

Motivation

To explore an alternative to the traditional lecture that can help professors make better or different use of their scheduled time with the students.

Project Goals

► To test the ability of an eTEACH Web Learning-Module to provide "lecture-type" information to the students via the World Wide Web.

► Measure student learning from the Web Learning-Module (WLM).

► Assess how effectively a WLM can prepare students for successful participation in an active discovery-based learning environment.

The Extra-Solar Planet Project

- exploring an alternative to the traditional lecture

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Project Outline

The eTEACH authoring tool was used to create a WLM on the topic of detection of extra-solar planets. The WLM was implemented into an introductory astronomy course at UW - Madison (Spring 2004). ~100 UW undergraduate students participated in the project. The project was divided into 3 phases.

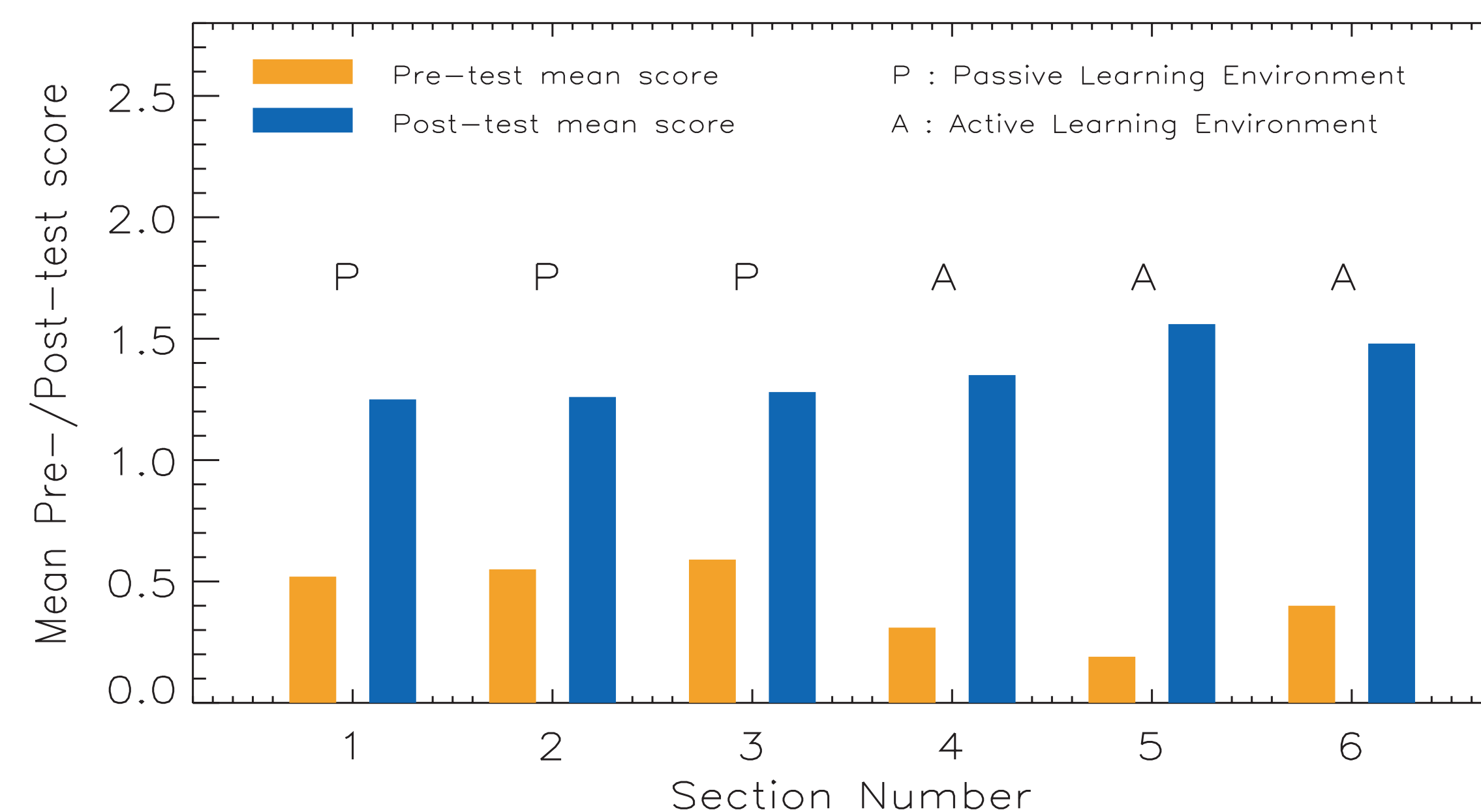
Phase 1: (The week prior to the WLM) Students took pre-test designed to measure knowledge of key concepts prior to WLM.

Phase 2: Students attended WLM (eTEACH presentation) on the WWW.

