OFFICE OF
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Improving Learning Through Assessment

Brief Evaluation Report on Pilot of Dr. Frame Software University of Wyoming Implementation

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BACKGROUND

This report summarizes an evaluation of a pilot version of an innovative course software package, called "Dr. Frame." Used in engineering classes, the software is designed to provide hands-on experience to students with the characteristics of certain structures. In Spring of 2006, an implementations of the software were used in an engineering class at the University of Wyoming as part of a class assignment. Before and after the exercise, students completed surveys (pre- and post-) that contained content questions (parallel questions for pre- and post-) aimed at assessing changes in students' understanding relevant concepts. The post-survey contained a set of evaluative questions to assess students' satisfaction with the exercise and the extent to which they found it useful.

The surveys were presented as online questionnaires at the beginning and the end of each exercise. Within the assignment, an introduction to the evaluation project was presented along with a link to the survey itself. Students' participation in the surveys was voluntary, although the exercise was part of a class assignment. A total of 18 students completed the pre-survey and 13 students completed the post-survey.

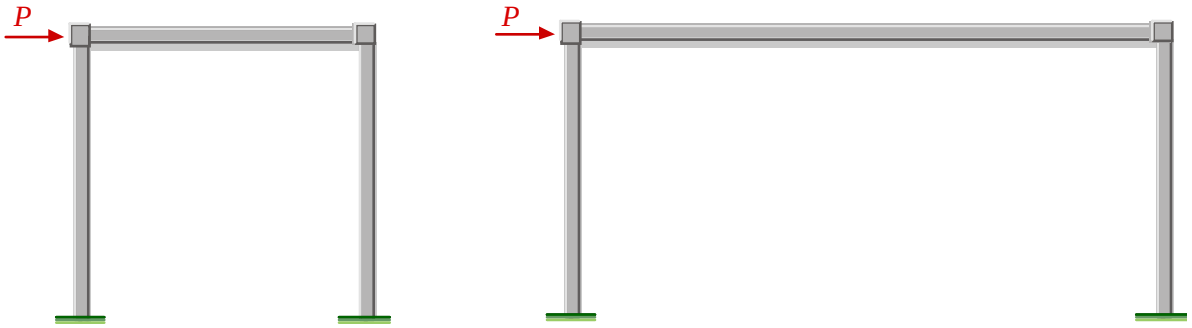
RESULTS

Results from the evaluation of the Wyoming implementation of Dr. Frame are presented in two sections. The pre- and post-comparisons of the content-related questions are presented first, followed by an analysis of the evaluative items presented only on the post-survey. Only basic descriptive information is provided for items involving numerical responses, and open-ended responses are presented in their entirety.

Pre-Post Comparisons: Conceptual Questions

There were three conceptual questions presented on both the pre- and post-surveys:

The two frames shown below are identical except for the bay width:



A B

1. Which frame will have larger base moments at the supports?

   (a) Frame A
   (b) Frame B
   (c) They will be equal

2. Which frame will have a larger horizontal displacement at the loaded joint?

   (a) Frame A
   (b) Frame B
   (c) They will be equal

3. What would be the most effective way to reduce the horizontal displacement of frame A?

(a) Increase the moment of inertia of the columns by a factor of 2.
(b) Increase the moment of inertia of the cross beam by a factor of 2.
(c) Reduce the moment of inertia of the cross beam by a factor of 2.
(d) Reduce the moment of inertia of the columns by a factor of 2.

