 300 Pharmacy Flash Cards (32.5%). Chi-square and *p*-value analyses indicated significant differences in resource usage across professional years, while no association was found between GPA and resource usage frequency. **Conclusion**: This study highlights the importance of diverse online resources and effective study tools in enhancing pharmacy education. By understanding student usage patterns, educators can optimise online platforms to meet educational needs better, improving learning experiences and outcomes.

Introduction

Online curricular resource platforms available through institutional subscriptions have become an integral part of healthcare education. These platforms include core reference texts, videos, self-assessments, drug information, and licensure review resources, to name a few (Aungst *et al.,* 2013; Rodis *et al.,* 2016; Park *et al.,* 2017; Donohoe *et al.,* 2018). These online curricular platforms are designed to be user-friendly and accessible from anywhere, featuring apps that students can download onto their phones (Aungst *et al.,* 2013; Rodis *et al.,* 2016; Park *et al.,* 2017; Donohoe *et al.,* 2018). Additionally, because these resources are frequently updated, students have immediate access to the latest medical content at their fingertips. Due to the 'easy and immediate' accessibility of online scholarly resources, instructors might assume that students will utilise these materials to enhance and support their learning. However, the question remains: Are students actually using these resources? Research in this area is limited, focused either on the use of "*non-scholarly*" resources such as YouTube, Wikipedia, and Google, or the use of subscription-based drug information databases such as Lexicomp, Clinical Pharmacology, Micromedex (Allahwala *et al.,* 2013; Hailemeskel *et al.,* 2016; Judd *et al.,* 2017; McCalla *et al.,* 2022). A preliminary study noted that 90% of pharmacy students surveyed at their institution used non-scholarly resources such as Wikipedia, YouTube, Sketchy (visual learning platform) and social media for their learning, with a preference for YouTube because it's free, fast and gives simple explanations. Their study, though small, is consistent with other studies (McCalla *et al.,* 2022). A study examined the utilisation and preference of drug information resources by 4th-year pharmacy students and found that 80% of participants in the study preferred Google (or other search engines)

compared to 43% preferring subscription-based databases and 17% preferring textbooks and journals (Hailemeskel *et al.,* 2016). A similar study found that medical students infrequently use their institution's library or online learning platform to access information but instead turn to Google and Wikipedia (Judd & Elliott, 2017). A study conducted in 2013 noted that 94% of medical students at their institution use Wikipedia (Allahwala *et al.,* 2013). Project Information Literacy (PIL), a nonprofit research institute that conducts national, ongoing studies on how adults find and use information, has been investigating how college students find, evaluate, and use information since 2008 (Head *et al.,* 2022). PIL results indicate that most students use Google, Wikipedia, and course readings over library databases to find information (Head, 2013). These studies suggest that today's students prioritise convenience when seeking information, a need that online curricular resource platforms are designed to meet. Access to scholarly sources through these platforms is only a click away, especially if links to recommended texts (and other learning resources) housed within these platforms are provided to students in syllabi, course handouts, and learning management systems.

The purpose of this study was to evaluate how Doctor of Pharmacy Students (PharmD) at a school of pharmacy use an online curricular resource platform, specifically identifying the most frequently used resources and potential barriers to their usage. This information will help identify not only which resources within the platform are most used but also determine potential barriers to use. This information can assist pharmacy educators in finding ways in which to encourage their students to use scholarly learning resources as well as minimise barriers to the use of such resources. While these online curricular platforms come at a price, they give students access to reliable, accurate, and evidence-based medical information, which they need as they develop their critical thinking skills.

Methods

Study Design

A voluntary, anonymous survey using Qualtrics (Qualtrics, LLC, Provo, UT) was administered electronically in spring 2023 to all PharmD students at a school of pharmacy located in the Southeastern United States. In this study, the four professional PharmD years will be categorised as Year 1, Year 2, Year 3, and Year 4. The sample size for this study included the entire population of PharmD students enrolled in the program at the time of the research, with all students eligible to participate in the voluntary survey. Based on a 95% confidence level and a 5% margin of error, the minimum required sample size was calculated to be 194 students.

An email was composed explaining the study's purpose, providing the survey link, and giving a two-week window to complete the survey; a reminder email was sent out one week prior to survey closure. The survey takes approximately 15 minutes to complete. Participants' consent was obtained through implied consent via survey participation. Before beginning the survey, all participants were informed about the study's purpose, procedures, and their right to withdraw at any time without consequence. By proceeding with the survey, participants indicated their consent to take part in the study, ensuring that their involvement was both informed and voluntary.