Phase 3: (The week following the WLM) **A)** Learning environment experiment. The ~100 students were divided into 6 sections. In sections 1-3 the TA reviewed the material /concepts covered in the WLM (*passive learning environment*). In sections 4-6 students worked in groups on realistic problem involving the material/concepts covered in the WLM (*active learning environment*). **B)** All students took a post-test identical to the pre-test at the end of each section.

Assessing Student Learning

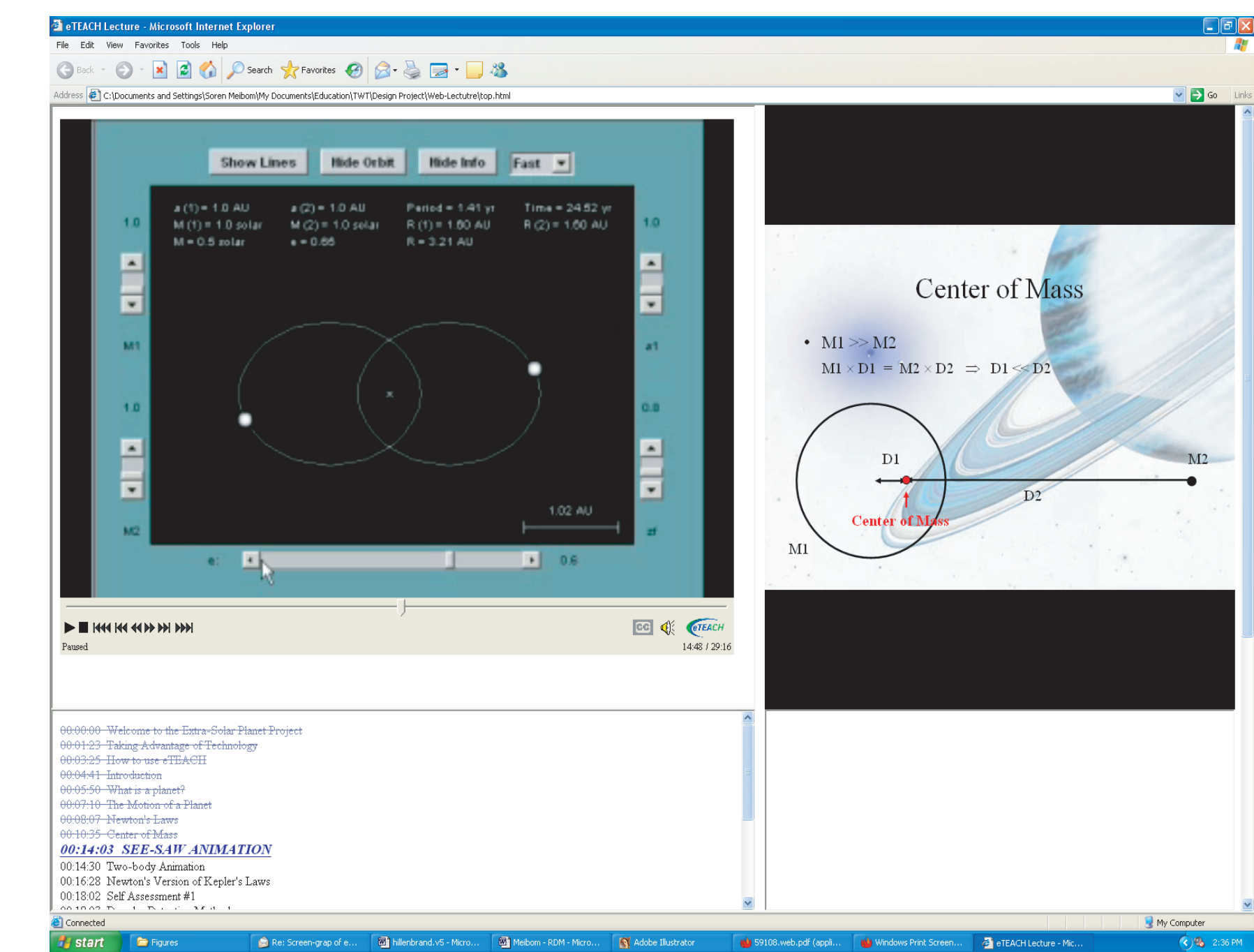
Center of mass (CM) was a key concept taught in the WLM. The first question on the pre- and post-test was designed to measure understanding of the concept of CM in a two-body system. A rubric was designed to fairly grade the pre- and post-test answers to that question. 16 -24 students took the pre- and post-test in each section. Figure 1 shows the average pre- (orange) and post-test (blue) scores for all 6 sections.



Conclusions

1. All post-test scores are significantly higher than the pre-test scores. Student understanding of the concept of center of mass improved from the WLM.

2. The difference between pre- and post-test scores are higher for the sections engaged in an active learning environment. Active learning works.



Technological Advantages

The combination of computers, the eTEACH software, and the WWW offer a high level of flexibility and thus accomodate students with diverse learning styles. For example:

► The students can access the WLM anytime and anywhere where they have access to a computer and the WWW.

