

Comprehension SEEDING Project

Comprehension Through Self-Explanation, Enhanced Discussion and Inquiry Generation

Overview

Comprehension SEEDING facilitates more effective classroom engagement and deeper student learning.

Students submit free-text responses to instructors' open-ended questions via mobile devices. Natural Language Processing clusters the answers and provides the instructor feedback on the types of misconceptions and their frequency.

Unlike clicker technology, students must articulate their understanding of a concept to aid in deep learning.

Teacher's Questions

The teacher provides a question and reference answer.

Question Text

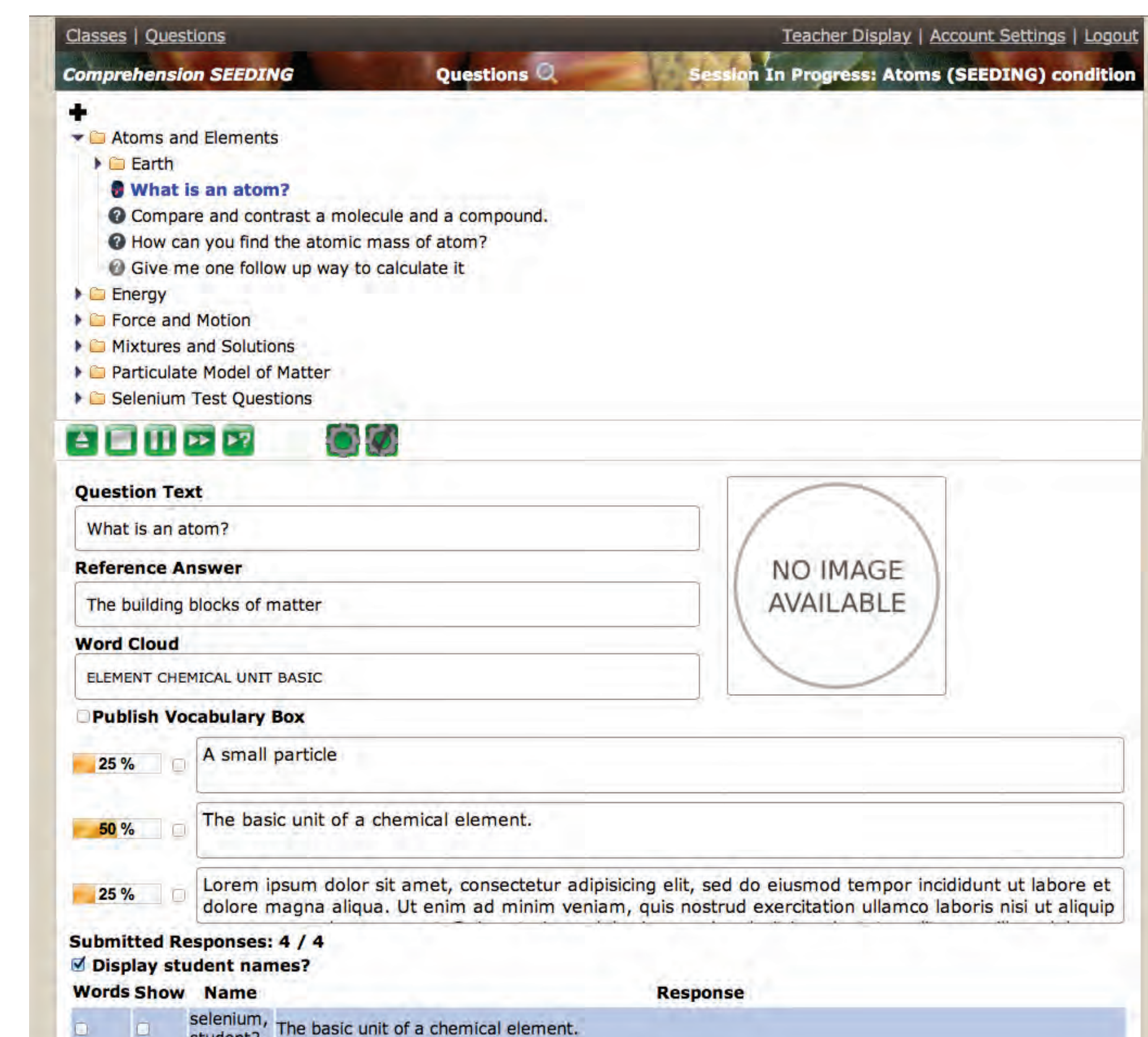
What is an atom?