The survey instrument (Appendix A) consisted of demographic questions and questions related to the frequency of use of the platform, what resources housed within the platform students used, how frequently they used those resources, and reasons for using/not using the platform and/or resources housed within the platform. The survey questions were developed based on comments made by students during office hours, suggesting limited use of the platform. The study received ethical approval and was granted an exemption by the University's Institutional Review Board (EXMT-P-23-S-6), confirming that it adhered to the necessary ethical standards for research involving human participants.

Statistical analysis

Data was imported from Qualtrics into Statistical Package for Social Sciences (SPSS) version 28 (IBM Corp) for analysis (SPSS Inc., 2021). Descriptive statistics were used to summarise the data. Chi-square tests were used to assess whether the utilisation of the online curricular resource platform was influenced by professional year and GPA, as this statistical method is appropriate for examining relationships between categorical variables.

A *p*-value threshold of less than 0.05 was used to determine statistical significance, as it is a widely accepted standard for indicating that the observed results are unlikely to have occurred by chance.

Results

Demographic characteristics

The characteristics of the study participants are summarised in Table I. A total of 180 students completed the survey. While the study aimed for a sample size of 194 participants, the authors successfully gathered data from 180 fully completed surveys, which still provides a robust representation for these analyses and maintains the statistical power necessary to draw meaningful conclusions.

The distribution across professional years shows that the majority of participants were in their Year 4 (37.8%), followed by the Year 3 (23.3%), Year 1 (20.6%), and Year 2 (18.3%). Regarding age distribution, a significant proportion of participants fell within the age range of 22-25 years (53.9%), followed by those aged 26-30 years (23.3%), 19-21 years (11.1%), and those over 30 years old (11.7%). Approximately half of the participants had a GPA greater than 3.5 (48.3%), while 36.7% had a GPA between 3.0 and 3.5. A smaller percentage had GPAs between 2.5 and 3.0 (11.7%) and less than 2.5 (3.3%).

These results highlight the diverse demographic and academic profiles of the study participants, reflecting a broad representation across professional years, age groups, and academic performance levels.

Table I: Demographic characteristics of student respondents (n=180)

Characteristics	N (%)
Professional year	
Year 1	37 (20.6)
Year 2	33 (18.3)
Year 3	42 (23.3)
Year 4	68 (37.8)
Age range in years	
19-21	20 (11.1)
22-25	97 (53.9)
26-30	42 (23.3)
30+	21 (11.7)
Approximate GPA	
> 3.5	87 (48.3)
3.0 – 3.5	66 (36.7)
2.5 – 3.0	21 (11.7)
< 2.5	6 (3.3)

Online curricular resource platform usage

Table II presents the frequency of usage of various online resources among participants during the previous academic year. A significant portion of respondents reported using the online curricular resource platform occasionally (52.2%) and less frequently, never (17.2%), whereas 30.6% used it frequently (once or more per week). Regarding the usage of course textbooks available through the online curricular resource platform, a majority reported occasional usage (65.1%), while 21.5% indicated never using them, and 13.4% used them frequently. The list below outlines reasons provided by students who indicated that they had not used the course textbooks available on the platform.

- "*Most of the information needed is in the slide decks/handouts*"
- "*Lectures provided the information*"
- "*Very confusing*"
- "*Not needed*"
- "*It was difficult for me to find them all throughout P1 year, so I stopped trying*"
- "*Don't learn well from reading, I get the most out of coming to class and being engaged there*"
- "*I always find what I need through PubMed, clinical pharmacology, Micromedex, and Lexicomp*"
- "*I could never find the correct book I needed*"
- "*I needed quick information and didn't have time to sort through sources. I used lexi-comp, up-to-date, and relevant guidelines*"

Table II: Use of an online curricular resource platform

Question	N (%)
During the last (previous) academic year, how often have you used the online curricular resource platform?	
Never	31 (17.2)
Occasionally	94 (52.2)
Frequenty (once or more per week)	55 (30.6)
During the last (previous) academic year, how often have you used course textbooks available through the online curricular resource platform?	
Never	32 (21.5)
Occasionally	97 (65.1)
Frequently (once or more per week)	20 (13.4)
During the last (previous) academic year, how often have you used the study tools available through the online curricular resource platform?	
Never	41 (30.9)
Occasionally	73 (54.9)
Frequently (once or more per week)	19 (14.2)
During the last academic year (previous), how often have you used NAPLEX central on the online curricular resource platform?	
Never	86 (65.2)
Occasionally	32 (24.2)
Frequently (once or more per week)	14 (10.6)

Study tools on the online curricular resource platform were occasionally used by 54.9% of respondents, with 30.9% reporting never using them and 14.2% using them frequently.

