Team Leadership on Capstone Design Project Teams

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Agenda

- Introduction and Background
- Literature review
- Course Surveys
- Assessments and Evaluations
- Conclusions
ME Capstone Projects

- Capstone Course created in Sept 2004
- Typical class size is between 65 and 110 students
- Typically 14 to 22 projects and teams
- No interdisciplinary teams (only ME students)
- Max of 5 senior students per team
- Min of 3 senior students per team
ME Capstone Design Projects (1, 2, 3, 4, 5)

- **Industry Partner** – projects supported by gifts to the program
- **Research Partner** – projects supported by research funding
- **Design Competitions and Student Organizations** – projects supported by ME department funding
- **Student and Faculty created projects** – projects supported by ME department funding
ME Capstone Design Projects Program

- Website at [www.me.ucsb.edu/projects](http://www.me.ucsb.edu/projects)
Course Deliverables

- **Problem Scoping** (Fall)
  - Product Design Specifications
  - Project Plan
  - Project Presentation
  - Prelim Project Completion Requirements
  - Prototyping, Testing, Modeling and Analysis

- **Concept Generation** (Winter)
  - Preliminary Design Review
  - Engineering Report
  - Project Budget
  - PTMA

- **Solution Realization** (Spring)
  - Complete Project with PCR review
  - Complete Project E-Binder
  - Poster Competition
Desired Outcomes

- Maximize the number of High Performance Teams
- Eliminate Dysfunctional Teams
- Desire motivated, engaged, and enthusiastic students and teams
Project Teams

“A team is a small number of people with complementary skills who are committed to a common purpose, performance goals, and approach for which the hold themselves mutually accountable.” (7)
Driving Factors for Project Teams (7,8)

- All teams need a sense of purpose and a clear cut mission.
- Mission broken into meaningful performance goals for each team member to pursue.
- Work approaches, procedures and processes ensure that all accomplish a task efficiently and effectively.
- Support a common mission and take their individual responsibility in accomplishing a task.
- Mix of skills, experience and expertise.
High Performance Team (7,8)

- Deeper sense of purpose
- More ambitious performance goals
- Better work approaches and outcomes
- Mutual accountability
- Complementary skills and expertise
Team Dysfunction

- Absence of trust
- Fear of conflict
- Lack of commitment
- Avoidance of accountability
- Inattentions to results
- Conflict or behavior by one or more team members that prevents the team from performing or completing activities

June 2013

2013 ASEE
Recent Efforts

- Improved Project Selection Process
- Improved Team Selection Process
- Improved Project Completion Requirements
## 2013 Updated Results

<table>
<thead>
<tr>
<th>Year</th>
<th>Total Students</th>
<th>Total Teams</th>
<th>Total placed 1&lt;sup&gt;st&lt;/sup&gt; preferred</th>
<th>Total placed 2&lt;sup&gt;nd&lt;/sup&gt; preferred</th>
<th>Total placed 3&lt;sup&gt;rd&lt;/sup&gt; preferred</th>
<th>Total prefer</th>
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</thead>
<tbody>
<tr>
<td>2009/10</td>
<td>73</td>
<td>15</td>
<td>49 (67%)</td>
<td>10 (14%)</td>
<td>12 (16%)</td>
<td>97%</td>
</tr>
<tr>
<td>2010/11</td>
<td>68</td>
<td>14</td>
<td>52 (76%)</td>
<td>12 (18%)</td>
<td>1 (2%)</td>
<td>96%</td>
</tr>
<tr>
<td>2011/12</td>
<td>78</td>
<td>16</td>
<td>56 (72%)</td>
<td>11 (14%)</td>
<td>5 (6%)</td>
<td>92%</td>
</tr>
<tr>
<td>2012/13</td>
<td>68</td>
<td>14</td>
<td>57 (84%)</td>
<td>7 (10%)</td>
<td>0 (0%)</td>
<td>94%</td>
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<table>
<thead>
<tr>
<th>Year</th>
<th>Total Teams</th>
<th>Student Formed</th>
<th>Instructor Formed</th>
<th>Total High Perf</th>
<th>Total Dysfunctional</th>
</tr>
</thead>
<tbody>
<tr>
<td>2009/10</td>
<td>15</td>
<td>7(47%)</td>
<td>8 (53%)</td>
<td>4</td>
<td>0</td>
</tr>
<tr>
<td>2010/11</td>
<td>14</td>
<td>8 (57%)</td>
<td>6 (43%)</td>
<td>2</td>
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<tr>
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<td>16</td>
<td>12 (75%)</td>
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<td>2</td>
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<td>13 (93%)</td>
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<td>2</td>
<td>1</td>
</tr>
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Team Leaders (11)

In the professional environment:
- Focuses on the Goal
- Ensures a Collaborative Climate
- Builds Confidence
- Sets Priorities
- Manages Performance
Team Leadership

- Little understood in the Capstone environment
- Examine current informal team leadership role
  - Provide improved guidance
  - Provide improved support
Informal Leadership

Reported attributes on student teams:

- Exerts influence on group processes (task)
- Maintains goal focus for self and group (task)
- Creates a collaborative atmosphere (relational)
- Exhibits technical competence (task)
- Exhibits fairness, humility, and trust (relational)
- Uses creativity and intuition (task & relational)
Informal Leadership

Important observation:

- A dysfunctional relational leader resulting in poor team performance
Course Surveys

- 2012/13 Capstone students 23 of 68 responded to address Course and Project Expectations
- 2012/13 Capstone team leaders 14 of 14 responded
- 2012/13 Capstone students 68 of 68 responded regarding Team Dynamics for Fall and Winter
Course Survey Expectations

Expectations from your team:

- Resolve conflicts
- Work well together
- All perform equally, each member should participate and carry their own load
- Meet goals
- Utmost commitment and dedication
- Deliver a final product that meets requirements
Course Survey Expectations

Expectations from your team leader:

- Organize team and resolve conflicts
- Organize meetings, monitor all team members
- No power trips
- Leadership
- Coordination
Primary role as team leader:

- Project planning documents
- Review and submittal of course documents
- Motivate
- Facilitate
- Assign responsibilities
- Maintain communication
- Organization and Coordination
Team Leader Survey

Team leaders indicate that they **enjoy**:

- Sense of responsibility in leading the team
- Sense of accomplishment
- Project management
- Guide the team
- Communication
- Ability to interact with everyone on the team
Team Leader Survey

Team leaders indicate that they dislike:

- Poor work habits by some team members
- Burden of paperwork
- Not enough time for project management
- Pressure of team performance and achievements
- Not being able to focus on specific tasks
- More difficult and time consuming
It should be noted that we have identified

2 High Performance teams
1 Dysfunctional team.

- Good team satisfaction overall (4.37 of 5)
- High Performance Teams (4.67)
- Dysfunctional Team (4.35)
2012/13 Observations

High Performance Teams

- Team Leader 1 – demanding, very organized, intern at industry partner
- Team Leader 2 – hard-working, leads by example, soft-spoken, independently generated project

Dysfunctional Team

- Team Leader 1 – very disorganized, poor communication skills, became disengaged
- Team did not respond when team leader disengaged
Conclusions

Role and expectations for a good team leader:

- **Maintain focus** for self and the team objectives
- Ensures a **collaborative environment**
- **Motivates** and exerts influence on the team
- Demonstrates and contributes **technical expertise**
- Exhibits fairness, humility, and **trust**
- Maintains **communication** within the team and externally
- Project management in terms of **organization and coordination**
References


References


References


