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Experiences in Teaching and Learning

Successes and challenges in implementing specifications grading in skills-based laboratory courses: Experiences at two colleges of pharmacy

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ABSTRACT

Background and purpose: Specifications grading, a grading schema focused on mastery of skills, may provide an alternative to traditional grading. Specifications grading uses three components (pass/fail grading, bundles, and tokens) to allow students to demonstrate competency in specific areas as part of competency-based education. The purpose of this article is to outline specifications grading and review its implementation at two colleges of pharmacy.

Educational activity and setting: Two colleges of pharmacy used specifications grading within a first-year skills-based laboratory course. Instructors identified key skills for each course and the minimum performance levels for each grade (A, B, C, etc.). Each college evaluated skills that aligned with course learning objectives.

Findings: Incorporating specifications grading helped better align assignments and assessments to course learning objectives. Instructors felt specifications grading introduced more rigor into the course. Instructors identified four challenges when implementing specifications grading, including: (1) lack of integration into the learning management system, (2) initial student confusion, (3) modifications needed due to unforeseen circumstances, and (4) logistical issues when implementing token exchange. Many of these challenges can be overcome with instructor tracking of passed assignments and earned/redeemed tokens, periodic reinforcement of the grading schema with students, and creating flexibility within the course, especially the first time the schema is implemented.

Summary: Specifications grading was successfully implemented in two skills-based courses. Challenges encountered with implementing specifications grading will be continually addressed. Implementation of specifications grading in other forms of course deliveries (e.g., electives, didactic) may require adjustment and further evaluation.

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Background and purpose

Traditional grading systems, where points are awarded for assignments, tests, and other learning activities and lead to a letter grade (e.g., A, B, C), have long been used in higher education to measure achievement in both didactic and skills curricula. Despite widespread use, studies have suggested little correlation with evidence of student achievement of learning outcomes when traditional grading systems are utilized.[1,2] A recent commentary outlined that traditional grading may lead to deficiencies in accurately measuring student learning, increasing student motivation to learn, providing feedback to students, and correlating grades with performance in experiential settings.[3] With the creation of entrustable professional activities for pharmacy schools, programs are now tasked with identifying, documenting, and assessing pharmacy students' baseline competency (i.e. perform the skill without direct supervision) for key skills.[4–6] Alternate methods of assessment and grading could include pass/fail grading, mastery grading, or competency-based grading. One grading option that can address such deficiencies is specifications grading. Specifications grading is a form of competency-based assessment that allows for the demonstration of student mastery of specific elements of a curriculum.[7] With this grading schema, the instructor determines the skills, knowledge, and abilities a student must obtain within the course. During course delivery, the instructor utilizes the following three components to demonstrate student achievement: pass/fail grading, tokens, and bundles (Fig. 1). All of these components are optional, so the instructor can choose which of these three components to implement. Specifications and contract grading hold several similarities, including having a set of completed assignments that will determine a student's grade, assessments more likely to be graded as pass/fail, and improved student motivation. There are a few differences between these grading schemas, such as linking course grades to outcomes, expectations (or specifications) are outlined at the start of the semester, and each assessment is graded, allowing the instructor to set a minimum bar for passing each assessment.

Until recently, alternative grading systems, including specifications grading, have received little attention in pharmacy education. Recent publications have discussed competency-based grading,[8–10] mastery grading,[11,12] and pass/fail grading,[13,14] yet there is no published research on specifications grading in the pharmacy education or health education literature. Specifications grading has been examined in other science, technology, engineering, and mathematics-based courses.[15–18] Implementation of specifications grading in an undergraduate engineering course resulted in students finding specifications grading easier to understand, in students being more motivated throughout the entire semester, and was generally well-received by the faculty members.[19]