Figures 1 through 3 show the percentage of respondents provided each answer for the pre- and post- conceptual survey questions, presented below:

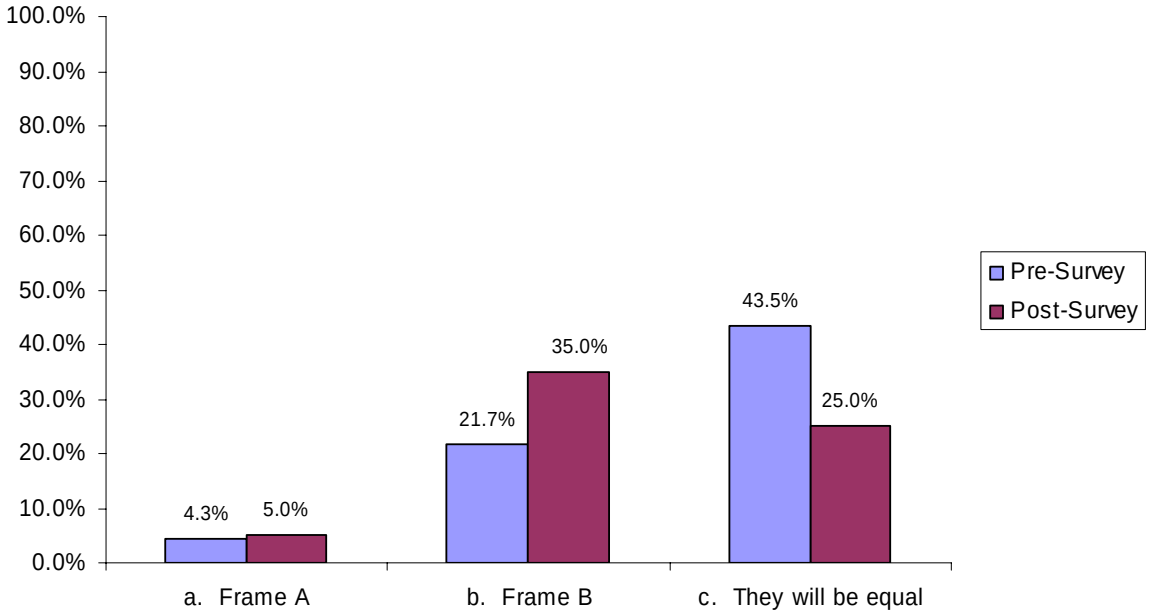


Figure 1. Percentage of individuals providing each response to Question 1 on the pre- and post-survey.

