A Virtual Clinical Pharmacology Module for Medical Students to Review, Prescribe and Order Diabetic Drugs

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BACKGROUND

- Prescription errors lead to medical errors.
- New doctors are more than twice as likely to make an error in prescription than senior doctors.
- Online self-learning modules can improve prescribing competency.
- In North Carolina, 12.4% of the adult population have been diagnosed with diabetes.

INTRODUCTION

- In the Brody medical curriculum, a medical pharmacology course is delivered in the second-year medical curriculum.
- The medical pharmacology course content for each drug class includes indications for use, mechanism of action, metabolism, adverse effects, drug-drug interactions, and contradictions.
- However, as medical students enter the third- and fourth-year clinical rotations, other pertinent information such as dosing and ordering drugs in the electronic health record (EHR) become applicable skills for residency. These skills are not taught previously in the medical curriculum.
- The goal of an online clinical pharmacology module is to review content from the previous medical pharmacology course and add content to build skills for residency such as dosing and ordering in the EHR.
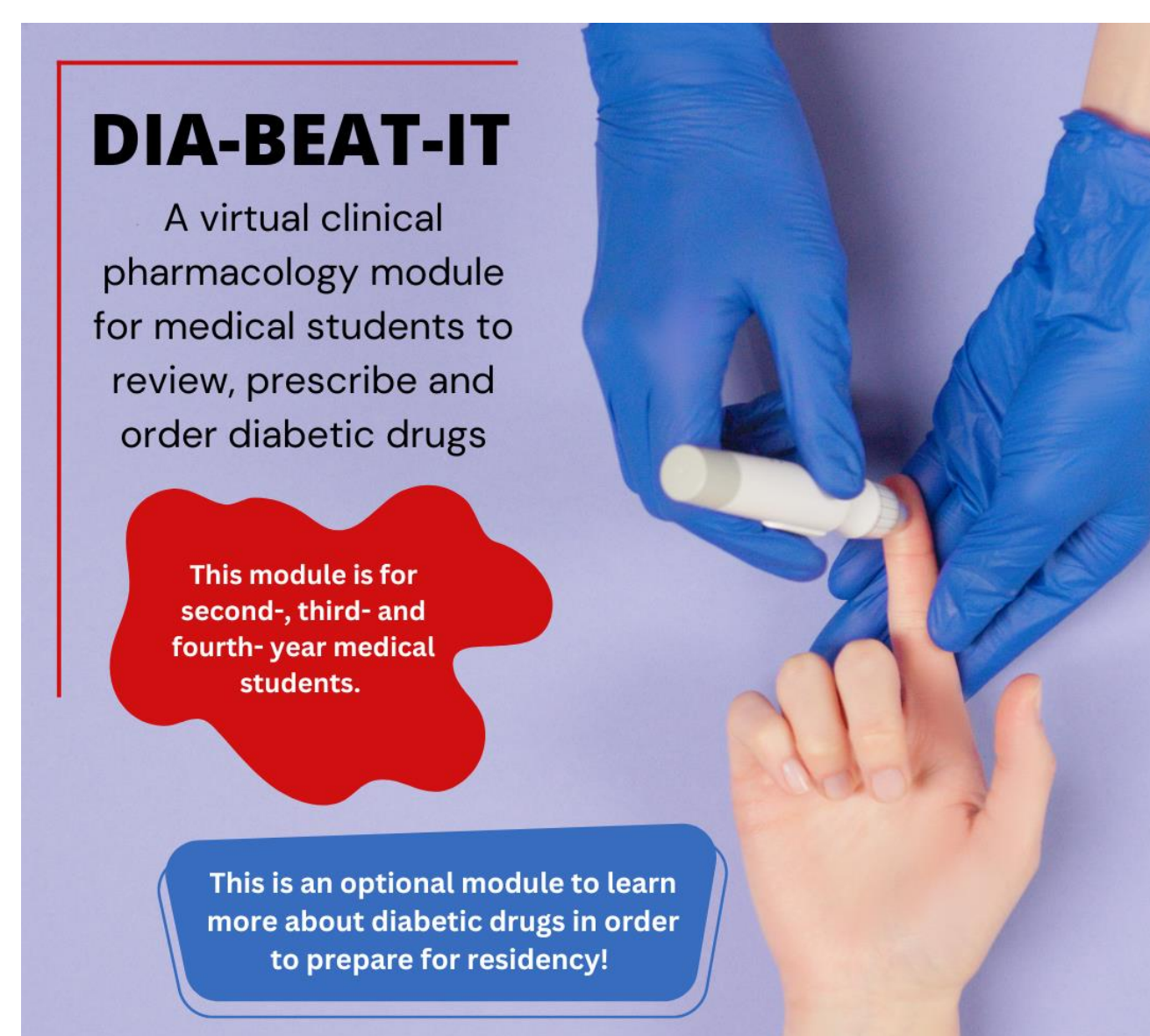
MATERIALS & METHODS

Figure 1. Recruitment flyer for Dia-Beat-It module

- This research study is an educational prospective cohort study.
- Second, third and fourth-year medical students at Brody School of Medicine may volunteer to participate.
- The study will utilize quantitative study design.
- Methods include a pre- and post- knowledge survey and a post-evaluation survey.