Two authors of this manuscript (MJ, SD) initially learned about specifications grading from a podcast, Teaching in Higher Education, where the hosts interviewed Dr. Linda Nilson regarding her published book (Specifications Grading[7]) about this new grading schema.[20] Previously, the authors' courses used a traditional point-based grading system that the authors felt did not adequately measure achievement of learning objectives. After learning about the benefits of specifications grading over traditional grading, the authors implemented this grading schema (as described below) at Texas A&M University (TAMU) School of Pharmacy. This grading schema was selected over others as it allowed students to demonstrate mastery of course objectives, reduced faculty grading, and promoted higher student motivation to learn while maintaining high academic rigor. Pass/fail grading (which is a component of specifications grading) was not selected as the primary grading schema as the institution did not have institutional permission to alter these courses to be pass/fail courses. The authors from TAMU presented the grading schema as a part of a webinar to other pharmacy educators for potential implementation in skills-based courses. After attending the webinar and reading the Nielson text, the authors at Mercer (SM, JA) decided to implement this grading schema. The Mercer authors consulted with the TAMU authors during the design process of the Mercer course. Like TAMU, Mercer was unable to implement a pass/fail grading system, thus specifications grading was attractive.

This article outlines how these two colleges of pharmacy, TAMU School of Pharmacy and Mercer University College of Pharmacy, implemented specifications grading in a first-professional year skills-based course. It includes a description of how each program

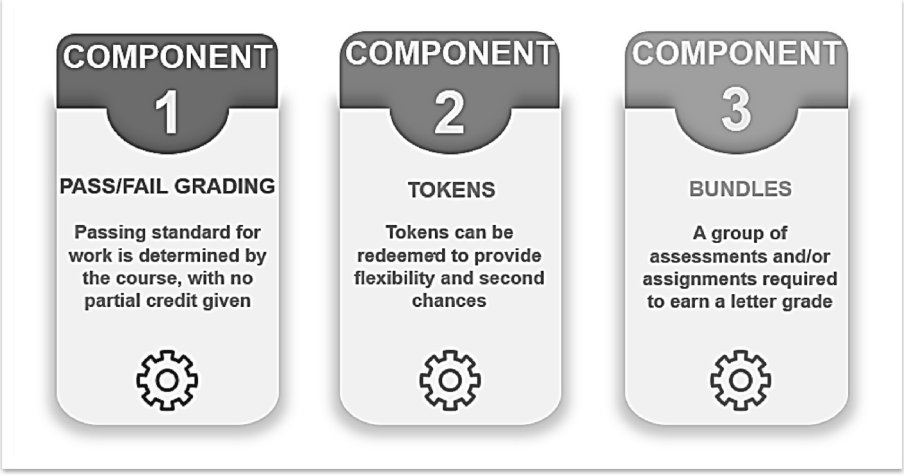

Fig. 1. Specifications grading component overview.

designed the grading schema around the three components of specifications grading and provides some lessons learned in this process.

Educational activity and setting

At both the institutions, skills-based laboratory courses are designed to prepare first professional year pharmacy students to be "practice-ready" for their community introductory pharmacy practice experiences (IPPEs). At TAMU, specifications grading was used in a two-course series, while at Mercer, it was introduced in the first of a new series of six courses. Both institutions are four-year programs, with three years of didactic coursework and one year of advanced pharmacy practice experiences. Additional details about the implementation at each school are outlined below and in Table 1.

Both courses implemented specifications grading as the overarching grading schema. During course development, each institution's course instructors used backward design to identify skills necessary for a student pharmacist on their community IPPE. Once identifying these skills, instructors identified the necessary summative assessments. Once the summative assessments were selected, the course instructors developed the course learning objectives to align with the desired results, which included the learning experiences and instruction (e.g., lecture and/or laboratory sections). Once the learning objectives were developed, specific criteria for the specifications grading schema were created. The specifications grading schema incorporated the following components: pass/fail grading, bundles, and tokens.

For the component of pass/fail grading, instructors determined specifications or grading criteria that defined satisfactory work for each assignment and assessment in the course. When work was submitted, instructors grade based on whether the predefined specifications were met or not. There is no partial credit.