Reference Answer

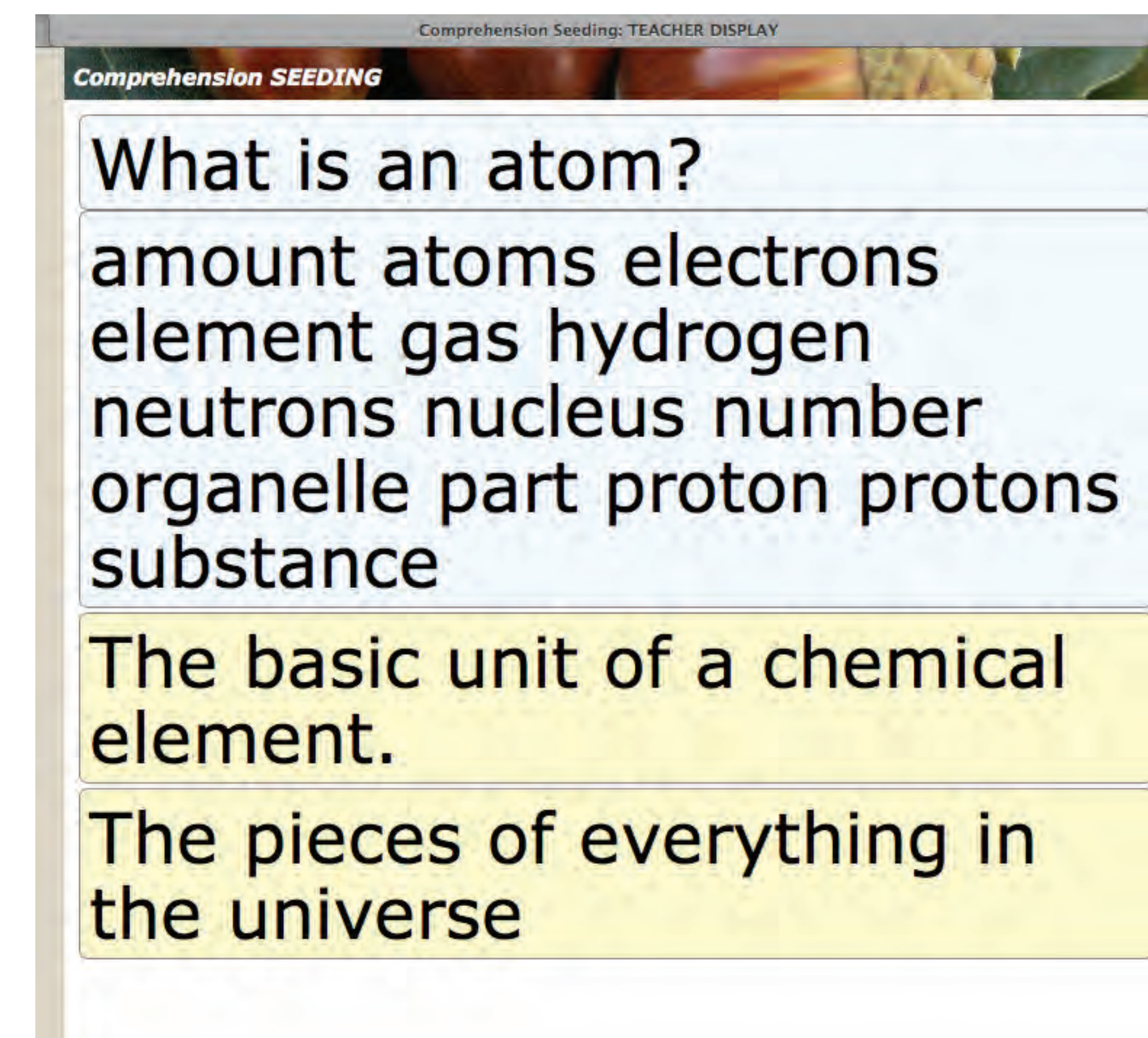
The building blocks of matter

Teacher's View

The teacher's view has a 2 window display. The teacher's control allows teachers to ask questions, see students' responses, and use the NLP capabilities that are included. (Shown on the left). The Teacher's Display allows the teacher to choose what to show to the class via a projector (Shown on the right) leading to **enhanced discussion**.