INNOVATION

ECU Canvas
- Canvas is an online learning management system
- Quizzes, surveys, pages and files created
- Content can be adapted to other virtual learning platforms

Learning Objectives
1. Recall medical pharmacology content for antidiabetic drugs
2. Prescribe a dose regimen for antidiabetic drugs
3. Prepare an order in the electronic health record for antidiabetic drugs

Figure 2. Home page of the Canvas website displaying the learning objectives as the three main modules

Asynchronous Self-Learning
- Each three module represents each three learning objectives
- Content pages, files and surveys are listed under each dropdown module
- Learners work sequentially through the site at their own pace
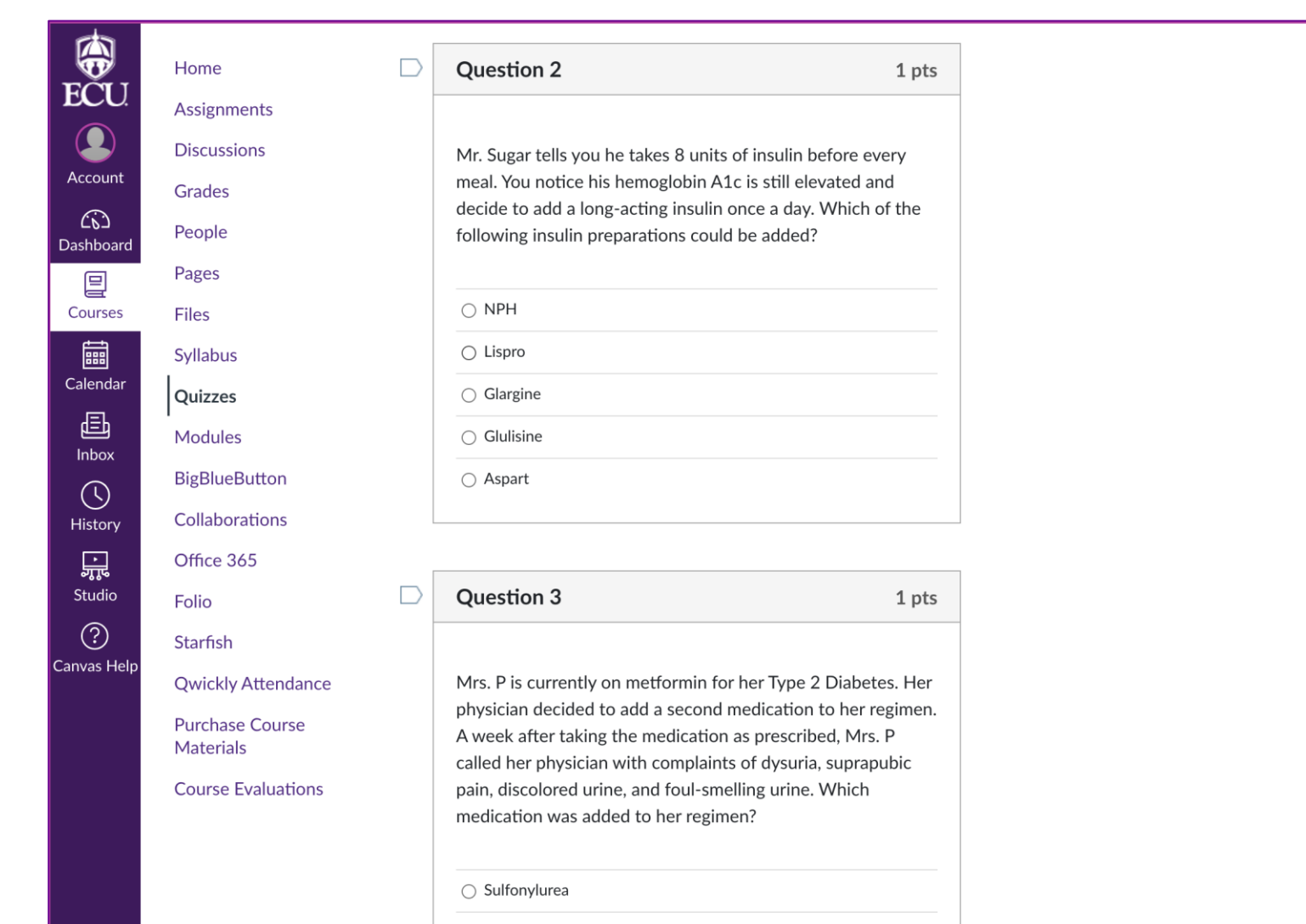
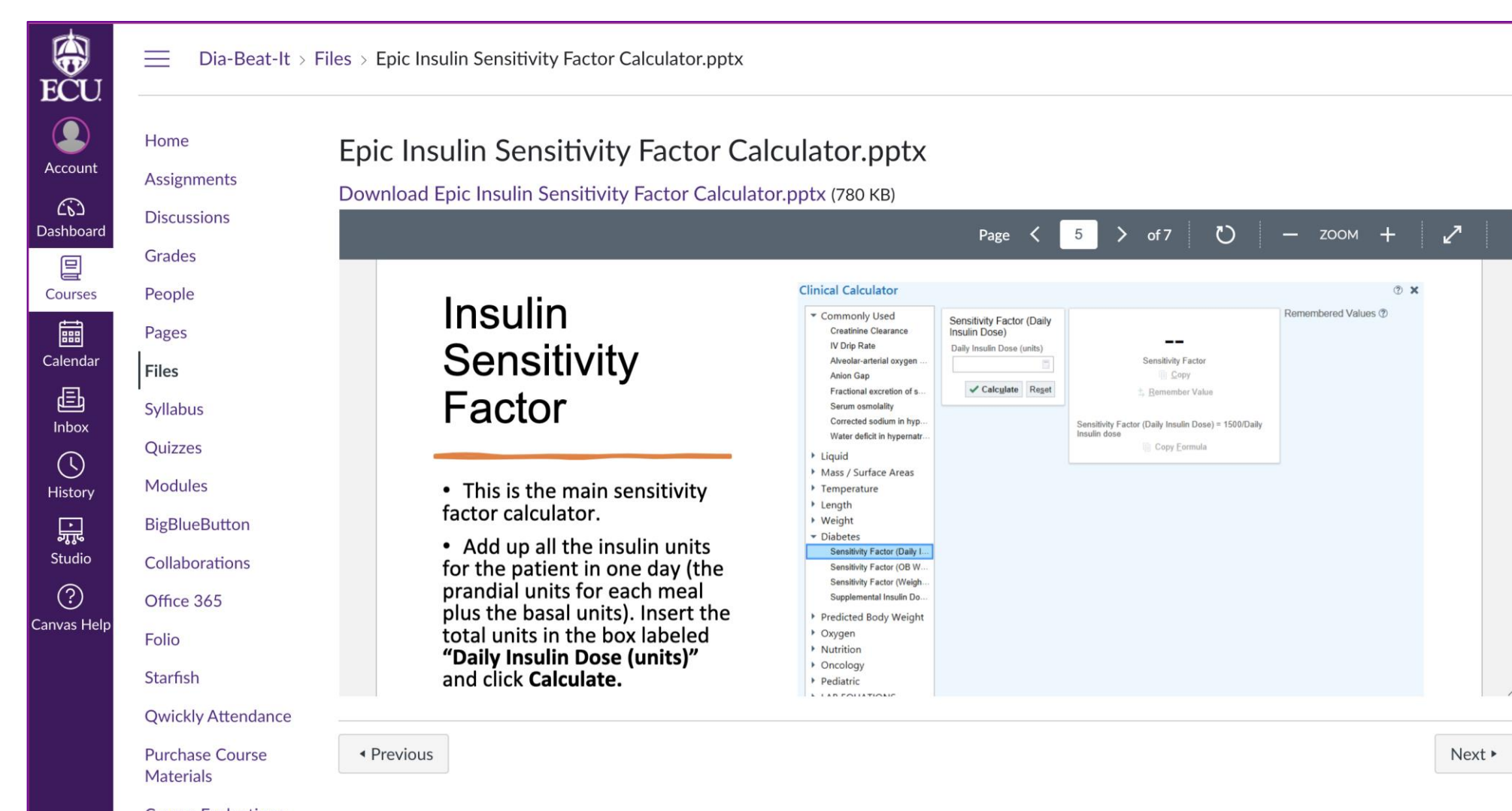**Figure 3. Pre- and post-knowledge survey questions in Canvas quizzes**