For the component of bundles, once pass/fail standards are selected, instructors decide how students would earn letter grades (or bundles) for the course. To earn a specific letter grade, students had to complete all the criteria listed in each column associated with a grade bundle. Even missing one criterion would move students to the corresponding letter grade for the lowest component completed. Each institution's bundle consisted of the following components: (1) attendance, (2) completion of assignments based on an established pass/fail criteria, and (3) high stakes assessments tied to course competencies.

For the component of tokens, students could use tokens in exchange for a redo of missing assignments or to earn a passing grade on an assignment. The course establishes the token economy, meaning tokens can be earned by the student or freely given by the instructor.

Implementation at Texas A&M University

Specifications grading was implemented in a first-year pharmacy skills-based course series that occurs before the community IPPE. Previously the course used traditional grading, but the instructors felt that the old grading system did not emphasize competency in skills and were interested in implementing specifications grading to focus on competency of skills. Table 2 outlines the use of specifications grading at TAMU.

Table 1
Summary of pharmacy skills lab courses at Texas A&M University School of Pharmacy and Mercer University College of Pharmacy.

	Texas A&M University School of Pharmacy	Mercer University College of Pharmacy
Average class size	120 students split between two campuses	125 students on a single campus
Course length		15 weeks
Course schedule	Lab section: 1.5 h/week	Lecture: 4 h/week Lab section: 2 h/week
Course learning format	Blended learning format that uses a weekly module-based design that combines pre-laboratory learning with face-to-face laboratory instruction and performance/assignment-based assessment	Blended learning format that uses a weekly large class lecture/activity/assessment session (lecture) with additional face-to-face laboratory instruction and performance/assignment-based assessment (lab section)
Summative assessment stations	• Tele-RX (students receive and transcribe a prescription order from a physician's office) • SBAR (students identify a drug therapy problem and communicate it to a provider using the SBAR tool) • Two prescription verifications (students verify 3 prescriptions each for legality and appropriateness using MyDispense)	• Drug information (students provide a response to a drug information question) • Prescription verification (students verify 2 prescriptions each for legality and appropriateness using MyDispense) • PPCP collect (student use SCHOLAR MAC in MyDispense to determine appropriateness of a self-care product) • Vital signs (students collect vital sign data including blood pressure, temperature, pulse, respiration rate) • Pharmacy calculations (students calculate day supply and dosing information) • Drug knowledge (students identify nonprescription products for appropriate brand name, generic name, and indication)
Final summative assessment		Yes

PPCP = Pharmacists' Patient Care Process; SBAR = situation, background, assessment, recommendation.

Pass/fail grading. TAMU used the following four components as pass/fail grading. (1) Pre-lab formative assessments required students to score 100% to earn credit towards tokens (these formative assessments had unlimited attempts). The highest attempt for each assessment was noted. These assessments did not count towards the final grade, but a grade of 100% was required to earn tokens. (2) In-lab, graded assessments were completed once each lab period. Most in-lab assessments required an 80% pass, while others were for a completion grade (i.e. complete or incomplete). (3) Successful completion of assignments, including an interprofessional education activity and end-of-course reflection, was required to pass the course. (4) Finally, students were required to pass all stations of the high-stakes summative assessment (objective structured clinical examination [OSCE] format) to pass the course. Two stations used a standardized rubric for grading, and one used a multiple-choice assessment to ensure students were learning about the appropriate dispensing of medications. Passing scores were determined by course faculty for each station.

Bundles. The grading schema at TAMU included four bundles of grades (A, B, C, and F). To earn the letter grade, students had to complete all the criteria listed for the specific bundle. Even missing one criterion would move students to the corresponding letter grade for the lowest component completed. For example, requiring remediation for one summative assessment station would automatically drop students to a "B" grade. TAMU used three components for bundles. (1) Attendance was expected, and excused absences were addressed on an individual basis. Students were allowed one unexcused absence without impacting the course grade. (2) Students were required to complete 10 of 11 in-lab assessments at an 80% ($<$ 80% fail; $\geq$ 80% pass) to earn an A for the course. Thus, we automatically dropped one assessment without affecting the grade. Each assessment not completed at 80% could drop the letter grade. In addition, for some assignments, completion of the activity (see the successful completion of minimum standards above) gave the student full credit. (3) A high-stakes summative OSCE was linked to course competencies. Students were required to pass the OSCE either on the first attempt or through remediation to pass the course. Passing scores were determined by course faculty for each station. For each OSCE station requiring remediation, the student dropped one grade bundle.

