



Incorporating Teaming and/or Active Cooperative Learning into the Engineering

Jim Morgan, Texas A&M
jim-morgan@tamu.edu



Acknowledgements

We gratefully acknowledge those who have contributed resource materials to this workshop:

Rich Felder, North Carolina State University

Rebecca Brent, NSF - SUCCEED Coalition

Karl Smith, University of Minnesota

Lynn Bellamy &, Arizona State University

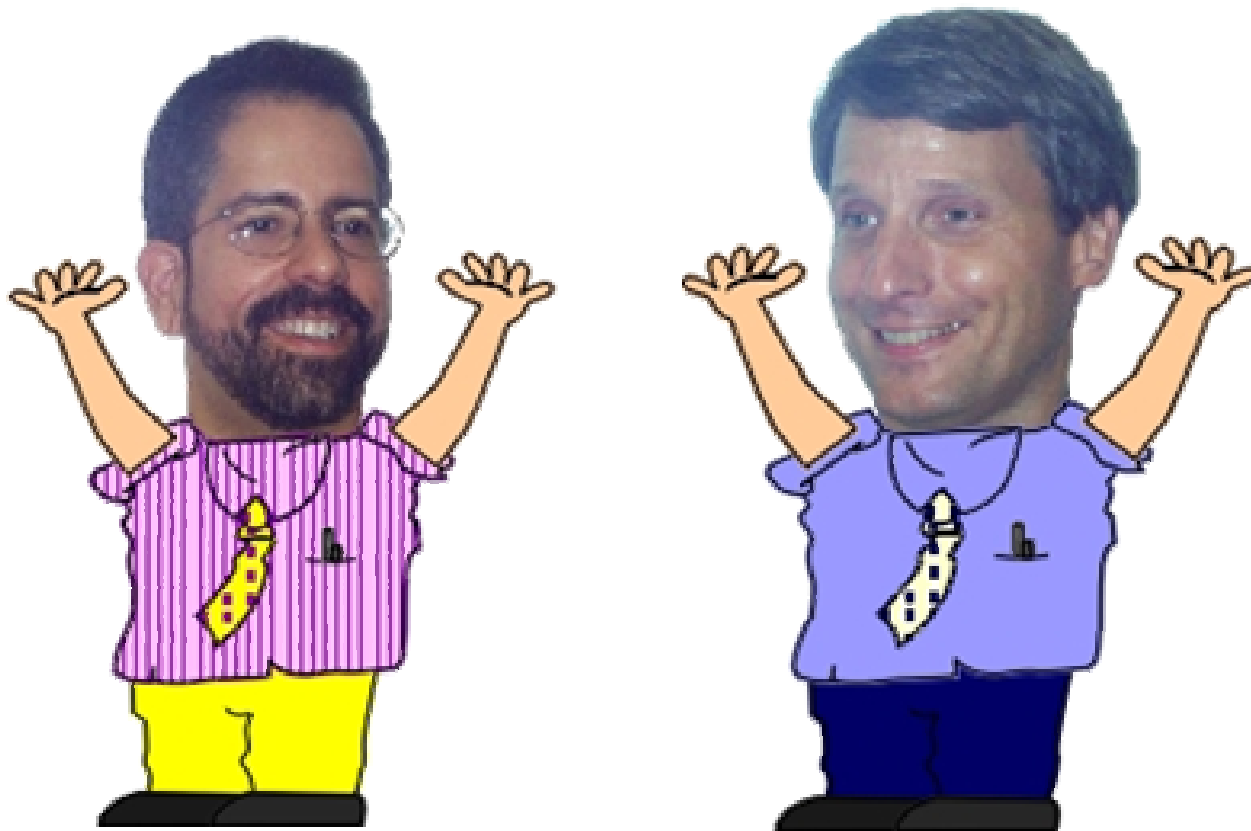
Barry McNeil, Larry Michaelson, Johnson&Johnson, ...

