The Intersection of Pharmacokinetics and Computer Programming: Designing Software for Calculations in Pharmaceutical Education

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INTRODUCTION

Online tools for pharmacokinetic practice problems are proprietary or limited in scope and flexibility of design. We developed a web-based tool to create pharmacokinetic problems with adjustable input variables to generate numerous accurate permutations. The student interface allows for flexibility of topics, tactile interactions, and curriculum wide usage.

METHODS

An online platform was developed by university programmers with customizable mathematic variables. It generates problem sets from basic kinetics to complex dosing regiment with an option to give a pre-determined acceptable percentage of error. Design of the student interface was created to allow selection of PK topics to practice, the ability to print for tactile learners, and access throughout their 4-year enrollment.

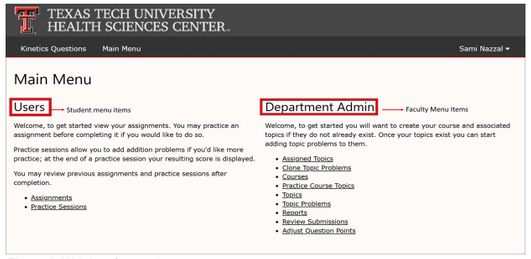

Figure 1: Web interface main page.

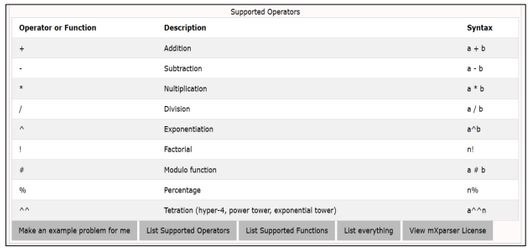

Figure 2: Sample of mathematical operations available.

FACULTY VIEW

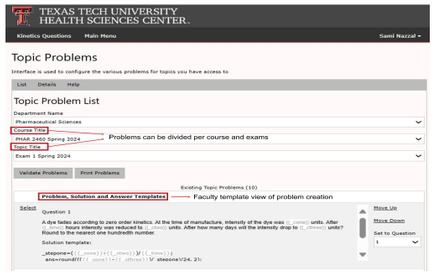

Figure 3: Image illustrates customization of settings allowing faculty to choose course name, content topic and view item creation.

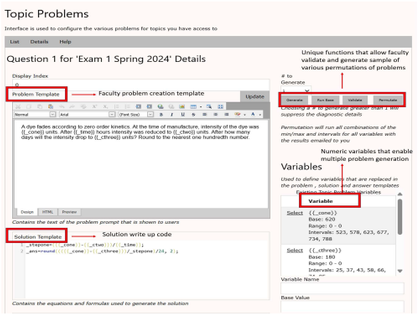

Figure 4: Image illustrates problem template creation settings, coding language for problem solution and gives faculty flexibility of variables within problems.

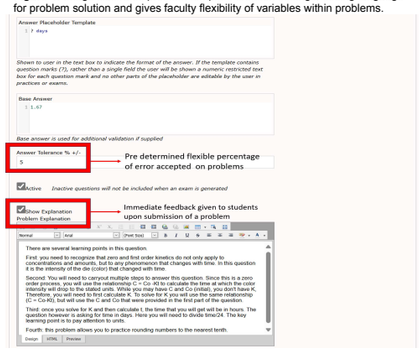

Figure 5: Image illustrates optional settings allowing acceptable percentages of error and solution feedback

STUDENT VIEW

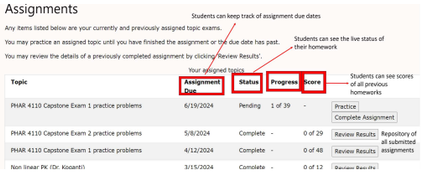

Figure 6: Student view of pending and completed assignments.

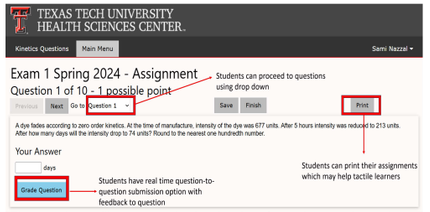

Figure 7: Image illustrates navigational options for students to choose between ability to print for tactile learners and instant submission for grading.

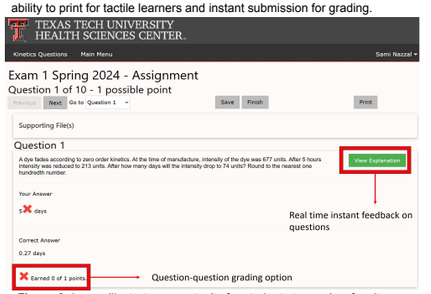

Figure 8: Image illustrates opportunity for students to preview faculty explanation of answer and their grade.

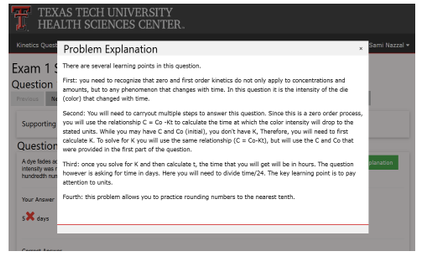

Figure 9: Students get optional detailed faculty feedback on all questions.

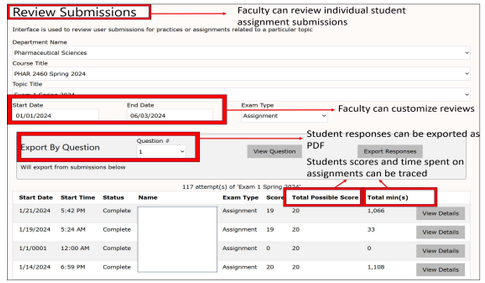

Figure 10: Image illustrates ability for students to review their submitted assignments and practices at any time.

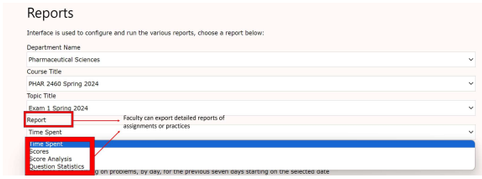

Figure 11: Image illustrates faculty view of reporting options.

RESULTS

We developed a FERPA compliant web-based platform for kinetic calculations. Mathematical operations such as exponents, square root, factorial, Log, and Ln, etc. were coded in software instructions to increase kinetic content flexibility. Student reports included response, correct answer, number of practices generated, and time between assignment generation and submission for faculty monitoring.

CONCLUSION

This software creates variable pharmacokinetic content to meet the needs of the pharmacy curriculum. Since problems generated are student specific, students were forced to practice independently but had access to as many problems as needed. The flexibility of this software allows not only for use in pharmacy education but potential use in other areas of health science curriculums as well, such as OSCEs and NAPLEX review.