Tokens. Tokens were incorporated to allow for "redos" for in-lab assessments that did not meet the minimum grade requirement. Students could redeem tokens to redo missing assignments or to earn a passing grade on a quiz/assignment. During the first iteration of the course, each student was given two tokens. In the second iteration, students could earn a maximum of two tokens. A token was earned by passing four pre-lab formative assessments. At the end of the semester, a token exchange window was created, consisting of a one-week window where students could exchange each token to redo an in-lab assessment. Students were given the same assessment to complete using previously provided formative feedback.

Implementation at Mercer University

Before the implementation of specifications grading, students at Mercer had separate courses focused on the practice of pharmacy (didactic course) and the skills of a pharmacist (skills course). Mercer implemented a renewed curriculum in fall 2020 that combined these previous courses into one skills-based lab course. Mercer included this skills-based course in each semester of each didactic year (i.e. first-year through the third year). At Mercer, IPPEs are offered during the summer months between years (e.g., community IPPE is administered over the summer between a student's first- and second-professional year). Specifications grading was planned to be used in all six skills-based courses to ensure individual mastery of identified skills. Table 3 outlines the use of specifications grading at Mercer.

Pass/fail grading. For pass/fail grading, Mercer used three components. (1) Students completed in-lab assignments during the lab period. Formative feedback was provided to students, but assessments were graded as submitted/not submitted. A student's letter grade was determined by the number of in-lab assessments submitted. (2) All students must complete certifications in HIPAA (The Privacy Act), BLS (Basic Life Support for the Healthcare Provider), and vital signs assessments to pass the course. (3) Students were required to pass all stations of the high-stakes summative assessment (OSCE format) to pass the course. The summative assessment was four stations, with two stations utilizing a rubric and two stations utilizing structured-response questions. Passing scores were determined by course faculty for each station.

Bundles. Mercer has six grades (A, B+, B, C+, C, F). To earn the letter grade, students had to complete all criteria listed in each of three bundles as follows. (1) Mercer required full attendance and engagement for students for all class and lab sessions. For attendance, students were allowed to have excused absences and tardies if communication with faculty was appropriate, as described in the course

Table 2
Texas A&M University School of Pharmacy course grading schema.

	Earn A	Earn B	Earn C	Earn F
Unexcused absence	1	2	3	4
Earn $\geq$80% on in-lab assessments (n = 11)	10	9	8	$<$ 8
Earn 100% on pre-lab formative assessments (n = 9)[a]	8	7	6	$<$ 6
Pass summative assessment stations (n = 4)	No remediation required	Successfully remediate 1 station	Successfully remediate $\geq$2 stations	Does not successfully remediate
Complete interprofessional activity and end-of-course reflection	Yes	NA	NA	No
Complete peer grading assignments (n = 2)	2	1	0	NA

NA = not applicable.
[a] There were unlimited attempts available to students before deadline.

Table 3
Mercer University College of Pharmacy course grading schema.

	Earn A	Earn B+	Earn B	Earn C+	Earn C	Earn F
Unexcused absence or tardy	0	1	NA	2	NA	> 2
Engagement in labs ($n = 14$)	14	12 or 13	NA	10 or 11	NA	< 10
Average formative assessment grade (Drugs)	≥ 89.5	86.5–89.4	79.5–86.4	76.5–79.4	69.5–76.4	≤ 69.4
Average formative assessment grades (Calculations)	≥ 89.5	86.5–89.4	79.5–86.4	76.5–79.4	69.5–76.4	≤ 69.4
Submitted in-class assessments ($n = 27$)	27	22–23	NA	17–18	NA	< 17
Submitted all certifications (HIPAA, BLS, VS)	Yes	NA	NA	NA	NA	No
Pass summative assessment stations (n = 4)	No remediation required	Successfully remediate ≥1 station	NA	NA	NA	Does not successfully remediate