Teacher's Control Window

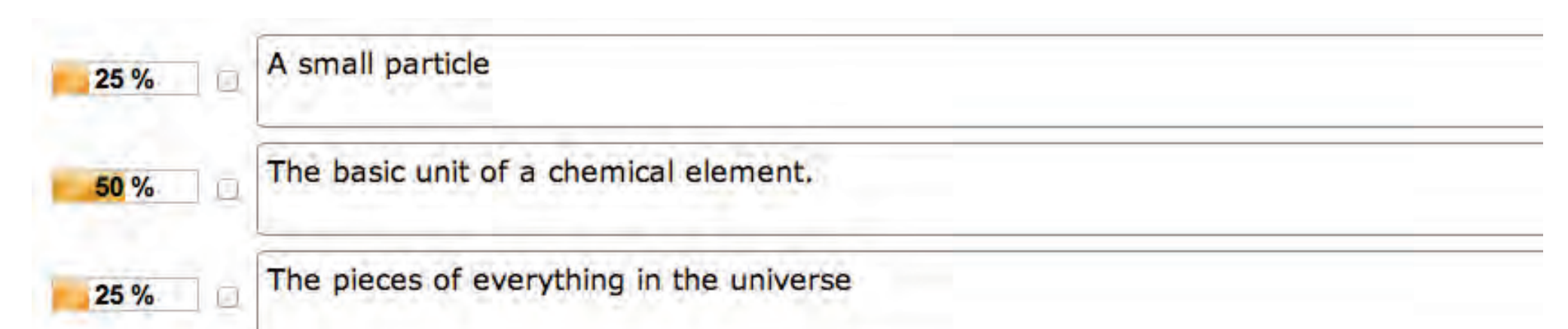


Teacher's Display for Classroom Display

HLT Techniques:

- * analyze the semantics of student responses
- * generate up to four distinct clusters whose responses indicate a similar (mis)conception
- * select the response that is the most representative of that belief.

This facilitates a classroom discussion centered on the actual views held by that teacher's students.



