Wake Up! Your PDQ is Due!

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ABBREVIATIONS: CLS = clinical laboratory science; PDQ = pre discussion quiz.

INDEX TERMS: active learning; clinical laboratory science; instructional design; student engagement.

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BACKGROUND

Student engagement in the classroom can often be an elusive goal. We as faculty in a four-year university-based clinical laboratory science program were noticing a trend of more students coming to class unprepared. In an effort to increase student engagement in two different pre-professional practice clinical laboratory science (CLS) courses, the pre-discussion quiz (PDQ) was implemented as a curricular component for enhancing student engagement. This was done as an active learning strategy to motivate students to read the material and respond to a series of questions in preparation for discussion before they came to class. A review of educational literature suggests intrinsically motivated learning enhances the learning process. It is suggested this intrinsic motivation is linked to such factors as the perception of personal control, self-efficacy, and the perception of relevance.[1] These instructional strategies should give the learner some control over sequence of instruction and pace,[2] and some even believe they should not be optional.[3] The use of incentive-based preparation exercises has been found to significantly improve student engagement and provide an effective means of assessment.[4]

OVERVIEW

The pre discussion quizzes (PDQs) were delivered via WebCT® in undergraduate CLS immunology and chemistry courses. Each course was 16 weeks long, met twice a week at 8:00 AM during the fall semester, and included 24 in the student cohort. Most students were at junior status with a few seniors and an occasional sophomore. The cohort included both native students, e.g., those students who began their post secondary experience at this institution, and transfer students from other two-year and four-year institutions. Each PDQ was made available to students as early as 48 hours before and up to 15 minutes before class began. Once the deadline for submission of the PDQ had passed, students were able to print the PDQ including both questions and answers to use as a resource when studying for the subsequent exam.

In general, the PDQs covered one, two, or three chapters in the text with four to five key points per chapter used as the foundation for the questions. Most of the questions included in the PDQ were basic recall questions. Often the information included in the PDQ would later be used in an exam question which was usually delivered as an application, synthesis, or evaluation question.[5] Students were required to answer each PDQ question within one minute of accessing the questions in WebCT®. Most questions were multiple choice with a range of 8 to 15 questions per PDQ. Students were allowed to take the timed PDQ only once. The PDQ was not proctored and students had been made aware of the penalties for dishonesty including collusion. The points a student achieved on the individual PDQs were added to the total points for the course. By using WebCT® for the delivery of the PDQ, the timing factors were never an issue. The quiz opened and closed at a specific time and students could view the time frame on a continual basis.

RESULTS

The majority of students took their PDQ within 12 hours of the individual class discussion but before the 60 minute interval (Figure 1). In the immunology course this meant students were taking the PDQ sometime between 8:00 PM Sunday evening and 6:45 AM on Monday morning. For the chemistry course, students were taking the PDQ sometime between 8:00 PM on Wednesday evening and 6:45 AM on

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Thursday morning. Only 70% of students completed the PDQ during the first week in the immunology course and 75% in the chemistry course. Once students realized the value in both content and points, the participation level increased to 100% after the first three weeks in both courses.

Additionally, the mean scores on the subsequent exams increased for students using PDQs compared to the previous cohort of students prior to PDQ implementation (Figures 2 and 3). The mean score increased on all but one of the immunology exams and increased on all three of the chemistry exams. The content on each exam and the type of questions did not change from year to year. The exams were never made available to either cohort of students other than in the instructor's office with both the student and the instructor present for a meaningful discussion about the individual student's responses on the exam. While increasing exam scores was not the primary objective, it was a value added outcome.

DISCUSSION

Through implementation of the PDQ, students in both pre-professional practice immunology and chemistry CLS courses made the choice to read the material before the beginning of class and come better prepared to discuss the material. The concept of opening the book before class and not relying solely on the lecture material during class was not a popular one with the cohort of CLS students when it was first implemented. Perhaps put more accurately, in the beginning students approached the PDQ challenge "kicking and screaming all the way". However, it was our observation students came to rely on the PDQs as yet another resource in narrowing a large amount of content into a more manageable unit of information. Comments from student evaluations in other courses that did not use the PDQ as an active learning strategy included:

- "I really miss the PDQs, they helped me focus."
- "Why doesn't every course have these (PDQs) available?"
- "Suggestion for next year: Make PDQs for Blood Bank too."

Once students realized the content and points were valuable to their overall success in the course, many students became part of the solution to achieving student engagement instead of part of the problem of taking up space and never contributing. If students were not going to be in class the morning the PDQ was to be completed, they were required to contact the instructor before class either via email or telephone regarding the reason for their absence in order to protect the points earned on the most recent PDQ. If students completed their PDQ before the deadline but failed to come to class that day without contacting their instructor, the PDQ points were forfeited. This practice also addressed a professional behaviors component for pre-professional practice CLS students.