BLS = Basic Life Support for Health Care Providers; HIPAA = Health Insurance Portability and Accountability Act; NA = not applicable; VS = vital signs of temperature, heart rate, and blood pressure.

syllabus. Engagement during lab sessions was assessed by the same course instructors and included students paying attention during lectures and activity times (e.g., not on a cell phone or laptop, not surfing the internet). (2) Assignments were marked as complete or incomplete based on submission. Annotated keys were provided for some assignments, and others were evaluated via a rubric with scripted feedback. For certain formative assessments, the average for each formative assessment type (e.g., calculations) determined the bundle the student would fall into. For example, if the student earned an average grade of 80 in one category and an average grade of 70 in another category, the student would receive the grade bundle to the lower grade (the highest the student could earn is a C for the course [Table 3]). (3) A high-stakes summative OSCE was linked to course competencies. If performance on the OSCE required remediation of ≥1 station, the student dropped one grade bundle. To successfully pass the course, students had to pass the summative OSCE either on the initial attempt or on the first remediation attempt.

Tokens. Formal tokens were not implemented at Mercer, but students were given one free pass with no grade penalty for not submitting an assignment. An electronic spreadsheet (outside the learning management system) was used to track absences, tardies, and free passes.

Data collection

After the course, students completed evaluations using each program's predefined course evaluation policy and processes. Data from these course evaluations were provided to course coordinators based on the institutions' predefined course evaluation policies and processes. In addition, course instructors at each institution met regularly to discuss challenges and barriers during and after the course to make ongoing improvements. Successes, challenges, and solutions identified were discussed among the authors and prioritized based on the potential to be experienced by other institutions that implement specifications grading.

Findings

Successes

Overall, both institutions found positive effects with implementing specifications grading in their respective skills-based laboratory courses. First, we found incorporating specifications grading into the course grading schema helped better align assignments and assessments to course learning outcomes. Second, we felt specifications grading introduced more rigor into our skills-lab courses because the focus shifted towards achieving baseline competency rather than point accumulation. We have gained more confidence that a student earning an A in the course would be able to demonstrate significantly greater competence in the concepts and skills than a student earning a C. Third, while the grading of assessments was still occurring, the final score for formative assessments was pass/no pass, which required faculty to create clear rubrics and checklists to set transparent expectations. The inability to earn partial points was beneficial in minimizing student requests for grade challenges and shifting the students' focus from a final grade to mastering a skill. For the requests that were received, the conversation shifted more towards how the assignment might be improved to meet the specifications rather than a space to lobby for a higher score. We felt students valued the feedback more because it became a vital element for them to understand why they did not pass a particular assignment. Lastly, at TAMU, most students commented (within course evaluations) on liking the idea of second chances through the use of tokens, which they felt lowered their anxiety. We also felt using tokens allowed for the normalization of struggle in the learning environment and created a safer space for learning.

Challenges

While we are staunch advocates of specifications grading schema in our skills-based laboratory courses, implementing this grading schema came with some challenges.

Challenge #1: no straightforward integration of specifications grading into the learning management system. Learning management

systems (LMS) typically calculate grades by weighting the average scores of various course elements and typically cannot calculate grades from a specifications grading schema. This led to the following three challenges: (1) students could not readily review their grades at any given time, (2) the LMS could not automatically calculate final course grades, and (3) the LMS could not track tokens. Thus, course coordinators had to calculate grades manually and track earned tokens using an external spreadsheet.

Challenge #2: new grading schema can lead to initial student confusion and preference for the traditional grading schema. At both institutions, student course evaluations showed that some students expressed initial confusion with the passing expectations for various activities. For example, some assignments required students to achieve a minimum grade to pass, some only required completion, and some were averaged. Also, some students did not initially understand that all components of a bundle had to be completed to earn the corresponding letter grade for the course. Lastly, some students felt the grading system in the course was too harsh and thought a traditional grading system would be more lenient. This feeling may be because certain assessments in the bundles directly impacted the course letter grade. For example, at TAMU, students must pass all summative assessment stations the first time to be eligible for an A in the course. At Mercer, the averages for the formative assessments (e.g., drugs, calculations) essentially determined the course letter grade.