Karan Watson, Texas A&M University

also acknowledge colleagues at Texas A&M University, those in the *NSF Foundation Coalition...*

Getting Started

The Signal





What is the Signal?

- Raise your hands to inform your neighbors.
- Finish your sentence.
- **DO NOT finish your paragraph.**
- Turn towards the facilitator.



Workshop Structure

- Use **+/ Δ** 's (Plus / Deltas).
- A **+** is a comment about one thing you found valuable and
- A **Δ** is a suggestion about how to improve something.

Workshop structure (continued)

- **The Issue Bin:**
 - topics that will or may be addressed later;
 - questions that can or should be deferred until the end of the workshop; and
 - items that can or should be the subject for another session.
- **Paraphrase the issue and record it on a post-it-note[®] where it can be viewed by others.**

Workshop structure (continued)



- **Code of Cooperation:**
 - **EVERY** member of the team is responsible for the team's progress and success.
 - Listen to and show respect for the contributions of other members, i.e., **be an active listener**.
 - **CONSTRUCTIVELY** criticize ideas, not persons.
 - Be succinct, avoid long anecdotes and examples.
 - No rank in the room.



Questions about the Workshop

- **first individually write down**

In the next minute . . . **specifically what do you want to know about teaming in a Active Cooperative Learning class?**

- **Share your list with the person sitting next to you**
- **Now as a team, assemble on flip chart, and prioritize your list . . .**



Selected Workshop Topics

1. .
2. ..
3. ...
4.
5. . . .





Team Problems

- **Individually, list 5 problems you might have as a faculty member using teams**
- **Share your list with the person sitting next to you**
- **Suggest a strategy for each problem**

Why Teams (part 1)?

✓ **P**ositive Interdependence

✓ **I**ndividual Accountability

➤ **G**roup Processing

➤ **S**ocial Skills

✓ **F**ace-To-Face Interaction



Teaming

Why Teams (continued)?

- **Industry wants:**
 - teamwork skills
 - communication skills
 - negotiation skills
 - conflict resolution skills
- **Provides support system for students**
- **& more, better reasons**
 - More Learning Styles can be reached, &
 - Higher levels of learning are possible
- **and Fewer papers to grade**

Using TEAMS

- Start most classes with a

Readiness **A**ssessment **T**est



- Some to individuals, then teams
- Some to teams, then individuals
- Sometimes give the lowest individual **score** to all members of the team

Using TEAMS

- Start *some* examples with *ThinkPairShare* on possible approaches to solving a problem
- *After* a report out and discussion
- Sometimes complete as second exercise . . .
- Sometimes leave solution for homework . . .

Using TEAMS

- **Start some classes with an exercise**
- **first individually write down**
if I only answer one question . . . **specifically what don't you understand**
- **Now as a team, assemble and prioritize your list ...**

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- **Now as a team, assemble and prioritize your list ...**
THEY WILL BE SURPRISED !!!!



Team Problems

- **Individually, list 5 problems your students might have in teams**
- **Share your list with the person sitting next to you**
- **Suggest a strategy for the top 3 problems**



Ten Common Team Problems

1. **Floundering**
2. **Overbearing participants**
3. **Dominating participants**
4. **Reluctant participants**
5. **Unquestioned acceptance of opinions as facts**
6. **Rush to accomplishment**
7. **Attribution**
8. **Discounts and "plops"**
9. **Wanderlust: digression and tangents**
10. **Feuding members**

From Scholtes, Peter R., *The Team Handbook*, Joiner Associates (1988)



Common Team Problems (Student's Perspective)

- One of my teammates never comes to class.
- One of my teammates never participates
- No one comes to our meeting prepared to work
- One of my team members is very rude
- Most of my teammates just want to rush to accomplishment.