NAPLEX Central, offered by the National Association of Boards of Pharmacy (NABP), is a resource hub for pharmacy students and graduates preparing for the North American Pharmacist Licensure Examination (NAPLEX) (National Associations of Boards of Pharmacy, 2024).

The NAPLEX Central on the Online Curricular Resource Platform was predominantly reported as never used (65.2%), occasionally used (24.2%), and frequently used (once or more per week) by 10.6% of participants. The most frequently cited reasons provided by students for not using NAPLEX Central included:

- "*Unsure of what it is*"
- "*I didn't know about it*"
- "*haven't found a need for it yet*"
- "*I don't know where to find it*"
- "*utilised Rx Prep*"
- "*haven't begun my NAPLEX prep yet*"
- "*other resources available*"

These findings highlight varying degrees of engagement with different online resources, underscoring the diverse utilisation patterns among the study participants.

Student engagement with online resources by professional year

Chi-square tests were also used to determine if utilisation of the Online Resources is impacted by professional year (Table III).

Table III: Percent usage by professional year

Professional year	Frequently n(%)	Occasionally n(%)	Never n(%)	Chi-square	*p*-value†
Online curricular resource platform					
Year 1	5 (9.1)	25 (26.6)	7 (22.5)	16.5	0.01
Year 2	18 (32.7)	12 (12.8)	3 (9.7)		
Year 3	9 (16.4)	24 (25.5)	9 (29.0)		
Year 3	23 (41.8)	33 (35.1)	12 (38.7)		
Course textbooks					
Year 1	1 (5)	25 (25.8)	4 (12.5)	18.6	0.05
Year 2	9 (45)	19 (19.6)	2 (6.3)		
Year 3	2 (10)	20 (20.6)	11 (34.4)		
Year 3	8 (40)	33 (34.0)	15 (46.9)		
NAPLEX Central					
Year 1	0 (0)	1 (3.13)	25 (29.1)	45.0	0.01
Year 2	3 (21.4)	4 (12.5)	20 (23.3)		
Year 3	2 (14.3)	2 (6.25)	26 (30.2)		
Year 3	9 (64.3)	25 (78.1)	15 (17.4)		
Use of study tools					
Year 1	2 (10.5)	9 (12.3)	15 (36.6)	20.4	0.02
Year 2	8 (42.1)	12 (16.4)	7 (17.1)		
Year 3	1 (5.26)	23 (31.5)	7 (17.1)		
Year 4	8 (42.1)	29 (39.7)	12 (29.3)		

†*p*-value of Chi Square test

Online curricular resource platform

Regarding the online curricular resource platform, Year 4 students reported the highest frequency of use, with 41.8% indicating frequent use, followed by Year 2 students at 32.7%. In contrast, Year 1 students reported the least frequent use at 9.1%. Occasional use was highest among Year 4 students (35.1%), while Year 1 students had the lowest at 26.6%. The highest rate of never using the platform was among Year 4 students (38.7%), and the lowest was among Year 2 students (9.7%). The significant differences in platform usage across professional years (chi-square = 16.5, *p = 0.01*) suggest that as students progress, they may increasingly recognise the platform's value for their studies.

Course textbooks

In terms of using Course Textbooks, Year 2 students reported the highest frequency of use (45%), closely followed by Year 4 (P4) students (40%). Year 1 students had the lowest frequency of use at 5%. Occasional use was highest among Year 4 students (34.0%), with Year 2 students reporting the lowest at 19.6%. The pattern of never using the textbooks was most common among Year 4 students (46.9%) and least common among Year 1 students (12.5%). The significant differences observed (chi-square = 18.6, p = 0.05) indicate varying levels of reliance on textbooks, potentially reflecting changes in study habits and resource preferences as students advance in their academic careers.

NAPLEX central

When analysing the use of NAPLEX Central, Year 4 students were predominant in frequent use (64.3%), with no Year 1 students reporting frequent use. Occasional use was highest among Year 4 students (78.1%) and lowest among Year 1 students (3.13%). Never use was highest among Year 3 students (30.2%) and lowest among Year 1 students (0%). The highly significant differences in NAPLEX Central usage (chi-square = 45.0, p = 0.01) suggest that as students approach the final stages of their education, they are more likely to engage with this specialised resource in preparation for their professional exams.

Study tools

Finally, in using Study Tools, Year 2 students reported the highest frequency of use (42.1%), while Year 1 students reported the lowest (10.5%). Occasional use was most common among Year 4 (P4) students (39.7%) and least common among Year 1 students (12.3%). Never use of study tools was highest among Year 1 students (36.6%) and lowest among Year 2 students (17.1%). The significant differences observed (chi-square = 20.4, p = 0.02) imply that certain study tools are increasingly adopted as students progress, likely due to growing awareness of their effectiveness in enhancing learning outcomes.

In summary, the chi-square and p-value analyses reveal significant and real differences in how frequently students in different professional years use various educational resources. The p-values indicate that these differences are not due to random chance but rather reflect genuine variations in usage patterns across the academic cohorts.

In a separate analysis not detailed here, the data did not provide sufficient evidence to indicate an association between student GPA and the frequency of online resource usage.

Use of multimedia resources and study tools

Figure 1 illustrates the percentage of multimedia resources used by participants during the previous academic year leading up to the survey. A significant proportion (49.4%) of participants reported not using any multimedia resources on the platform. Among those who did utilise multimedia, Harrison's Pathophysiology Animations were the most commonly used (13.1%), followed closely by NAPLEX Review Videos (12.5%). Harrison's Pathophysiology Animations is a library of concise, high-yield video animations designed to simplify complex pathophysiology concepts through high-quality visual presentations. Pharmacology lecture videos (10.7%) and Pharmacy Calculations Lecture Videos (9.5%) were also utilised, albeit to a lesser extent. Various organ system videos were the least utilised (4.8%). These findings indicate varied engagement with multimedia resources, with almost half of respondents not utilising these resources during the previous academic year.

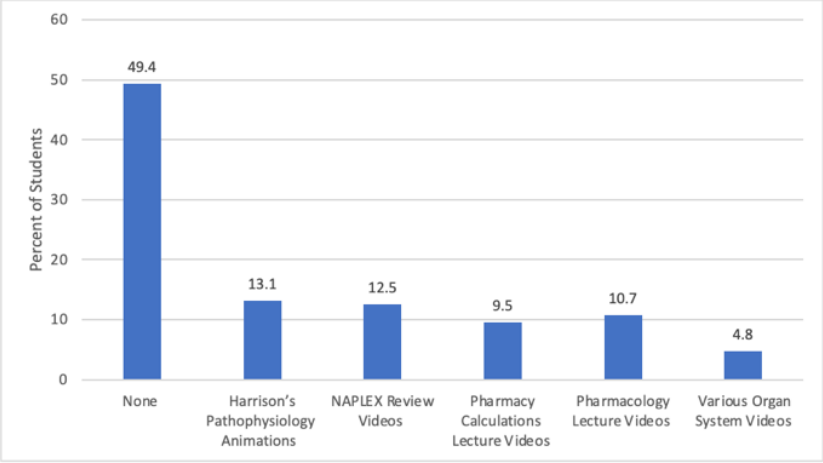

Figure 1: Multimedia usage

Figure 2 displays the usage of various study tools available on the platform among participants. The most utilised tool was the Top 300 Pharmacy Flash Cards, with 32.5% of respondents indicating its use. Review Questions followed as the second most used tool, with 18.9% of respondents utilising them. Other frequently used tools included the Top 300 Prescription Drug Challenge (8.3%) and Pharmacotherapy Flash Cards (7.5%). Less frequently utilised tools included Pharmacy Calculations Flash Cards, Medical Terminology Pharmacy Flash Cards, and Pharmacology Flashcards, each used by approximately 7.5% of respondents. The least utilised tools were the Top 100 Nonprescription Flash Cards, Top 200 Injectable Flashcards, and Top 100 Nonprescription Drug Challenge, each used by 3.9% or less of participants. These findings illustrate varying degrees of engagement with different Study Tools available on the platform, highlighting preferences among participants in utilising resources for their academic and professional development in Pharmacy.

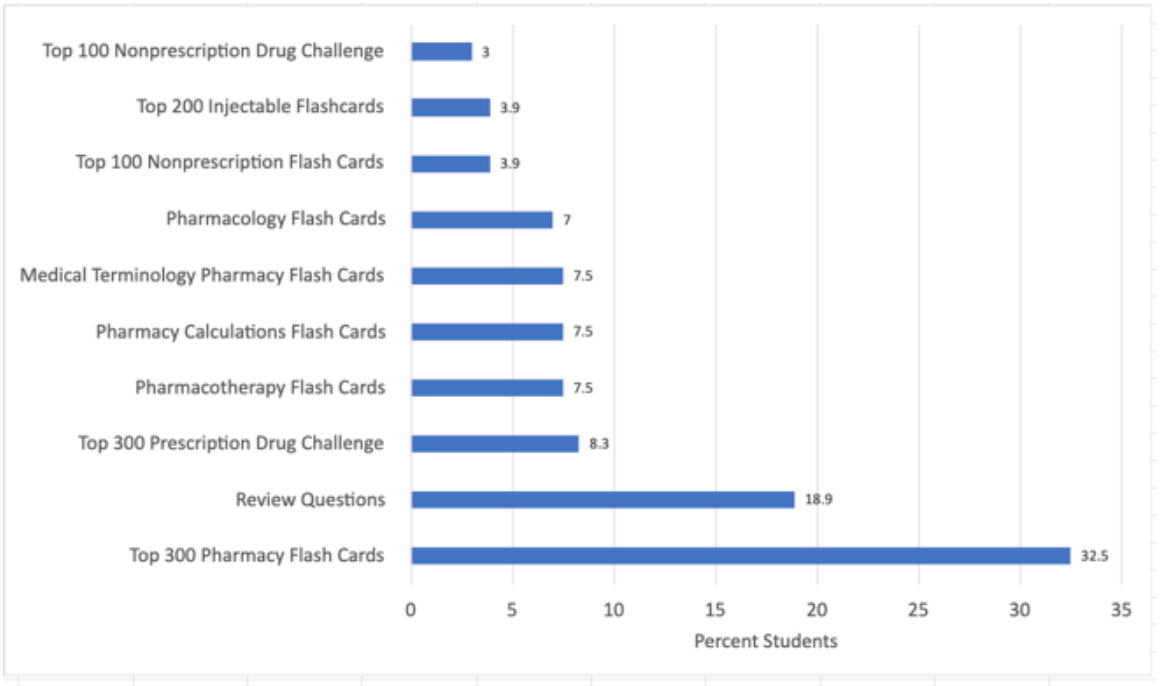

Figure 2: Study tool usage

Motivations for using the online curricular resource platform

Table IV outlines the most common motivations reported by participants for using the Online Curricular Resource Platform. The most common reasons included being recommended by faculty or a faculty advisor and clarifying lecture information, each cited by 19.6% of respondents. Supplementing class notes was another prevalent reason, reported by 19.0% of participants. A notable number of respondents also used the platform to complete course assignments (13.8%) and to test their knowledge or understanding prior to exams (13.5%). Additionally, 10.0% used the platform to prepare for class sessions. A smaller proportion reported using the platform based on recommendations from peers or tutors (4.5%).

These findings highlight diverse motivations among participants for utilising the online curricular resource platform, emphasising its role in supporting learning through various academic activities and recommendations from educational stakeholders.

Table IV: Motivations for using the online curricular resource platform

Response choices†	N (%)
Recommended by faculty advisor	61 (19.6)
Clarify lecture information	61 (19.6)
Supplement class notes	59 (19.0)
Complete course assignment	43 (13.8)
Test my knowledge/understanding prior to exams	42 (13.5)
Prepare for class	31 (10.0)
Recommended by a peer or tutor	14 (4.5)

†Particpants could select all that applied

Discussion

The study findings reveal a diverse demographic and academic profile among participants, spanning various professional years, age groups, and GPA ranges. This diversity suggests a broad representation within the study sample, reflecting the multifaceted nature of the student body in pharmacy education. Regarding the utilisation of online resources, the study highlights varied engagement among participants. Harrison's Pathophysiology Animations and Top 300 Pharmacy Flash Cards emerged as frequently utilised resources, indicating their significant role in supplementing educational content. In contrast, other resources such as NAPLEX Central and certain multimedia on AccessPharmacy saw comparatively lower levels of use, suggesting potential areas for improvement or alternative approaches to increase their integration into student learning strategies.

A chi-square test indicated that engagement with online resources and study tools varies significantly by professional year. This reflects potential differences in resource needs and study habits as students advance through their pharmacy education. Understanding these patterns can help educators tailor resource provision to better meet the evolving needs of students, ensuring that they are well-supported at each stage of their academic journey.

Motivations for using the online curricular resource platform varied among participants, with clarifying lecture information, faculty recommendations, and supplementing class notes emerging as primary reasons. These motivations underscore the platform's role in supporting academic learning and preparing students for assessments.

Results from this study fall in line with previous research showing that most students do not take full advantage of online curricular resource platforms available through institutional subscriptions (Allahwala *et al.,* 2013; Head, 2013; Hailemeskel *et al.,* 2016; Judd & Elliott, 2017; Head *et al.,* 2022). These same studies have looked at the use of online resources among both pharmacy and medical students as a study tool in the curriculum. In general, students identify Wikipedia and Google as their primary online resource with usage ranging from 80-94%. Primary reasons for selection of these two resources was ease of access and understanding. This is followed by use of subscription databases (43%) and textbooks and journals (17%) among study participants. The preference for using these resources has been attributed to generational learning styles (Hailemeskel *et al.,* 2016).

Many schools of pharmacy now include a drug information course as part of their first-year curricula, noting the importance of instructing students on how to effectively utilise online databases (Hailemeskel *et al.,* 2016). Another study noted a significant increase in usage of learning platforms by students between 2006 and 2015 (Judd *et al.,* 2017). The number and type of learning resources utilised were found to be highly variable. Interestingly, students tend to select specific resources based on peer recommendation rather than recommendation of faculty. Despite the wide range of highly credible databases now available, studies suggest students tend to rely on a select few resources, such as Google and Wikipedia, during their initial inquiry (Allahwala *et al.,* 2013).

In the current study, only a little over half (52.2%) of students reported using online curricular resources occasionally. Interestingly, the frequency of use of these platforms increased as students advanced through the curriculum. The authors believe this could indicate that as students gain more knowledge, they better realise the benefit of utilisation of these resources. In addition, it could be useful to investigate whether higher-level courses "*promote*" online curricular resources more frequently than lower-level pharmacy courses within the curriculum, as this may also be a cause for increased utilisation as students advance through the curriculum.

Based on the results of this study, the authors believe there are likely multiple reasons students do not fully utilise online curricular resource platforms. Some of these may include a lack of instruction on how to use online curricular resource platforms, students feeling instructors provide everything needed to be successful, lack of adequate drug information skills needed to effectively use this resource, and lack of reading comprehension, which prevents students from effectively learning from an online platform.

A few studies have evaluated reading comprehension among pharmacy students (Fuller *et al.,* 2007; Ficzere *et al.,* 2016; Wicaksono, 2023). This was, in part, spurred by the fact that there has been a general decline in reading ability among college students, which can have a direct impact on student success. In higher education, including pharmacy school, reading demands increase. The complexity and difficulty of reading requirements also increases. These studies have also concluded that pharmacy texts are written at a higher level than the average pharmacy student's level of reading comprehension (Fuller *et al.,* 2007; Ficzere *et al.,* 2016; Wicaksono, 2023). The combination of these factors has the potential to negatively impact student success.

In addition to a possible lack of reading comprehension, studies have also shown students largely do not complete outside reading assignments. In general,

more than 70% of students do not complete these assignments (Coulter & Smith, 2012). Reported reasons for this lack of completion include the expanding use of lecture slide software, leading students to believe provided lecture slides include all necessary information to be successful on the exam, with no need to complete additional work (Coulter & Smith, 2012).

Part of pharmacy education is developing students as lifelong learners with critical thinking ability. The American Association of Colleges of Pharmacy (AACP) Curriculum Outcomes and Entrustable Professional Activities (EPA) document, revised in 2022, identifies the educational outcomes (EO) and EPAs expected of all pharmacy graduates. Specifically, educational outcomes are statements that describe what a learner should be able to do at the end of a program. The EOs represent the knowledge, skills, and attitudes of pharmacists that all students should demonstrate upon graduation. The EPAs describe the work of pharmacists as workplace tasks and responsibilities that all students are entrusted to do in the experiential setting with direct or distant supervision. This document highlights the need for practitioners to evaluate scientific literature, and critical analysis of scientific literature is necessary to enhance clinical decision-making (Medina *et al.,* 2023). These skills are required in the workforce; there is no "*lecture*" to fall back on. Educating students on how to effectively use an online curricular resource would develop these skills, so it should be made a learning priority within curricula.

The above studies highlight the need for faculty to promote the use of online platforms by highlighting their value in assisting student success as well as evaluating resources provided to students that may deter student utilisation of online curricular platforms.

The financial investment by institutions to supply online curricular resources to students is significant. Because of this, it would benefit institutions to identify avenues to highlight and/or emphasise this resource's benefit to increase student utilisation.

Future studies will be designed to investigate whether courses within the PharmD incorporate the use of online curricular resources. Areas of investigation will include use as aspects of lecture delivery and/or content, incorporation into course assessments, and incorporation into project and group activities and assignments.

The present study has several limitations that should be considered when interpreting the findings. The response rate was 46%, which may introduce non-response bias, potentially affecting the generalisability of the results. There was an uneven distribution of participation among the four classes (years in the program) of students, which may have influenced the representativeness of the data and limited the ability to draw comparisons across different academic years. A self-administered survey tool was utilised to gather data. There is a potential for reporting bias since the participants' responses rely on their own self-assessment. Also, while protecting student privacy, the survey's anonymity posed a significant limitation in linking individual students' use of online curricular resources with their academic performance. This restriction impeded the ability to conduct a more granular analysis that could have provided deeper insights into how specific patterns of resource usage might correlate with student success. Future studies should consider employing methodologies that allow for the collection of identifiable data under strict confidentiality agreements to enable a more comprehensive understanding of these dynamics. While the survey covered several essential areas related to the use of the online curricular platform, it did not include questions on perceived usefulness, student satisfaction, or ease of navigation. These omissions may have limited the ability to fully understand students' overall experiences and preferences, especially regarding their use of non-scholarly platforms. Another limitation of this study is that the questionnaire was not formally validated. However, the survey questions were developed based on informal feedback from students, providing a rationale for their selection and structure. In future research, the authors will ensure that all survey questions are validated before administration to enhance the reliability of the findings.

Conclusion

The current study underscores the importance of diverse online resources and effective study tools in enhancing pharmacy education. Understanding these usage patterns and motivations can inform educators and administrators on optimising online platforms to better meet the educational needs of students, thereby improving overall learning experiences and academic outcomes in pharmacy education contexts.

Conflict of interest

The authors declare no conflict of interest.

Ethics approval and informed consent

This study was conducted in accordance with the ethical standards set forth by the Samford University Institutional Review Board and received an exemption under exemption number (EXMT-P-23-S-6). Participation was entirely voluntary, and participants were provided with detailed information regarding the study's purpose, procedures, potential risks, and benefits. They were assured of their right to withdraw from the study at any time without any consequences.

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Appendix A: Survey instrument pharmacy students' utilisation of an online curricular resource platform

Questions	
Indicate your professional year:	P1 P2 P3 P4
What is your age range?	19-21 22-25 26-30 30+
What is your approximate GPA?	> 3.5 3.0 – 3.5 2.5 – 3.0 < 2.5
During the last academic year, how often have you used course textbooks available through the Online Curricular Resource Platform?	Never Occasionally Frequently (once or more per week)
List the textbooks you have used over the past two semesters:	[text box]
During the last academic year, how often have you used the study tools available on AccessPharmacy?	Never Occasionally Frequently (once or more per week)
Which of the following study tools available on the online curricular resource platform have you used?	
Select all that apply:	Top 300 Pharmacy Flash Cards Top 300 Prescription Drug Challenge Pharmacotherapy Flash Cards Top 100 Nonprescription Flash Cards Top 100 Nonprescription Drug Challenge Top 200 injectable Flashcards Pharmacology Flashcards Pharmacy Calculations Flash Cards Medical Terminology Pharmacy Flash Cards Review Questions
During the last academic year, how often have you used NAPLEX Central on the Online Curricular Resource Platform?	Never Occasionally Frequently (once or more per week)
During the last academic year, which of the following multimedia on the Online Curricular Resource Platform have you used?	
Select all that apply:	Pharmacy Calculations Lecture Videos Various organ system videos NAPLEX Review Videos Pharmacology Lecture Videos Harrison's Pathophysiology Animations
Select your reasons for using the online curricular resource platform. **Select all that apply:**	Recommended by a peer or tutor Recommended by faculty or faculty advisor Complete course assignment Supplement class notes Clarify lecture information Prepare for class Test my knowledge/understanding prior to exams