Transforming the Culture: 
Undergraduate Education and the 
Multiple Functions of the Research 
University

Technologies to enable and evaluate 
collaborative projects in undergraduate education

Breakout Session
November 9, 2006. 3:30-5:15
Discussion leader, Kent L. Norman
Department of Psychology, University of Maryland
College Park

Laboratory for Automation Psychology and Decision Processes
Group Projects

• For years many instructors in undergraduate courses across the disciplines have struggled with group projects.
  – What projects should be given?
  – How should we assign students to teams?
  – How do we monitor the teams?
  – How do we evaluate the group product and the individual efforts?
Groupware

• In past few years, there has been a rapid development of a new breed of software for Computer Supported Collaboration Work (CSCW).

• “Groupware” was originally designed to facilitate collaborative efforts in business and industry, but has clear applications in science and education.
Groupware

• Electronic communication tools: email, instant messaging, file sharing, web publishing
• Electronic conferencing tools: internet forums, video-conferencing, electronic meeting systems
• Collaborative management tools: electronic calendars, project management, knowledge management
Social Computing

• At the same time, "Social Computing" has emerged with people communicating/interacting via
  – Instant Messenger and iChat
  – Blogging, personal websites
  – Sharing music, photos, and videos over the Internet (YouTube, etc.)
  – Virtual communities (Facebook, MySpace)
  – Cyberspaces (Secondlife, etc.).
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Social Computing
Technologies

- The question is, “How can we use the same or similar technologies to manage and enhance collaboration in the classroom and beyond?”
Session Plan

• This session will discuss:
  – techniques for enabling collaborative team projects and
  – Techniques for assessing their progress using various forms of groupware technology.
Process and Product

• Rather than focusing only the completed project at the end of the semester, we will ask how we can use "shared spaces" on computer networks, wiki servers, blogspaces, and discussion boards to monitor and evaluate the progress of groups and the individual members.
Sharing

- We will share past and current successes.
- Discuss emerging ideas of turning course projects into global knowledge construction using websites such as Wikipedia, the free online encyclopedia, and Wikibooks.
Discussion Boards

- Minutes of group meetings
- Exchange of ideas
- Sharing of materials
- Organization of materials
- Encouragement
Hosting the Collaboration

Example of Group Project in HyperCourseware
Facebook

- Groups for projects
- Discussions
- Messages
WebLogs

- www.wordpress.com
Websites

- Students generate a website for the project.
- Examples:

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Wikis

A **wiki** ([IPA: 'wɪ.kiː] <WICK-ee> or ['wiː.kiː] <WEE-kee>[1]) is a type of website that allows the visitors themselves to easily add, remove and otherwise edit and change some available content, sometimes without the need for registration. This ease of interaction and operation makes a wiki an effective tool for **collaborative authoring**. The term wiki can also refer to the **collaborative software** itself (wiki engine) that facilitates the operation of such a website, or to certain specific wiki sites, including the computer science site (an original wiki), **WikiWikiWeb**, and online encyclopedias such as **Wikipedia**.
Functional fixedness

Functional fixedness is a cognitive bias that limits a person to using an object only in the way it is traditionally used.

Introduction to Functional Fixedness

The concept of functional fixedness originated in Gestalt Psychology, which is a movement in psychology that emphasizes wholistic processing where the whole is seen as being separate from the sum of its parts. Duncker defined functional fixedness as being a "mental block against using an object in a new way that is required to solve a problem." This "block" then limits that ability of an individual to use the components given to them to make a specific item, as they can not move past the original intention of the object.

Experimental paradigms typically involve solving problems in novel situations in which the subject has to use of a familiar object in an unfamiliar context. The object may be familiar from the subject's past experience or from previous tasks within an experiment. The end result is that the subject typically unable to overcome the bias which hinders or completely prevents the subject from completing the task rather than making use of the available objects in a novel but more efficacious manner.

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Assessment

How do we assign partial credit for the process?

Tracking progress:
• Follow the email, cc’s to the instructor
• Follow the discussion spaces
• Monitor the versions and contributions
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Wiki History
### Current Conceptual Relevance

- **Functional Fixedness Universal?**

  We may ask ourselves if functional fixedness varies across environments, cultures, or history. In a recent study,

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<td><strong>Overcoming Functional Fixedness in Science Classrooms with Analogical Transfer</strong> (Solomon, 1994)</td>
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<td>The Shuar community had only been exposed to a limited amount of industrialized artifacts, such as machetes, axes, cooking pots, nails, shotguns, and fishhooks, all considered “low-tech.” Two tasks were assessed to participants for the study: the box task, where participants had to build a tower to help a character from a fictional storyline to reach another character with a limited set of varied materials; the spoon task, where participants were also given a problem to solve based on a fictional story of a rabbit that had to cross a river (materials were used to represent settings) and they were given varied materials including a spoon. In the box task, participants were slower to select the materials than participants in control conditions, but no difference in time to solve the problem was seen. In the spoon task, participants were slower in selection and completion of task. Results showed that individuals from non-industrial (“technologically sparse cultures”) were susceptible to functional fixedness. They were faster to use artifacts without priming than when design function was explained to them. This occurred even though participants were less exposed to industrialized manufactured artifacts, and that the few artifacts they currently used were in multiple ways regardless of their design. (German &amp; Barret, 2005)</td>
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<td><strong>Following the Wrong Footsteps: Fixation Effects of Pictorial Examples in a Design Problem-Solving Task</strong> (Chrysikou, E.G., &amp; Weisberg, R.W., 2005)</td>
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Discussion

• Generate 2-3 specific ideas or recommendations to be incorporated into the final conference report and to be used to inform the Reinvention Center's agenda for the next two years.

• Address topics that are not addressed directly in the conference program, but that may be relevant (cost, scaling up, implementation …)