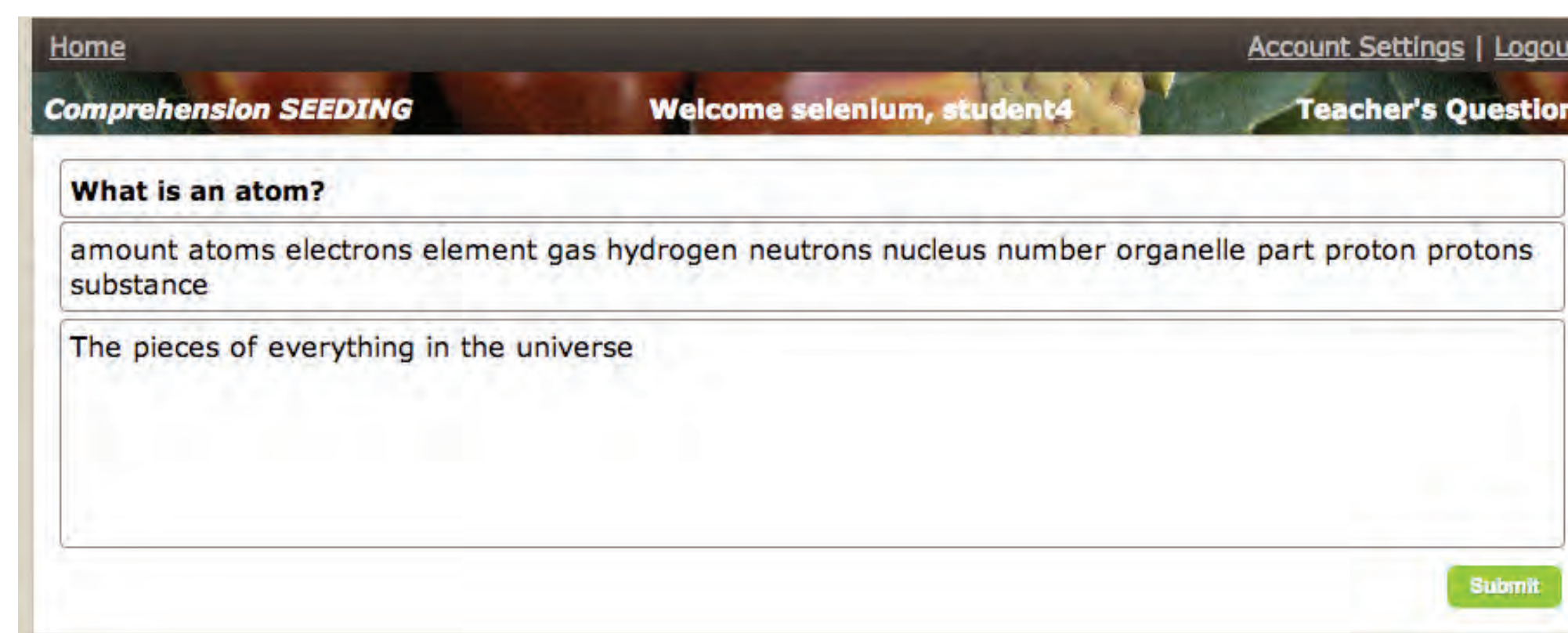
Teachers can edit and project the representative views for the class to discuss.

Word Cloud

A word cloud is created in real-time as students are answering the question. This word cloud provides the teacher an instant view of the top words shared across all the student's responses.



Student's View



Individual Student's Display

Learning sciences has found that the active construction of answers is much more effective in increasing deep learning than the simple selection of a multiple choice answer.