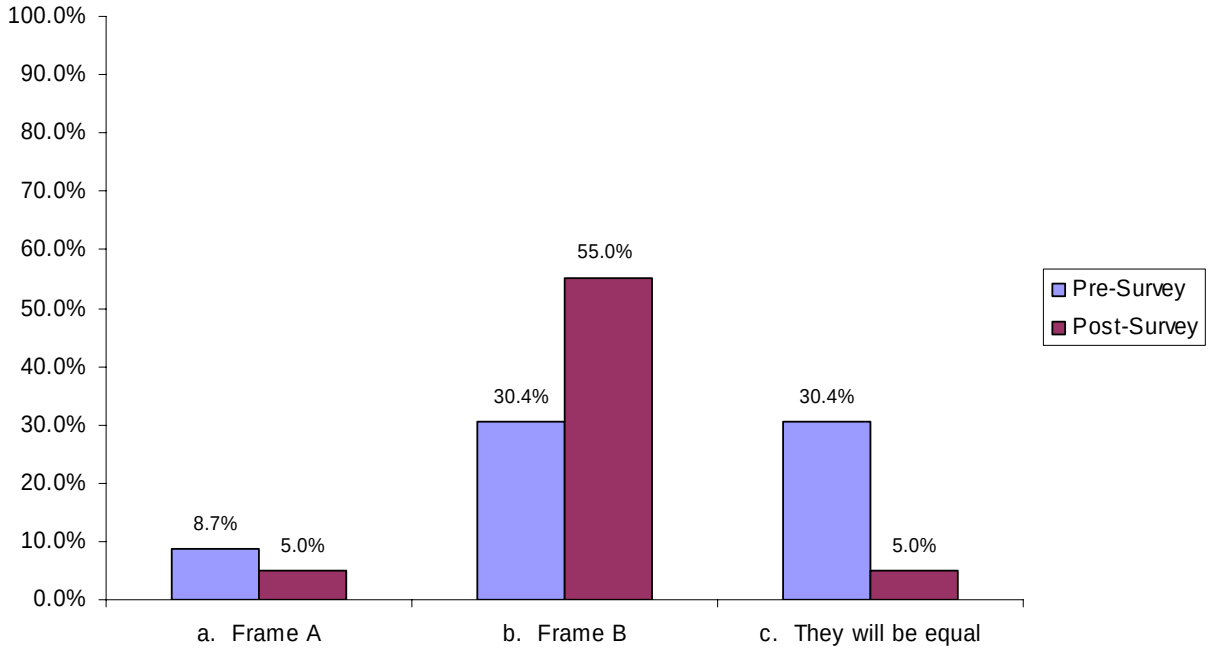


Figure 2. Percentage of individuals providing each response to Question 2 on the pre- and post-survey.

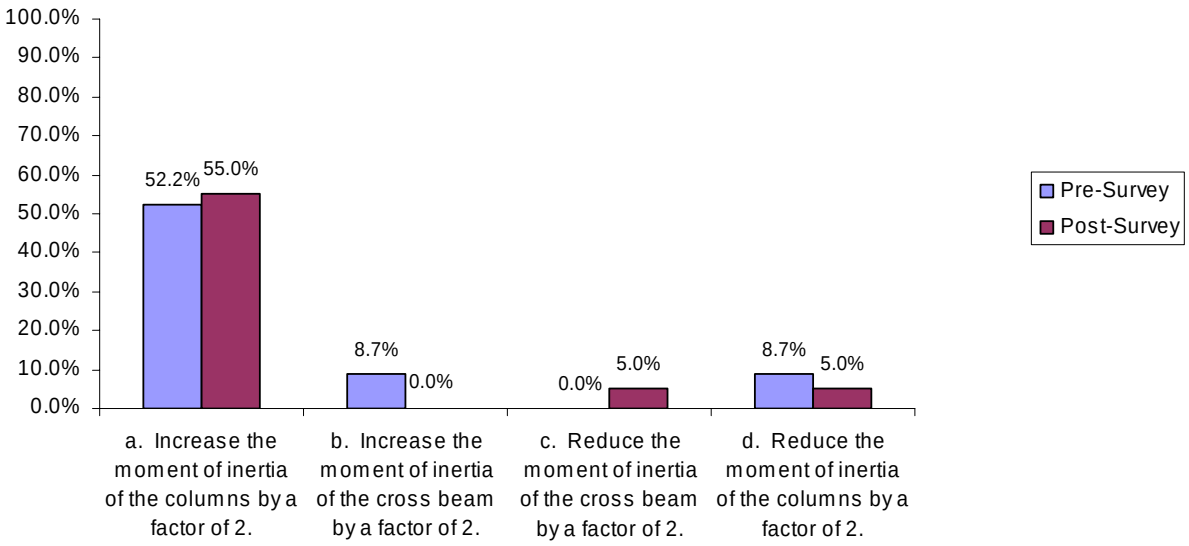


Figure 3. Percentage of individuals providing each response to Question 3 on the pre- and post-survey.

Participants were also asked to rate their level of confidence in the responses they provided on the conceptual questions on both the pre-survey and post-survey, from a scale of 1 "Not at all confident" to 6 "Completely confident." Mean confidence ratings for each question, both pre- and post- are presented in Figure 4.