Challenge #3: modifications and adjustments occurring during course delivery due to unforeseen circumstances. In our experience, the first implementation required the most adjustments. Both institutions used the process of backward design to design their respective courses.[21] During the course offering, changes were made in response to solicited and unsolicited feedback from students to ensure students were not disadvantaged due to the initial implementation of specifications grading. Feedback came from student emails, focus groups, and post-lab conversations. For example, at Mercer, the course coordinators changed the syllabus to allow one late assignment submission without a penalty. This change was implemented after the course started to address student concerns regarding the increased rigor of this new grading schema. At both institutions, unforeseen circumstances and scheduling conflicts prevented a component of the bundle from being completed during the semester. As a result, course coordinators had to modify the published bundles and communicate the changes to the students.

Challenge #4: logistical issues with the implementation of tokens. Only one institution implemented tokens. While the implementation of tokens in the course was overall well-received by the students, we did have to address several questions related to logistics, including: (1) when do you allow for the token exchange, (2) how do you release assessments for resubmission, and (3) how do instructors ensure only the exact number of tokens earned are exchanged? The token exchange window allowed students to resubmit an assignment that did not meet passing criteria during this one-week window. In our experience, students appreciated having the opportunity to redo unsatisfactory formative assessments before a summative assessment. The process of releasing the assessment for resubmission varied based on the assessment. We kept track of the number of tokens exchanged in a spreadsheet external to the LMS which was helpful, as several students tried to resubmit more assessments than the number of tokens earned. Considering instructor workload, it was estimated to take approximately one hour to review the LMS, identify the students who did not earn a passing grade, and give them an extra attempt at the assessment. Most in-lab assessments were auto-graded by the LMS; however, in-lab assessments that were manually graded also required manual grading on the second attempt, slightly increasing the workload. It was noted that 96% of students eligible for resubmission met the "passing" criteria when given a second attempt.

Discussion

We are continually revising our specifications grading schema. After the first implementation of specifications grading, we identified some potential solutions to the identified challenges and outline these solutions below.

Challenge #1: spreadsheets can be used to track grading components and student course performance.

Unfortunately, many available LMS are not set up to accommodate the bundled nature of assignments in specifications grading. Because of the increased workload that will likely come with the initial implementation of this new grading schema, a mechanism to track the various components and student course performance must be established early on to minimize grading delays. While this is not ideal, an external spreadsheet can be used to track the various assignments and activities and calculate the final course grades. The information can be uploaded into the LMS gradebook for students to view. Depending on the LMS, there may be various ways to denote whether a student has met the specifications of an assignment in the grade book, such as "0/1," "pass/not pass," "satisfactory/unsatisfactory," or "complete/incomplete." Regardless of the mechanism used, course coordinators must teach students how to interpret the grade book and periodically reinforce how the grading schema works throughout the semester so students can determine and know their course's standing.

Challenge #2: give students clear details on the grading schema and periodically reinforce specifications grading to ensure student understanding; if needed, consider revising the grading schema.

Getting students to buy into a new grading schema like specifications grading can be challenging. It is beneficial to describe the specifications grading scheme during the verbal introduction to the course and in the printed course syllabus. Three main areas should be emphasized and reinforced: (1) the passing standard for each activity, (2) the components of each bundle that must be completed to earn the letter grade, and (3) how each activity fits into the grading scheme. Lastly, courses must follow a strict nomenclature regarding the naming of assignments and activities. Student confusion will likely lessen when all course instructors use the same nomenclature. Consistency in terminology among the course instructors, syllabus, activity, and gradebook, is necessary. To encourage student acceptance, it helps to outline to the students the importance of achieving baseline competency in the areas and how the course objectives relate to becoming a practice-ready graduate of a pharmacy curriculum. Both colleges are revising the grading schema based on student feedback. In subsequent offerings, TAMU will allow three tokens to be redeemed for one summative assessment remediation and Mercer will ensure all summative assessments contribute equally to the course grade.