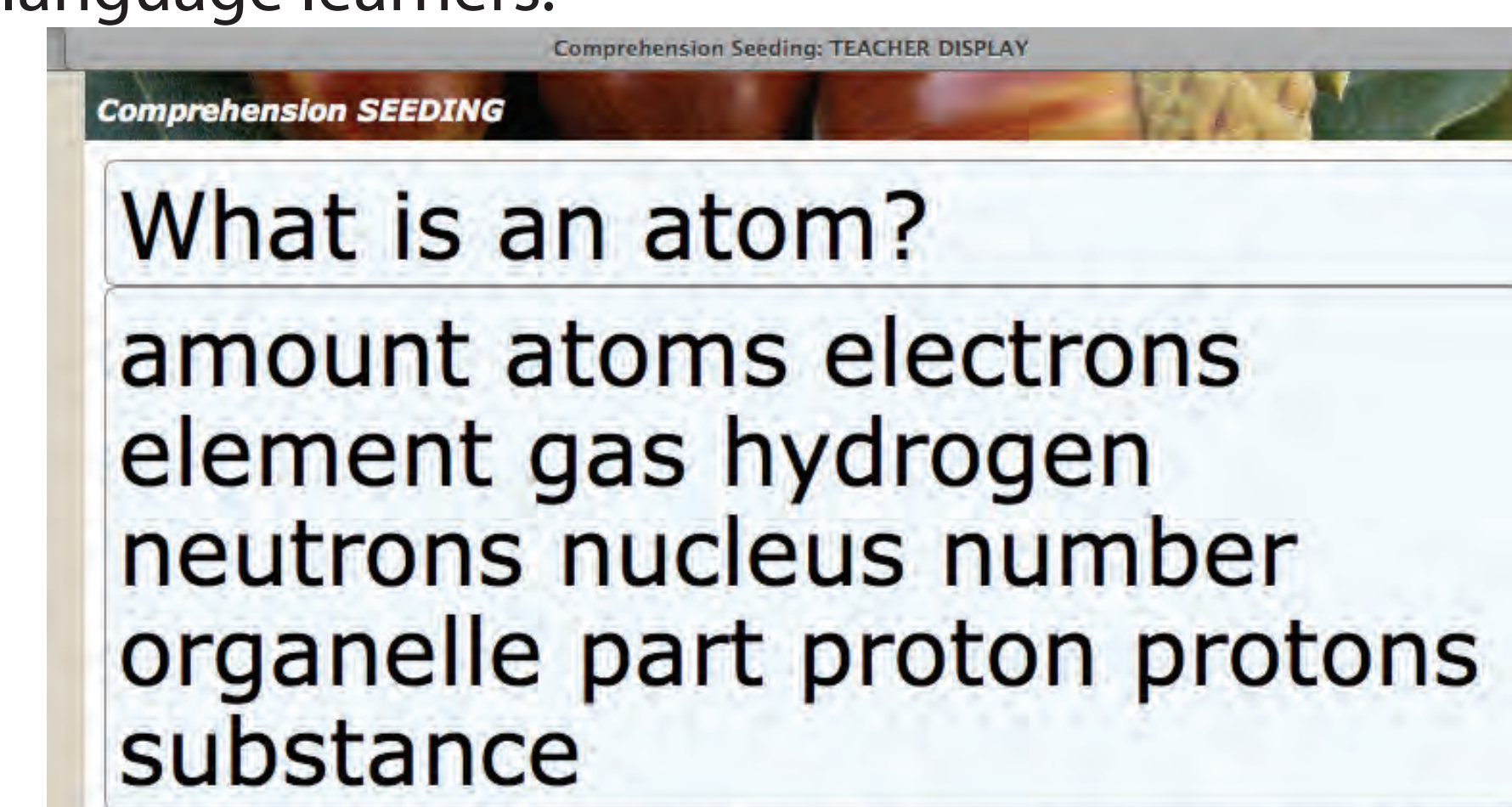
The student's view is controlled by the teacher. The student can view the teacher's question and provide a short answer. While the question is open for responses, the student can also edit their answer.

If enabled by the teacher, the student can see a vocabulary list generated utilizing NLP technologies to assist second language learners, for example, who are stuck trying to think of the right word.

As the students answer, the teacher is provided with real-time NLP-based analysis of the classroom responses.

Vocabulary List

Human language technologies are utilized to automatically generate a vocab list based on semantic analysis of the words in the question and reference answer, and then including synonyms, antonyms, and content words. Teachers can share the vocab list with individual students directly to their screen, or to the entire class on the projected display. This is often used to assist English language learners.



SEEDING Development Team

Dr. Rodney Nielsen,
Associate Professor, CSE
Director, HiLT Lab



UNT CSE Student Developers

Mingyu Lin
James Glenn

Frank Paiva

HiLT Lab

Human Language Technologies
Health Informatics Language Technologies
Dr. Rodney Nielsen

UNT[®] UNIVERSITY OF NORTH TEXAS[®]