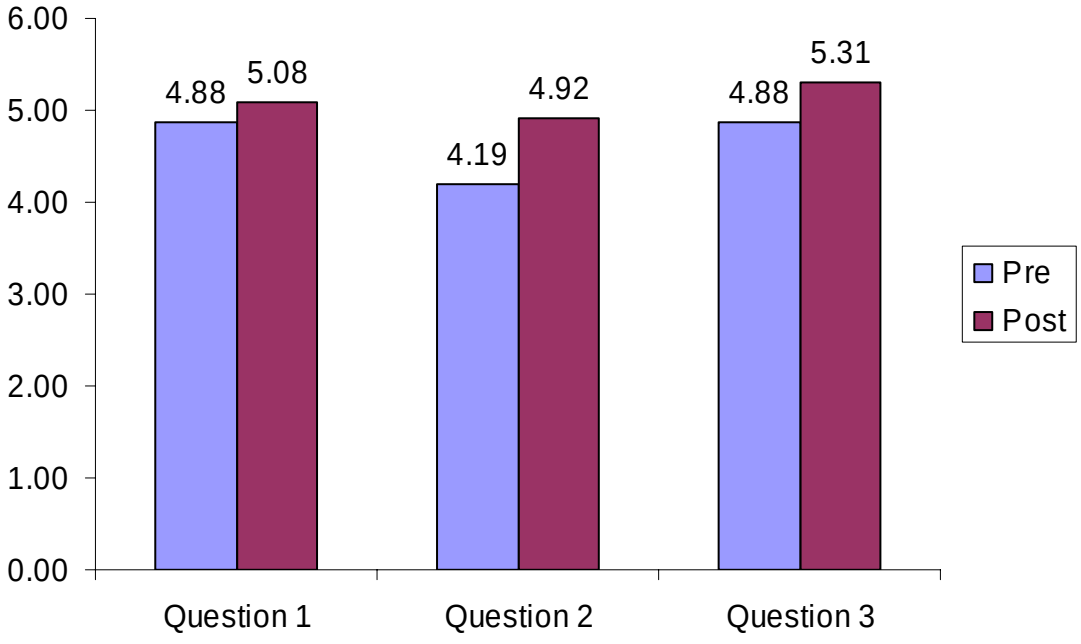


Figure 4. Mean confidence ratings (on a scale of 1: Not at all confident to 6: Completely confident) provided by participants about their responses to three conceptual questions on the pre- and post-surveys for the FRAME activity.

Frame Post-Survey: Evaluative Questions

Ratings

The evaluative questions on the post-survey began with a set of six statements; participants were asked to indicate the extent to which they agreed or disagreed with the statements. Table 1 shows the frequency, mean and standard deviation of their responses.

Table 1: Descriptive statistics for six evaluative statements of the FRAME activity.

	Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree	*Mean*	SD
	1	*2*	*3*	*4*	*5*		
This activity enhanced my understanding the behavior of frames.	0.0%	0.0%	15.4%	84.6%	0.0%	3.85	0.38
The software was easy to use.	0.0%	0.0%	15.4%	53.8%	30.8%	4.15	0.69
I enjoyed this activity.	0.0%	0.0%	30.8%	61.5%	7.7%	3.77	0.60
This activity was a good use of my time.	0.0%	7.7%	15.4%	69.2%	7.7%	3.77	0.73
Now that I've completed this assignment, I will probably have to study less for the final exam.	0.0%	69.2%	7.7%	15.4%	7.7%	2.62	1.04
If given the opportunity, I would like to return to this activity as a study resource.	0.0%	0.0%	23.1%	61.5%	15.4%	3.92	0.64

As a visual presentation of these data, Figure 5 shows the mean ratings for each item.

