

UVU

# DXSTORIES

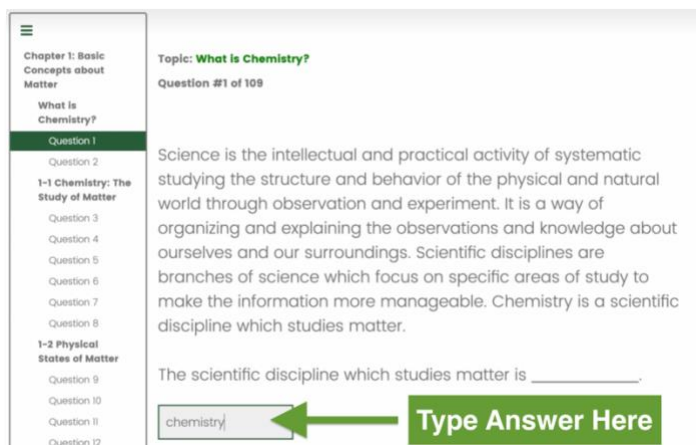
DIGITAL TRANSFORMATION | *Teaching & Learning*

## 1. WHAT WAS THE PROBLEM?

How to help students actively engage in learning key Chemistry 1110 concepts that improves student comprehension, retention, and ability to apply their knowledge more effectively.

## 2. HOW DID THE PROJECT LEADERS APPROACH SOLVING THE PROBLEM?

Created in the mid 1990s by Dr. Charles Davidson (Weber State University), ChemTutor was initially used in 2005 as a supplemental help resource for students while Mr. Bob Davidson taught the in-person Chemistry 1110 course. In 2012, Bob developed the first UVU hybrid chemistry course and used ChemTutor for the course's online lecture portion. Dr. Fern Caka contributed to ChemTutor in 2012 and it has undergone several major adaptations\* to improve student learning.



The screenshot shows the ChemTutor interface. On the left is a navigation menu with a hamburger icon at the top. The menu items are: 'Chapter 1: Basic Concepts about Matter', 'What is Chemistry?' (highlighted in green), 'Question 1', 'Question 2', '1-1 Chemistry: The Study of Matter', 'Question 3', 'Question 4', 'Question 5', 'Question 6', 'Question 7', 'Question 8', '1-2 Physical States of Matter', 'Question 9', 'Question 10', 'Question 11', and 'Question 12'. The main content area displays the topic 'What is Chemistry?' and 'Question #1 of 109'. The question text reads: 'Science is the intellectual and practical activity of systematic studying the structure and behavior of the physical and natural world through observation and experiment. It is a way of organizing and explaining the observations and knowledge about ourselves and our surroundings. Scientific disciplines are branches of science which focus on specific areas of study to make the information more manageable. Chemistry is a scientific discipline which studies matter.' Below the text is a text input field containing the word 'chemistry'. A green arrow points from a green box labeled 'Type Answer Here' to the input field.

ChemTutor presents concepts in a step-by-step, scaffolding method with more advanced concepts being built on earlier simpler ones. As students read the content, that reinforces the concepts thus improving comprehension.

After reading a section, a student types in an answer. If a student submits...

...a correct response, then ChemTutor congratulates the student and a new question appears.

...an incorrect response, then ChemTutor prompts the student for a new attempt.

...another incorrect response, then ChemTutor provides the correct answer and, to move to the next question, a student must type the correct answer supplied by ChemTutor to help reinforce the concept.

ChemTutor is structured to promote "Reading for Content" (i.e., equivalent to listening to the instructor and taking lecture notes while the student's typed answer is like them responding directly to the instructor's questions).

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### 3. WHAT WERE THE RESULTS?

In addition to the improved student learning outcomes, the best outcome about ChemTutor is that it has helped make Chemistry 1110 a much more palatable experience for most students: it is no longer the dreaded class that it once was.

### 4. WHAT ARE THE NEXT STEPS?

According to Davidson, the next steps are to continue revising and updating the original 13 lectures to coordinate with the course textbook "General, Organic & Biological Chemistry." Finally, "ChemTutor [designed and developed in Qualtrics to help students learn chemistry] could be tailored to work with many other courses the functionality would be the same while instructors would plug in their course materials." Setting up Qualtrics with other subjects / course content would be time consuming yes, but the results, from Davidson's experience have been well worth the effort.

**“ChemTutor has helped make Chemistry 1110 a much more palatable experience for students.”**

### 5. WHO TO CONTACT FOR MORE INFORMATION?

Adjunct Instructor Robert Davidson, CHEM-1110 Elementary Chemistry, Chemistry Department, College of Sciences, [davidsro@uvu.edu](mailto:davidsro@uvu.edu).

Story Info: Pdf (July 1, 2022); Video (July 1, 2022).

\*Credit: Sam Gedeborg in the Office of Teaching and Learning was a critical part of making ChemTutor what it is today.