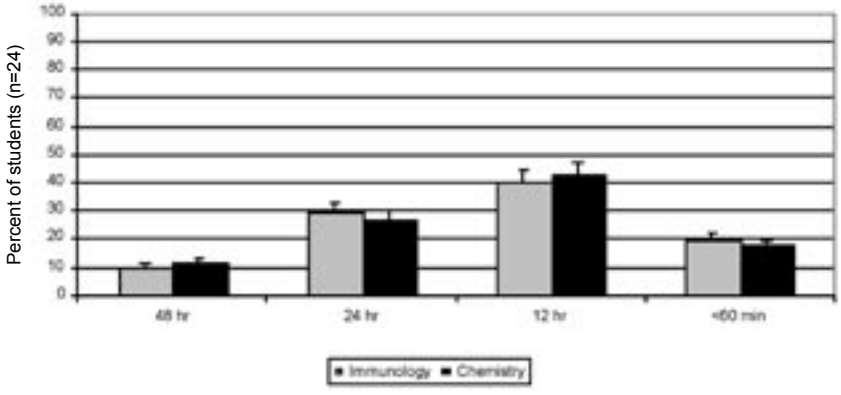
Each instructor noted increased student engagement in their respective course. Both instructors felt the students were asking better questions and commenting on content whereas before the instructors were basically lecturing to an often unresponsive group of students. With this positive outcome, instructors could then present application scenarios where students could apply theory to real-life situations in either a group setting or individually rather than spend time discussing basic information. Students enjoyed working through the scenarios especially as part of a group dynamic where they were engaged as full partners.[6]

In these two content-heavy courses, the PDQ did help to increase student engagement on a weekly basis which met the primary objective for implementing the PDQ. The entire PDQ experience can perhaps best be summed up by the student quote: "I had to read that whole chapter to answer that little PDQ."

CONCLUSION

Many active learning strategies have been suggested for increasing student

Figure 1. Time to completion of PDQ



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engagement.[7,8] The PDQ is one strategy that can be used in content-heavy courses with students who are reluctant to take on the task of preparing before the class discussion. In comparison to other student engagement strategies, from the instructor perspective, creating and implementing the PDQ was a fairly simple process which required minimal time with maximum benefits. The use of technology via WebCT® enhanced the process and provided the student a dual advantage of immediate feedback and future use of the information as a study tool.

While these results are from very discipline-specific courses, we feel there is a broad application for the PDQ in most courses throughout any curriculum. Adaptations to this instructional design might include variations in timing such as decreased or increased frequency and time allotted for each question. Future inquiry into the correlation of PDQ question to associated exam question could provide insight into challenging curricular material that might need useful repetition. While this instructional design delivery used WebCT®, other web-based instructional courseware could be used as the instructional delivery format.

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Figure 2. Mean exam scores in immunology

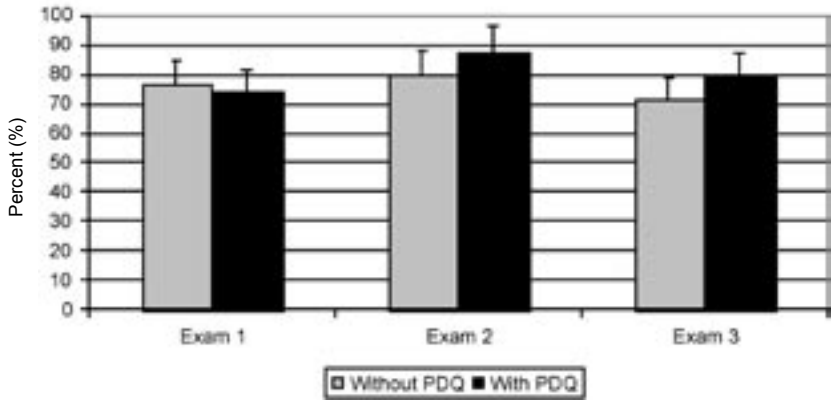
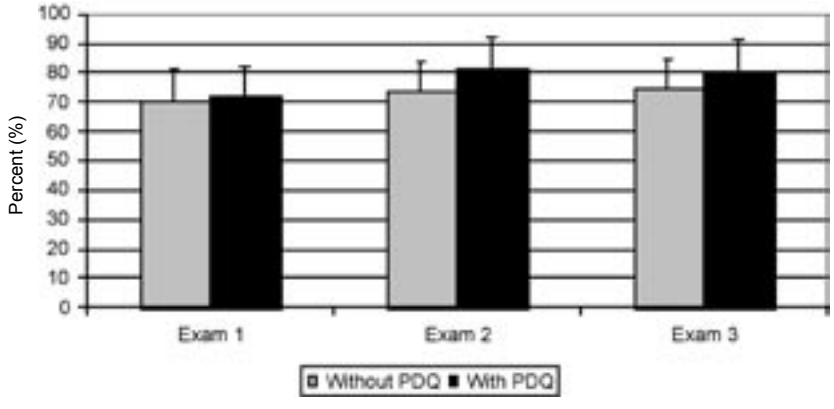


Figure 3. Mean exam scores in chemistry



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