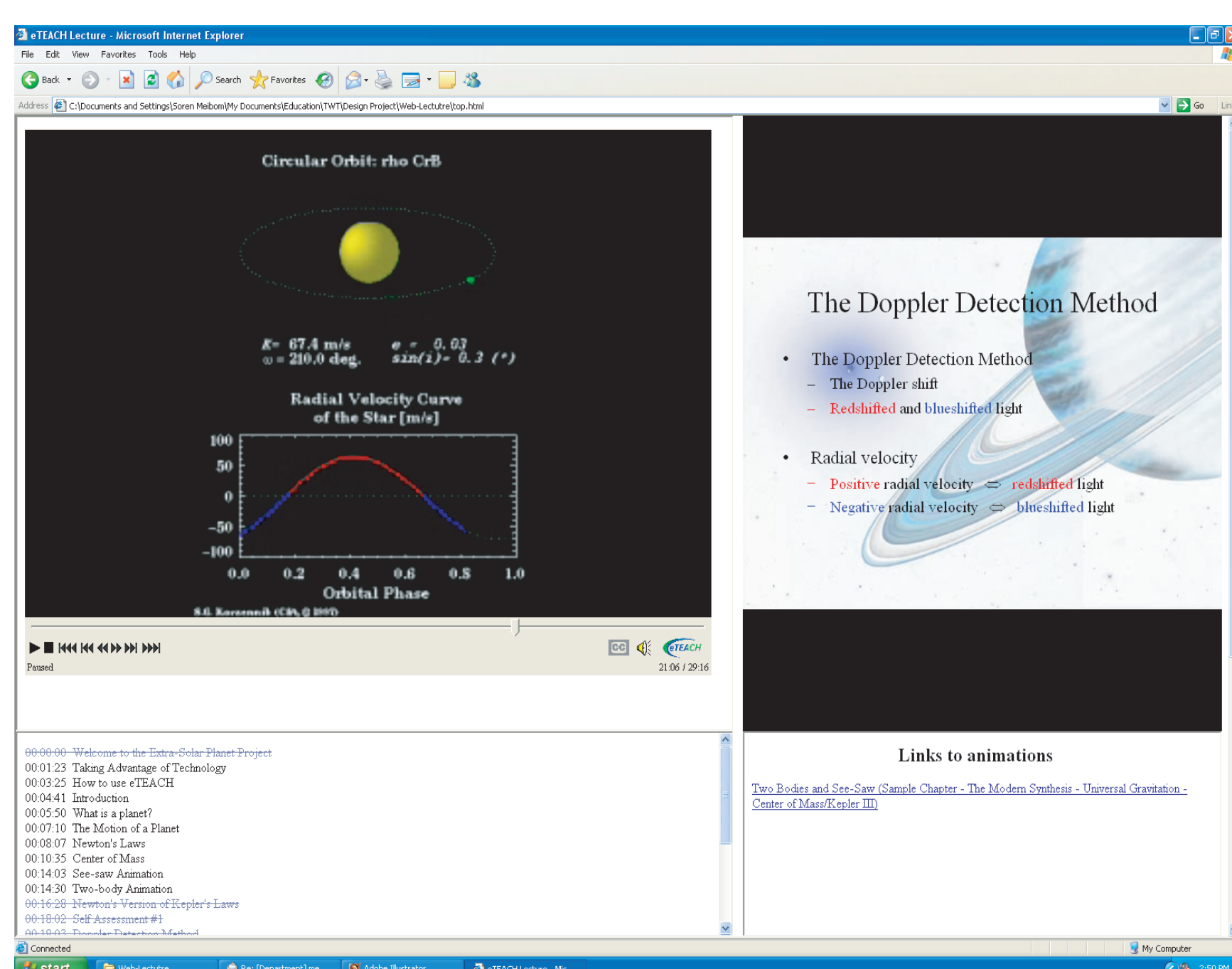
► The students can watch the WLM at their own pace and multiple times.

► The eTEACH software offers closed- captioning for hearing impaired students and frame-reading for blind students.

► Students can download the lecture-notes before attending the WLM.

► Self-assessment quizzes help students measure their understanding of key concepts as they are being taught.

► The WLM offer links to in depth examples to help students with difficult concepts and ideas.



The eTEACH Authoring Tool

(<http://eteach.engr.wisc.edu/newEteach/home.html>)

The eTEACH Authoring tool was developed by Greg Moses and Mike Litzkow at the University of Wisconsin - Madison School of Engineering. eTEACH offers high quality presentation of video and audio, synchronized with slides (e.g. Power Point slides) with notes, diagrams, and animations. The eTEACH presentation is accessible on the WWW (currently compatible with Windows PC's only; Internet Explorer and Power Point is needed). The viewer/student has full control over video and audio via a panel of control buttons. In addition, a interactive table of contents allows fast and easy access to any part of the presentation.