Solutions

- **Forming Teams**
- **Team Training**
 - roles, stages, tools
 - clearly establishes expectations
- **Code of Cooperation**
 - clearly establishes expectations
- **Peer Evaluation**
 - provides motivation



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Effective Teamwork

- The use of roles
- The development of a Code of Cooperation
- The use of agendas for planning meetings
- The use of minutes to keep a record of assigned action items
- The use of a process check for continuous improvement
- The use of the check for understanding to make sure everybody is “on the same page”



Effective Teamwork

- The use of **contact before work** to provide time for non task related discussions
- The use of the **issue bin** to provide time for discussion of items not in the agenda
- The definition of **decision-making processes** to be included in the agenda
- Development of **effective listening skills**
- Ability to give and take effective **constructive feedback** to team members

[Resources](#)



Team Roles

List three roles teams must include to be successful



Team Roles

KEY TEAM ROLES INCLUDE: Meeting Coordinator, Recorder, Timekeeper, Encourager/ gatekeeper, Devil's Advocate.

Roles should rotate among team members.



Important Roles

- **Meeting Coordinator** - coordinates and prepares for meetings and ensures all necessary resources are available for the meetings.
- **Recorder** - responsible for doing the writing during team exercises and provides copies of said material.
- **Time Keeper** - responsible for keeping track of time, as well as keep the team moving so that they finish the task at hand.



Important Roles (CONTINUED)

- **Encourager/ Gatekeeper** - encourages all the other team members to actively participate and holds back the verbose, dominate members. Also reminds the team when they are getting off task.
- **Devil's Advocate** - takes a position opposite to that held by the team to ensure that all sides of an issue are considered. This responsibility should be undertaken by all team members.

Some Rules About Roles

- **Initially:**
 - Rotate the roles on a regular basis until everybody has held a different position;
 - Hold the students accountable for knowing and using their assigned roles;
 - Design tasks that require students to make use of their roles; and
 - Have students do process checks to evaluate their role effectiveness.



Rules About Roles

- Rotate all roles until everybody has played each role
- At this time decide if the Meeting Coordinator role could be effectively rotated
- All other roles should be rotated



Facilitator-Teacher

- **Focuses on the team's process;**
- **Evaluates process performance;**
- **Continually develops personal skills in facilitating and group processes;**
- **Learns a variety of techniques to control digressive, difficult, or dominating participants, to encourage reluctant participants, and to resolve conflict among participants; and**
- **Learns when and how to employ these interventions and how to teach such skills to team members.**

Team Facilitation

- Bring code of cooperation.
- Individually write your goals for the class.
- Individually **+/ Δ** your actions towards achieving these goals.
- Plus/delta yourself and your team members on the code of cooperation.
- Set individual actions for the future.



Code of Cooperation

The agreed upon rules governing the behavior of team members, as well as any appropriate rewards and sanctions.

- It sets a norm for acceptable behavior for each team member and represents how the team members will interact with one another;
- It should be developed, adopted, improved and/or modified by all team members on a continuous basis;
- It should be easily accessible to team members.



Code of Cooperation

- **Individually list 3 things that MUST be on your team code of cooperation**
- **Now share lists with the person sitting next to you**
- **Add at least 1 item to your combined list**



Ten Commandments* An Effective Code of Cooperation

1. *Help each other be right, not wrong.*
2. *Look for ways to make new ideas work, not for reasons they won't.*
3. *If in doubt, check it out! Don't make negative assumptions about each other.*
4. *Help each other win, and take pride in each other's victories.*
5. *Speak positively about each other and about your organization at every opportunity.*
6. *Maintain a positive mental attitude no matter what the circumstances*
7. *Act with initiative and courage, as if it all depends on you.*
8. *Do everything with enthusiasm; it's contagious.*
9. *Whatever you want; give it away.*
10. *Don't lose faith.*
11. *Have fun!*

*
Ford Motor Company

Code of Cooperation

Example from a Student Team

- **Come to class having read assignment.**
- **Be on time for class and team meetings.**
- **Contribute to team efforts on quizzes and classes.**
- **Ask questions of our team and profs to increase understanding of material.**
- **Help teammates understand material being covered.**
- **Avoid procrastination.**

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Evaluating TEAMS

- **Tell them early** announce format
1st day
- **Give them practice** before it
counts
- **Include feedback**
- **Include peer evaluation**

Evaluating TEAMS

- Peer evaluation is only part

- I count peer as a multiplier

i.e., each student receive between 70% and 110% of there team grade depending on peer evaluation); team average remains unchanged

- Some use Bonus Points

e.g., each student can give up to n points to anyone [on team or in class]; cannot keep any; no one can receive > ?