Figure 5. PowerPoint file embedded in the page to allow learners to download instructions for "Epic Insulin Sensitivity Factor Calculator" to optimize experience
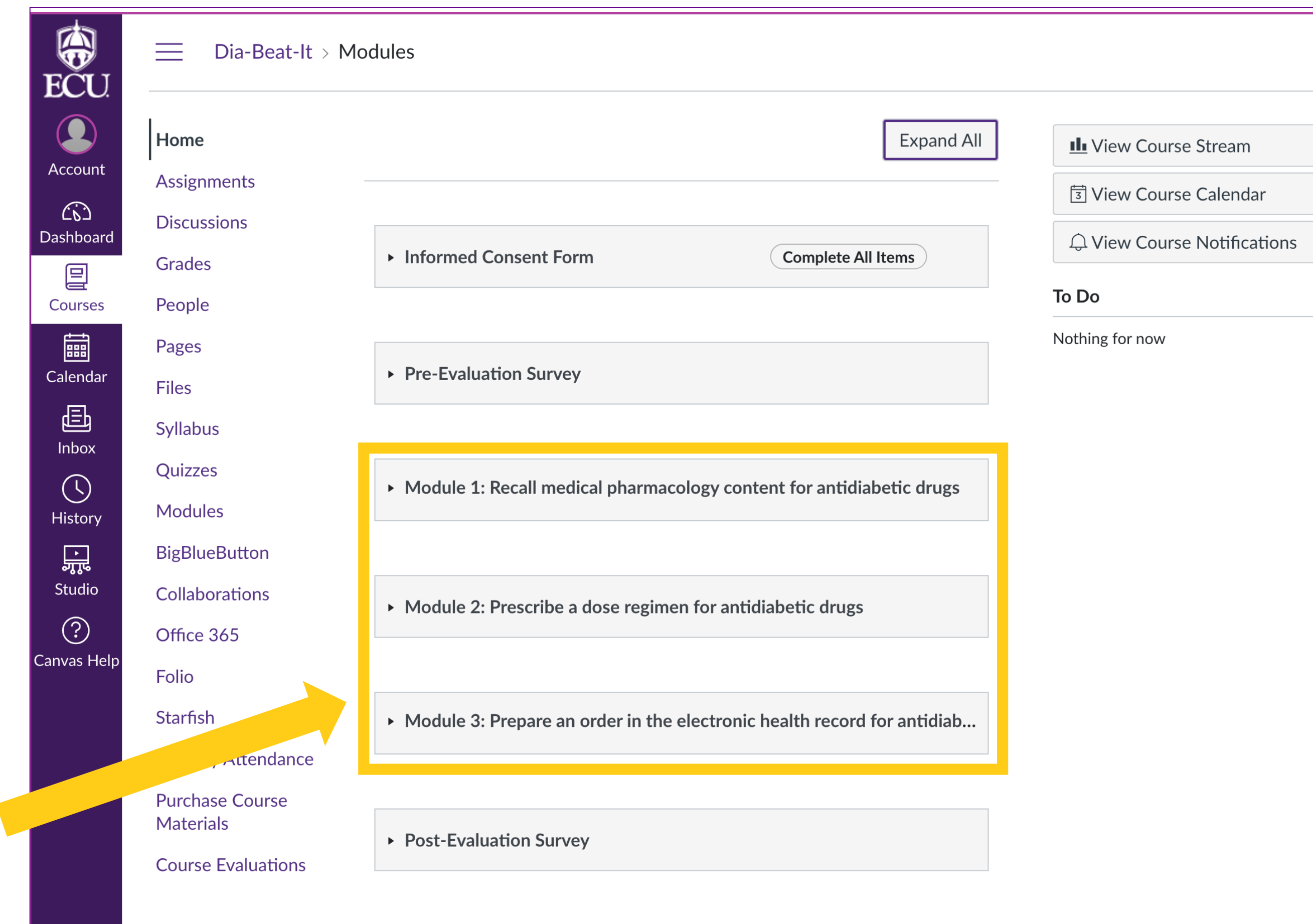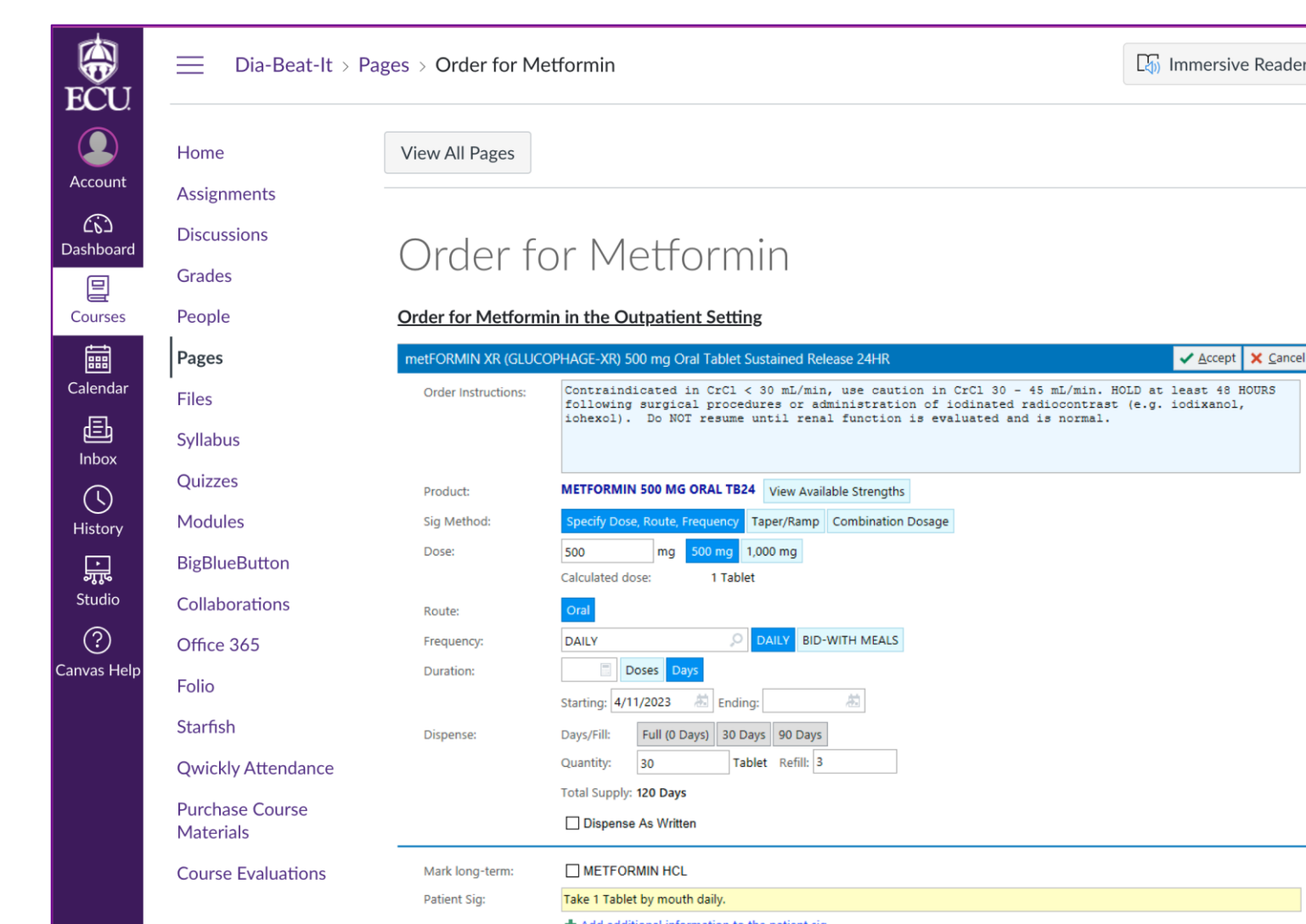

Figure 4. "Order for Metformin" is a page under "Module 3: Prepare an order in the electronic health record for antidiabetic drugs"

RESULTS

Table 1. Plan for Data Collection and Analysis

Data Source	Type of Data Collected	Analysis
Pre/Post Knowledge Survey	Quantitative score	Paired t-test
Post Evaluation Survey	Quantitative and qualitative data	Descriptive statistics, ANOVA

- We predict to find a significant increase in post-test score from pre-test score for all participants.
- We hope to understand the efficacy of the module from the post-evaluation survey in descriptive statistics regarding participant rating of aesthetics, navigation and content.

DISCUSSION

- The goal of this research is to demonstrate significant knowledge acquisition by completion of the virtual module.
- The advantage of utilizing an online context is that learners can work asynchronously and independently through the module.
- There have been multiple online pharmacology modules published but there has yet to be a module dedicated to second-, third- and fourth-year medical students with a focus on diabetic medications for both outpatient and inpatient therapy management.
- We hope to find that participants find the module easy to navigate. In the evaluation, the module can be considered as a future activity for the required curriculum, such as a flipped classroom or self-learning activity.

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