

# Key Learnings and Commitments from Mudd Design Workshop II\*

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*The final, wrap-up Session of Mudd Design Workshop II was designed to achieve two goals: (1) identify the key themes brought out during the entire workshop; (2) elicit commitments from the participants, to apply workshops ideas of their choice in their own classrooms during the next two years (in anticipation of reporting results to the next Mudd Design Workshop). Each session leader had been asked to capture in a few sentences the most important themes from their session, and any issues that had arisen; they presented them to the group of participants at the wrap-up session. These themes and issues were written on Post-It<sup>®</sup> Notes, and the participants used Affinity Diagramming to identify from the session input the overall key themes identified during the workshop. Finally, the participants committed to try ideas from the key themes or the session themes and issues in their own classrooms. People were enthusiastic about the workshop learnings, and were very willing to do this. The commitments were written down, so that people can be reminded of what they said they would do.*

## DISTILLING THE ESSENCE

SO WHAT DID all of this tell us? What were the key lessons and learnings from Mudd Design Workshop II?

During the course of the workshop, a wide variety of issues relating to the teaching of engineering design surfaced—too many to be remembered and effectively applied. For the workshop to have the maximum impact, the essence needed to be distilled out, and participants needed to leave with *Action Items*—commitments to try in their own classrooms some of the things they had learned during the workshop. The *Wrap-Up Session* was thus designed to achieve two goals:

- identify the *key themes and learnings* brought out during the entire workshop;
- elicit *commitments* from the participants, to apply workshops ideas of their choice in their own classrooms during the next two years (in anticipation of reporting results to the next Mudd Design Workshop).

## THE FINAL DESIGN EXERCISE

In order to identify the *key themes* which had been surfaced during the workshop, the closing *Wrap Up Session* was structured to review (and capture) the most important ideas from each of the workshop's presentations, and then to have the participants use *Affinity Diagramming* (a tool for non-numeric decision making; see [1]) to identify the key themes from the workshop as a whole.

Each session leader had been asked to capture in a few sentences the most important ideas and issues from their session, and be prepared to present them to the participants at the wrap-up session. These were captured (on Post-It<sup>®</sup> Notes—one per note) as they were presented by the session leaders.

After these presentations had been made and briefly discussed, the participants were divided into two teams (by counting off, which served to separate colleagues who had sat together), a set of notes (which had been duplicated) was affixed to a clean blackboard accessible to each team, brief instructions were given on doing affinity diagramming, and they were set to the task. Both teams completed organizing the notes into affinity groupings within the allotted time, and were then asked to assign a *title* to each affinity grouping. These titles were interpreted to be the *key themes* of the workshop.

## KEY THEMES

The workshop participants agreed with this set of key themes or key learnings from the workshop. They represent a synthesis of many of the individual workshop presentations and hallway discussions.

1. Focus on *learning* rather than on *teaching*—*coaching* rather than *teaching* as the methodology of the educator; *coach* rather than *sage* as the role of the educator.
2. Give attention to the *humanities engineer*—include *culture, values, and the notion of intent* in the academic program.

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3. Include *assessment* and *continuous improvement* in the program.
3. Focus on *projects* and *experiential design learning*—design projects must be *designed*.
4. *Grading* and *learning* must be addressed in new ways.

These statements are rather terse. The following are some expansions, drawn directly from the ideas and issues picked out by the session leaders.

1. Focus on *learning* rather than on *teaching*—‘the role of the teacher has to progress from *lecturer* to *moderator*’; ‘differentiation between functions of teaching, developing, and cultivating.’
2. Give attention to the *humanist engineer*—engineers have to decide how to deal with people; ‘respect emotional logic; let’s work with the human interests to develop it’; ‘values are part of engineering design.’
3. Include *assessment* and *continuous improvement* in the program—‘requirement for continuous improvement is an important (underestimated?) component of EC2000; initial discomfort with assessment process may result from confusion between *course* and *program* assessment.’
4. Focus on *projects* and *experiential design learning*—from the freshman [first year] level across the curriculum to the graduate level, there is compelling case-level evidence of the effectiveness of active learning of the hands-on, project-based type in engineering education.’
5. *Grading* and *learning* must be addressed in new ways—grading schemes designed to motivate students; ‘formal textual analysis yields characteristics that can be correlated with design project grades.’

## COMMITMENTS

Putting these ideas into practice is where the real value of Mudd Design Workshop II will be proven.

Most of the participants (excluding the few who had left early to catch airplanes home) were very willing to commit to try things they had learned during the workshop. If a good percentage of the commitments that were made are actually carried out, this workshop will have achieved its primary goals—and there will be lots of quality material to discuss at the next Mudd Design Workshop.

These commitments were logged:

1. Woodie Flowers (MIT) plans to stop lecturing in his classes, and use more of a *coaching* style.
2. Karen Yoshino (Harvey Mudd) will use her assessment instrument on the group of participants in this workshop. Phil Doecker (Dayton) and Joe Shaewitz (West Virginia) will assist her.
3. The Brigham Young team (Spencer Magleby, Len Pugh, Dorothy Taylor, Robert Todd), assisted by David Cannon (Stanford) will work on teaching faculty to *coach*.
4. Penny Hirsch (Northwestern University), Greg Olson (Northwestern University), and Sarah Kuhn (Massachusetts) will address in their programs: assessment; guidelines for projects; humanist engineering; coaching.
5. Clive Dym and Patrick Little (Harvey Mudd) will explore alternate ways of grading the freshman design course.
6. Sarah Kuhn and Patrick Little will look at the use of *studios* in design education
7. David Brown (Dartmouth) will work to have more computer science faculty and students to realize that they are *doing design*.
8. David Brown will work with his Human-Computer Interaction Class to design experiments.
9. David Cannon will work with the Stanford Learning Laboratory to try to identify what separates Engineering from the rest of the university, from a teaching/learning perspective.
10. Sarah Kuhn will explore *values* in design.
11. Woodie Flowers will report back on the growth, progress, and status of the First Competition.
12. Clive Dym will look beyond Engineering to the rest of the university for ideas relevant to the workshop learnings.
13. Sheri Sheppard (Stanford) will work with Clive Dym and other interested parties on the next workshop.

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## REFERENCES

- J. W. Wesner, J. M. Hiatt and D. C. Trimble, *Winning with Quality: Applying Quality Principles in Product Development*, Reading, MA: Addison Wesley, 1994.

**John Wesner** received both his BS and his Ph.D. in Mechanical Engineering from Carnegie Mellon University; in between he earned his MS ME at Caltech. Recently retired from Lucent Technologies Bell Laboratories, Wesner’s experience is in many aspects of Engineering Design, mainly doing and managing Product Design. Successful products include a

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