BESTEAMS Introductory Personal Knowledge Module

Acknowledgement of Support

The material is based upon work supported by the National Science Foundation under grant No. DUE-0089079: “Implementing the BESTEAMS model of team development across the curriculum.”

Any opinions, findings, and conclusions or recommendations expressed in this material are those of the author(s) and do not necessarily reflect the views of the National Science Foundation.

Additional support was provided by the A. James Clark School of Engineering, the Mechanical Engineering department at the University of Maryland, College Park, and Morgan State University, the United States Naval Academy, and Howard University.

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BESTEAMS Module Implementation Plan (MIP)
Introductory Level Personal Knowledge

Topic: Diversity in Learning Styles

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Introduction/Motivation

As engineering educators work to ensure their students are learning the skills industry now requires of its professionals, innovative strategies are developing to meet this need. This module teaches students to recognize their individual learning preferences so they may use that knowledge to participate in an effective team environment. Understanding the individual’s role on the team is vital before its members are able to synthesize their talents into a product larger and better than the solitary individual. Utilizing Kolb’s Learning Styles Inventory (LSI) will enable individuals to understand their own preferences, and is a first step toward guaranteeing that students learn the skills necessary to work effectively and efficiently in teams.

This Module Implementation Plan (MIP) is structured to ensure that the material will resonate with students of all learning style preferences—diverger, assimilator, converger, and accommodator alike. By “teaching around the cycle,” instructors provide information accessible to all learners as well as increase student awareness of other learning style preferences, allowing “learning around the cycle” to occur.

Note: Reference is made throughout the MIP to slide numbers. The complete PowerPoint presentation is available for download at [http://www.enme.umd.edu/labs/BESTEAMS/](http://www.enme.umd.edu/labs/BESTEAMS/).

Expected Outcomes

Upon implementation of this module, students should experience numerous outcomes that facilitate the development of useful team skills, including:

Module Part I (slides 1-20)
- Insight into the differences beyond those typically measured that are represented within an engineering classroom
- Insight into their own learning style preferences, as defined by the Kolb Learning Style Inventory
- Insight into how learning and communication style preferences influence the reception, delivery, and processing of technical information

Module Part II (slides 21-29)
- Insight into how learning styles affect team dynamics
- Insight into using learning styles in teamwork, particularly to minimize team weaknesses and maximize team strengths
- Insight into notion that good problem solving and effective teamwork rotate around the learning cycle
**Delivery Plan Part I (slides 1-20):** Designed for a 50-minute class period

A. