Students' self-efficacy completing the pharmacist patient care process: Integrating authentic assessment into a pharmacy elective

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Abstract

Background: Authentic assessments can be used to accurately measure students' ability to perform tasks reflective of practising pharmacist responsibilities. **Objective:** To evaluate the impact of an authentic assessment on student self-efficacy in completing the Pharmacists Patient Care Process (PPCP) in an elective course. **Methods:** An authentic assessment simulated a direct patient care visit in an ambulatory care setting. For the assessment, students completed four steps of the PPCP, followed by a survey to evaluate their perceived self-efficacy in completing the activity. **Results:** After the activity, 90% or more students felt more confident in knowing what information to collect, conducting a patient interview, and counselling a patient. General themes from free response questions confirmed student confidence and knowledge. **Conclusion:** Creating and implementing an authentic assessment allowed for students to demonstrate improved self-efficacy while conducting the PPCP in a setting that closely resembled a real-life practice environment.

Introduction

In pharmacy, one of the tasks required of students is completing the Pharmacist Patient Care Process (PPCP). Educational standards set out by the Center for the Advancement of Pharmacy Education (CAPE) and Accreditation Council for Pharmacy Education (ACPE) for pharmacy curricula require that students become APPE (Advanced Pharmacy Practice Experiences) and practice-ready and integrate the PPCP (Medina *et al.,* 2013; Accreditation Council for Pharmacy Education [ACPE], 2015). The PPCP is a standardised approach to a pharmacist providing patient care by collecting pertinent information, assessing that information for any drug therapy problems, developing a plan to resolve any identified drug therapy problems, and implementing it by counselling a patient accordingly (Joint Commission of Pharmacy Practitioners [JCPP], 2014). However, it may be challenging to assess these tasks through the use of a standard multiple-choice assessment. To accurately measure the student's

ability to perform tasks reflective of the responsibilities that they will have as a practising pharmacist, authentic assessments can be used to mimic and assess these skills.

An authentic assessment has been defined as an assessment requiring students to use the same competencies, combinations of knowledge, skills, and attitudes that they need to apply in the criterion situation in their professional life. A criterion situation is defined as reflecting or simulating a real-life situation that can confront students in their internship or future professional life (Gulikers, Bastiaens & Kirschner, 2004). Authenticity itself has been defined by many educators as having to do something with the real world (Frey, Schmitt & Allen, 2012). In 1988, Archbald and Newman criticised standardised testing and promoted authentic assessments that were relevant to the real world, termed as such if they have a meaning or value beyond success in school (Archbald & Newman, 1988). Wiggins, an educator and researcher,

also defined principles for an authentic assessment, which include replicating the challenges and standards of performance that typically face professionals, being responsive to individual students and school contexts, and revealing achievements on the essentials of the profession (Wiggins, 1989). He also defined an assessment as being authentic if it met specific qualifications, including being representative of the challenges within a given discipline, measuring essential elements while grading instead of small errors, recurring, being worthy of practice, and existing in harmony with school-wide aims. Over the years, many educators and theorists have agreed that an authentic assessment is a more proper and productive approach towards student evaluation (Frey, Schmitt & Allen, 2012). Authentic assessments can be seen in situations that involve a performance task, such as completing a driving test or demonstrating a trade or skill, and in the pharmacy curriculum, such as counselling a patient on a new medication (Hirsch & Parihar, 2014).

In the nursing education literature, allowing students to practice real-world skills in the didactic curriculum using authentic assessments has been shown to build student confidence and aid in the development of knowledge and skill competencies (Wu, Heng & Wang, 2015; Chong *et al.,* 2016). They also helped develop critical thinking skills and increased awareness of caring attributes and communication skills. Therefore, the integration of authentic assessments in the pharmacy curriculum is expected to have similar benefits to those in nursing education; however, to the authors' knowledge, no published studies have addressed the impact of authentic assessments on competency in pharmacy education.

Furthermore, integrating authentic assessments in the pharmacy curriculum may allow students to demonstrate self-efficacy in the skills required in APPE rotations and practice. Confidence can be described as self-efficacy, which is defined as an individual's belief in one's capacity to execute behaviours to produce specific performance attainments (Bandura, 1977; Bandura, 1994; Bandura, 1997). Students' self-efficacy has been identified as a strong predictor of academic performance across all areas and subjects (Usher & Pajares, 2008). Reflecting on students' self-efficacy allows educators to understand how comfortable and confident students feel while completing tasks expected of a pharmacist, which may provide an opportunity for an improved and more targeted curriculum and instructional design.

While authentic assessments are commonly implemented in the pharmacy curriculum in the form of simulation exercises, little has been published on

assessing student ability to perform the PPCP in its entirety during the didactic curriculum. The integration of the PPCP in the didactic curriculum has been seen in some pharmacy curricula using a capstone course, where students demonstrate their ability to perform individual, compartmentalised steps of the PPCP gradually over the course of the term (Phillips *et al.,* 2019). These steps involve activities such as searching an electronic health record, completing drug information questions and completing patient care plans (Saseen *et al.,* 2017). Streamlining the many steps of the PPCP into one course has not been extensively implemented. Additionally, it is not clear how this exercise would affect pharmacy students' self-efficacy. Even though self-efficacy has been associated with academic achievement, the literature evaluating self-efficacy while implementing a pharmacy task in the pharmacy didactic curriculum has yet to be documented. Previous research has described the use of small, individualised components of the PPCP (Margolis et al., 2020); however, the integration of the entire process given as one assessment has not been published. The objective of this study is to evaluate how an authentic assessment impacted student self-efficacy in completing the PPCP in a pharmacy elective course.

Methods

The authentic assessment occurred as an integral part of an elective course, i.e., Advanced Diabetes Care, in the pharmacy curriculum available to second and third-year pharmacy students from 2018-2020. The course aimed at developing the knowledge and ability to assess, manage, educate, and monitor patients with diabetes. Throughout the 2-credit hour term course, students were exposed to various scenarios that would prepare them for the end-of-course authentic assessment, viewed as a cumulative examination that allowed students to apply the fundamental principles learned throughout the course.

The preparation activities held throughout the term prior to the authentic assessment included active learning exercises that allowed students to engage in learning in a hands-on and integrated way. These activities included games that allowed for the application of diabetes knowledge and consisted of the following components: case studies and simulation activities featuring mock patients to practise in a similar format to the authentic assessment, insulin and glucometer training through a hands-on workshop, and lastly, a "diabetes for a week" activity where students simulated living with diabetes by counting carbohydrates, organising a pill box, checking blood

sugar, and calculating insulin doses. Students also participated in group diabetes education presentations, which helped them practise delivering education in a patient-friendly manner. Table I shows the information on course activities and the timeline in which they occurred.

Table I: Course activities and description

Week of course	Activity
1	• Course Introduction
2	• Initiating and adjusting insulin review
3	• Carb counting and meter use
	• Insulin administration and meter workshop
4	• Insulin pumps and Continuous Glucose Monitors
5	• Drug Information Questions
6	• Hospital DM Management
7	• Special Population-Geriatrics, paediatrics, and pregnancy
8	• Collect and patient interview workshop
9	• Assess and Plan
10	• Putting it all together/practice cases
11	• Patient Education Presentations
12	• Final Assessment

The authentic assessment was composed of students completing the PPCP. All students underwent the same authentic assessment process, with the only difference being the variety of patient cases and mock patients (pharmacy residents, fourth-year students, and faculty). The assessment occurred over a period of ninety minutes and was structured similarly to a direct patient care visit in an ambulatory care clinic. In this way, students were ambulatory care pharmacists, completing four main steps. First, the student collected patient information from an electronic health record (EHR). The EHR was delivered through EHR Go, an educational resource allowing instructors to customise patient cases for students to review. The student had thirty minutes to review the patient's EHR and fifteen minutes to interview the patient. After the interview, the student had five minutes to develop a clear treatment plan for the patient and ten minutes to deliver the plan to the patient. Before entering this course, students were introduced to the PPCP components and practised each section of the PPCP in required courses and labs. However, this was the first time in the curriculum that students individually completed the entire process from the start to the end.

Since the authentic assessment was integrated into a pharmacy elective that required a letter grade at the

end for course credit, a quantitative grading rubric was necessary. Overall, the grading rubric assessed the ability of the student to objectively conduct the interview, assess the information, and communicate a plan; however, due to the nature of the assessment, the course instructors and mock patients also subjectively provided feedback. The comments provided by the mock patients provided individualised and more robust constructive feedback, allowing students to understand specific areas of improvement and reflect on their self-efficacy while completing the PPCP.

Student survey

At the end of the course, students were given the option to fill out an anonymous survey to evaluate their confidence and self-efficacy after completing the authentic assessment. Participation in the survey was voluntary, and students were free to provide partial answers. Therefore, not all questions were answered by all students.

Questions 1-5 were rated on a 7-point Likert scale, ranging from strongly agree to strongly disagree, and assessed student confidence in performing various components of the PPCP. Questions 6 and 7 assessed what students learned about themselves after completing the authentic assessment and how the latter would affect their approach to patient care in the future, respectively. These two questions were answered in a free-response format that allowed the students to answer in any way. For Questions 1-5, all responses were quantified by response category. Answers to Question 6 were first categorised by having improved self-efficacy or areas of improvement. Improved self-efficacy responses indicated that the student felt more confident through completing the assessment, while areas of improvement responses reflected that the student recognised opportunities for improvement in completing the PPCP. Responses were then subcategorised into themes that distinguished specific components of the PPCP. Responses to Question 7 were also categorised by themes designated by study investigators.

Each investigator independently reviewed the free-response answers and identified similarities in words and phrases. The final list of themes was determined after the investigators jointly reviewed and compared the independent analyses. All survey data were confirmed and reviewed by all study investigators.

Results

In three terms, a total of 73 students completed the elective course and authentic assessment, and 65 completed the survey. While evaluating the cumulative data from all three terms, survey responses to Questions 1-5 showed that "strongly agree" was the most frequent answer to each question, with almost 100% of students somewhat agreeing with each question. Only Question 2 had one response of somewhat disagree. Overall, the results from Questions 1-5 suggest that students felt confident completing the PPCP after completing the authentic assessment (Table II).

Table II: Response data (Q1-Q5) - Student's self-efficacy in completing selected PPCP components

Students selecting each category	Strongly agree	Agree	Somewhat agree	Neutral	Somewhat disagree	Disagree	Strongly disagree
Q1: After the final, I feel more confident in my ability to identify what I need to collect from a medical record. (COLLECT)	38 (59%)	23 (36%)	3 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Q2: After the final, I feel more confident in my ability to identify what questions I should ask a patient during an interview. (COLLECT)	38 (59%)	23 (36%)	2 (3%)	0 (0%)	1 (2%)	0 (0%)	0 (0%)
Q3: After the final, I feel more confident in my ability to interview a patient using language they can understand. (COLLECT/IMPLEMENT)	45 (70%)	16 (25%)	3 (5%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Q4: After the final, I feel more confident in counselling patients on the use of their medications and medication supplies. (ASSESS/PLAN/IMPLEMENT)	35 (55%)	24 (38%)	5 (7%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)
Q5: After the final, I feel more confident in counselling patients on lifestyle modifications. (ASSESS/PLAN/IMPLEMENT)	41 (64%)	16 (25%)	7 (11%)	0 (0%)	0 (0%)	0 (0%)	0 (0%)

The majority of responses (52%) to Question 6, which evaluated what students learned about themselves after completing the authentic assessment, were categorised as improved self-efficacy. About half of the students reported improvement in communication, while the remaining half identified it as an opportunity for growth. The specific number of responses per subcategory was recorded and analysed (Table III).

Table III: Response data (Q6) - What is one thing you learned about yourself from completing the final in this course?

Improved self-efficacy (n=34)			Areas of Improvement (n=31)		
Subcategory	Theme *Improved confidence in...*	Responses n (%)	Subcategory	Theme *Recognising the need for improvement in...*	Responses n (%)
Communication	Communication with patients	16 (47%)	Communication	Counselling and patient interviewing skills	16 (52%)
Collection of Information	Collecting data from EHR before the patient interview	3 (9%)	Organization	Organization of patient interviews and notes	5 (16%)
Listening	Listening to patients	2 (6%)	Knowledge of Drug and Disease State	Diabetes medications and management	2 (6%)
Knowledge of Drug and Disease State	Diabetes medications and management	9 (26%)	Confidence in Recommendation	Recommending drug therapy and interventions	2 (6%)
Future Career	Practising in the Ambulatory Care setting	2 (6%)	Multi-Task Throughout Visit	Multi-task during Ambulatory Care visit to optimise patient care	2 (6%)
No Subcategory	No clear theme identified	2 (6%)	Collection of Information	Collecting data from EHR before the patient interview	1 (3%)
			No Subcategory	No clear theme identified	3 (10%)

For Question 7, which indicated how the assessment would change student approach to patient care in the future, the most frequent theme was related to the collection of information, with 22% of students stating

they were more aware of what to collect. The second most frequent theme (19%) was related to student confidence in completing the PPCP (Table IV).

Table IV: Response data (Q7)- How is this course final going to affect your approach to patient care in the future?

Subcategory	Theme	Responses n(%)
	By completing the final, I am now...	
Collection of Information	Aware of what to collect from the patient	16 (22%)
Confidence	Confident in how to conduct the PPCP	14 (19%)
Patient-Centred Approach	Aware of taking a patient-centred approach to care	9 (12%)
Structure and Efficiency	Able to have a structured and efficient approach during a patient visit	8 (11%)
Communication	Comfortable with patient-friendly communication	7 (10%)
Listening to Patients and Expressing Empathy	Better at listening to the patient throughout a patient care visit and understanding the concerns of patients with diabetes	5 (7%)
Patient Counseling	Competent in providing medication counselling	4 (5%)
Assessment and Plan	Able to devise an assessment and plan	4 (5%)
Collection from EHR	Aware of what to collect from the EHR	4 (5%)
Knowledge of Drug and Disease State	Motivated to stay up-to-date on diabetes guidelines and disease management	1 (2%)
Future Career	Aspiring to practice in ambulatory care	1 (2%)

Discussion

The use of an authentic assessment in a pharmacy elective course provided students with an opportunity to demonstrate self-efficacy when conducting a PPCP. The PPCP is an essential process for pharmacists, and the ability of students to perform it efficiently and effectively is essential in preparing them for APPE and professional practice. Other studies have demonstrated improved self-efficacy in performing components of the PPCP after completion of a capstone course. In study by Noureldin and the authors (2021), student self-efficacy of three components of the PPCP were evaluated after completion of a capstone course that included topic discussions, written assignments, and presentations (Noureldin *et al.*, 2021). Phillips and the authors (2019) compared self-efficacy of the PPCP at the beginning and end of a capstone course that included patient cases, quizzes, and practical exams; however, students did not perform patient interviews (Phillips *et al.*, 2019). In a study by Smith, the PPCP was incorporated into an interprofessional education-focused capstone course. Student performance using the PPCP with a standardised patient was assessed; however, self-efficacy was not evaluated in this study (Smith, 2020).

This study assessed self-efficacy of the PPCP after completing a simulation that mimicked a realistic ambulatory care encounter conducted by a practising pharmacist from start to finish. First, it had a time

constraint, where students could communicate with the patient before having to step out of the room to prepare a medication plan and explain it to the patient. Second, the assessment featured the student performing the entire ambulatory care visit from start to finish rather than being fragmented. Third, students had access to similar resources available to practising pharmacists, such as an electronic medical record and evidence-based medicine resources.

Through participating in the post-assessment survey, students had the opportunity to reflect on their strengths and confidence gained during the assessment and acknowledged areas for improvement. In this course, students reported feeling confident in all areas of the PPCP after completing the authentic assessment, with communication being the biggest strength they gained. However, they also acknowledged the need for improvement in this area. This result indicates that while the course enhanced their confidence in patient communication, more practice is needed to refine this skill, and students recognised that communication is a continuously evolving process. Potentially, activities could be modified in the elective course in the future to target this area and provide students with more opportunities to practise communication skills.

When students were asked to reflect on how the assessment would change their approach to patient care in the future, the most common response was related to

the collection of information from the patient. Many students commented on the need for an organised approach to collecting data. The process of interviewing a patient is vital to the PPCP, and developing an organised method is essential to ensure that all relevant data are gathered. Thus, this response illustrates the value of providing opportunities for students to practise information collection from patients to continue to be more efficiently organising themselves.

While authentic assessments do have many benefits, there are limitations to implementing them throughout the pharmacy curriculum. Creating authentic assessment cases, instruction guides, and materials for students was time-consuming, as was implementing assessment in the classroom setting, which could become challenging for larger classrooms due to the amount of time and adequate resources necessary for a successful authentic assessment. Mock patients had to be recruited, space had to be reserved for each student to perform the assessment, and faculty graders had to be available. In the spring of 2020, the assessment was completed remotely through Zoom due to the COVID-19 pandemic, which made the recruitment of patient actors easier since no travel or space on the college campus was necessary; recordings of the sessions allowed for increased faculty participation in grading. Thus, as more technology is utilised in the classroom, some of the barriers to implementing an authentic assessment may be reduced.

Limitations and strengths

As with any study, there are limitations. The student survey asked limited questions, only covering five main sections. A broader survey could provide additional insight could. A pre-assessment and a post-assessment could help detect differences in confidence levels before and after the authentic assessment. This method will be used in the future to gather more information on the areas of growth and opportunities for improvement.

Overall, authentic assessments in the pharmacy curriculum allowed students to practice hands-on tasks needed during APPE rotations and professional practice. Authentic assessments can also build confidence in achieving these skills and identify areas of improvement before entering rotations and practice. The authentic assessment implemented in this pharmacy elective course and administered as the final examination also allowed a better evaluation and understanding of students' self-efficacy in completing the PPCP, which was the primary outcome of the course. The integration of an authentic assessment could be similarly administered as final examinations of other courses throughout the pharmacy curriculum, such as pharmacotherapeutics if

resources were allotted to the development of these activities.

Conclusion

An authentic assessment in a pharmacy elective course allowed students to carry out the entire PPCP and demonstrate their self-efficacy in a setting that closely resembled a real-practice environment. Results from the student survey indicated that students felt more confident in their ability to perform the PPCP, specifically in communicating with patients during information gathering and medication counselling. Areas of improvement were also recognised, particularly in communication, which can be targeted in future activities.

Conflict of Interest

No financial disclosures or conflicts are present.

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