Challenge #3: create flexibility to account for several factors such as deficiencies in instruction or content delivery, miscommunication, and narrow criteria set due to limited experience.

Adjustments and modifications are necessary, especially if this is the first-time implementing specifications grading. When developing the course, it is vital to take the approach of outcomes-based course design, such as backward design, to identify the key learning outcomes and appropriate assessments that will be included in the course. Reviewing solicited and unsolicited feedback from students and frequently monitoring their course progression is essential. Solicited and unsolicited feedback from students and data on course progression may reveal some unanticipated consequences requiring modifications to the grading schema. In summary, it is advisable to critically monitor the first implementation of specifications grading and not hesitate to be flexible in the grading schema, so students are not disadvantaged while still aiming to preserve course integrity.

*Challenge #4: identify a platform to track earned and redeemed student tokens (*e.g.*, spreadsheet) and re-release assignments for "redos" so instructors can track the number of redeemed tokens.*

Tokens may minimize student anxiety, especially with the first implementation of specifications grading. Our suggestions to overcome logistical issues of the token exchange are to (1) identify how your LMS might handle assignment resubmissions, (2) ensure students and course coordinators can track the number of tokens earned and redeemed, and (3) reinforce with students how "token exchange" will work. Taking a proactive approach by setting up your token economy during course design may eliminate many issues that might appear mid-semester.

Next steps

At both institutions, the authors and other course instructors met at the end of each offering to discuss the grading schema and make necessary adjustments for the next offering. One change that continues to be made is how to simplify the grading schema and bundles to help students understand the grading schema and streamline the final grade calculation process. Specifications grading is planned to be used in our courses and possibly expanded into other courses with the bundles altered to fit course learning outcomes.

Implications for the academy and research

Specifications grading is an alternate grading schema that can be used in skills-based laboratory courses. This is the first manuscript in pharmacy education that outlines the use of specifications grading in this manner. Because of this, the authors focused on describing how each program implemented this grading schema into their courses. Outside of instructor viewpoints and student feedback, the authors did not identify any optimal metrics that could be used to evaluate this grading schema. Additional research needs to be undertaken to determine the measurable impact of specifications grading on student experiences and outcome achievement. As more discussion in academic pharmacy ensues around competency-based learning and curricula, there is increased movement to explore other grading schemas beyond the traditional grading system. Specifications grading has been successfully implemented in non-pharmacy didactic courses[15–18]; its flexibility may lend itself well for adoption into multiple areas within a curriculum, including skills-based, didactic, and experiential courses. Our work provides suggestions and lays the foundation for implementing specifications grading, an alternative to traditional grading. Finally, similar to other educational activities that have been implemented for the first time, the use of specifications grading did require a higher workload for faculty. While it was not directly assessed, the authors noted that each program needed to dedicate more time and energy into the design and development of our courses.

Summary

This paper described how specifications grading was integrated into skills-based laboratory courses at two colleges of pharmacy. Bundles improve the transparency of course learning outcomes and expectations for learners. Lastly, tokens add flexibility and second chances which have the potential to reduce student stress and incentivize them to use feedback to improve their work. Challenges with course development and student acceptance will be continually addressed with future iterations of the courses.

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CRediT authorship contribution statement

Merlyn L. Joseph: Conceptualization, Writing – original draft, Writing – review & editing, Visualization. **Susan W. Miller:** Conceptualization, Methodology, Resources, Writing – original draft, Writing – review & editing, Visualization. **Sandy Diec:** Conceptualization, Methodology, Validation, Resources, Writing – original draft, Writing – review & editing, Visualization. **Jill M. Augustine:** Conceptualization, Writing – original draft, Writing – review & editing, Visualization.

Declaration of Competing Interest

The authors declare that there is no conflict of interest.

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