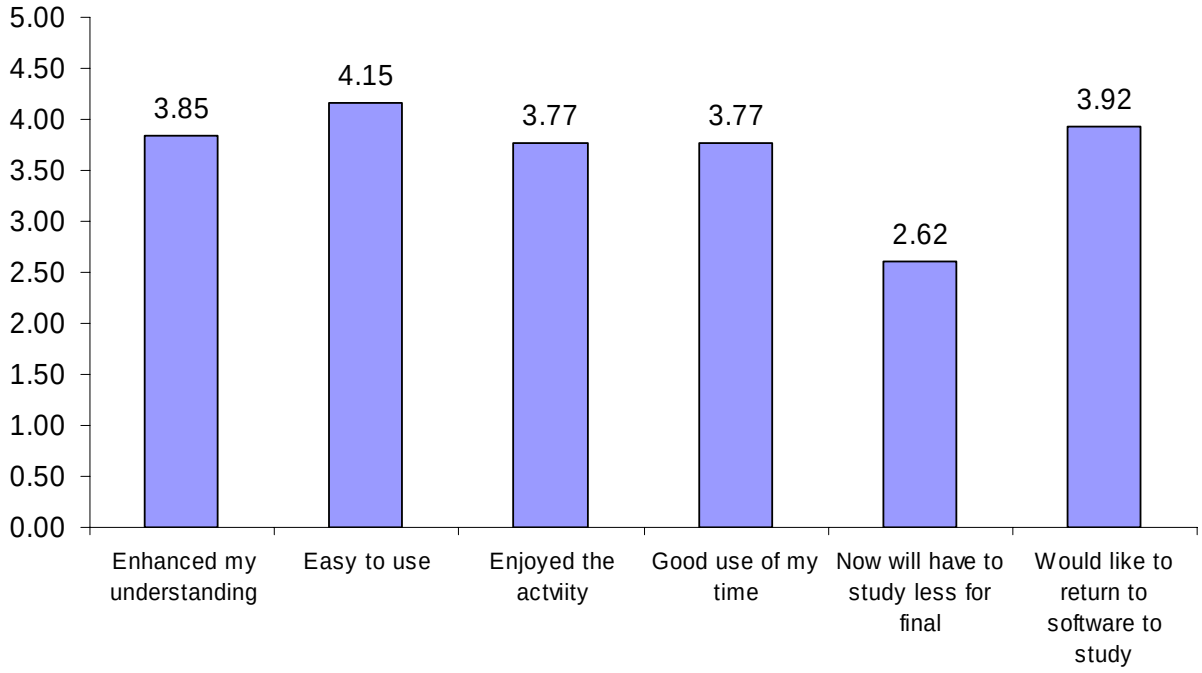


Figure 5. Mean ratings for each of the rated evaluation items on the post-survey.

Open-Ended Responses

Below is a complete list of all responses from students to each of the four open-ended evaluative questions at the end of the survey. For the most part, these comments are entered exactly as participants entered them (without correction of typographical errors).

What, if anything, did you find particularly valuable about this activity?

- actually seeing the changes happen right as wrok was being done to the beam.
- Determining the base Moment and max displacement.
- The way they have the introduction formatted.
- The introduction to how the program works.
- It showed us how to use DR. FRAME
- It was nice to visually see change in moments and displacements as length of the beam and the inertia was changed.
- The relative ease to learn the program.
- It provided means to learn a new program, one which seems to be beneficial and useful.

Did you have any technical problems with the software? If so, please describe these in detail below

- None (6)
- had touble extracting the files
- Had a little trouble getting it to work.
- It took a while for me to open this software. I didn't realize that I had to open the file after I open Dr.Frame application.
- It said Dr. frame encountered a problem and had to close. I reopened the program and then finished without any problem.

How, if at all, do you think this activity could have been improved?

- by showing what steps to do, than reset itself and have us do the same thing and get to the correct stage, and after it is right we could go onto the next step.
- I think it was fine.
- More interaction and examples.
- This is already good, but maybe it can involve student more..i.e. The screen won't proceed unless student complete what needs to be learned each screen.
- Taken at an earlier part of the semester...while doing moment diagrams and everything else.
- More interactive elements. Merely watching the mouse do the work made me forget what command did what. Making the user perform the operations might be better.

Any additional comments about the activities?

- Not really. I suppose it could have been a little more interactive. All you really had to do was push the => button in the window.
- This was a lot of fun.
- No
- Dr. Frame is a great program