Evaluating TEAMS

- **Format is not important**
- **Peer Evaluation is**

Evaluating TEAMS

- Format is not important
- Peer Evaluation is

Essential



Five stages of Team Development

- **FORMING (orientation)** - Tentative interactions; polite discourse; concern over ambiguity; and self-discourse.
- **STORMING (conflict)** - Criticism of ideas; poor attendance; hostility; polarization; and coalition forming.

Five stages of Team Development (continued)

- **NORMING (cohesion)** - Agreement on procedures; reduction in role ambiguity; revise Code of Cooperation based upon current experiences; and increased "we-feeling".
- **PERFORMING (performance)** - Decision making; problem solving; mutual cooperation; high task orientation; and emphasis is placed upon performance and production.
- **ADJOURNING(dissolution)**



Forming TEAMS

- **NOT** student formed
- **better** if not random
- **not hard to (re)form**
- **heterogeneous**
- **DIVERSE**



Forming TEAMS

- **Data is available**
- **→ admissions data**
 - 1st semester data**
 - High school data**
- **→ 1st day student survey**
- **→ observant assistants**



Forming TEAMS

- Learning Styles
- LifeStyles
- Behavioral Profiles
- Personality Profiles
- etc, etc, and so forth

Forming TEAMS

- Rank order by whatever
 - GPA, Math/Science Completed
 - size of high school
 - rank in high school class
 - AP credit [or # of math/science courses]
 - SAT . . . [or whatever you correlate to success]

Forming TEAMS

- **Combine from one from each quarter [or from two lists]**
- **Pair women & minorities**
- **Minor adjustments if team score is too high or too low**



Process Check

- Use **+/ Δ** 's (Plus / Deltas).
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Issue Bin

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Resources

- **Teams**

<http://www1.eas.asu.edu/~asufc/teaminginfo/teams.html>

<http://tlt.its.psu.edu/suggestions/teams/student/index.html>

Learning Styles

<http://www2.ncsu.edu/unity/lockers/users/f/felder/public/ILSpage.html>

<http://www.active-learning-site.com/vark.htm>

<http://www.hcc.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/lernstyl.htm>

- **Personality (or Character or Temperament) Profiles**

<http://www.keirsey.com/>

- **Behavioral Profiles** [DiSC (Dominance influence Steadiness Conscientiousness), LifeStyles, etc]



Resources

- **How People Learn: Brain, Mind, Experience, and School**, John D. Bransford, Ann L. Brown, and Rodney R. Cocking, Editors; Committee on Developments in the Science of Learning, National Research Council, National Academy of Sciences, 1999

<http://bob.nap.edu/html/howpeople1/index.html>

- **Interactive-engagement vs. traditional methods: A six-thousand-student survey of mechanics test data for introductory physics courses**, Richard R. Hake, Indiana University,

<http://carini.physics.indiana.edu/SDI/ajpv3i.pdf>

- **these and other Resources for Innovative Teaching**

<http://coalition.tamu.edu/eapo/classinvo8.html>



GRADING TEAMWORK

- See also:

<http://www.inov8.psu.edu/>

D.B. Kaufman, R.M. Felder, and H. Fuller,
**"Accounting for Individual Effort in
Cooperative Learning Teams."** *Journal of
Engineering Education*, 89(2), 133-140
(2000).



For More Information

Jim-morgan@tamu.edu

Froyd@ee.tamu.edu

<http://www.foundationcoalition.org>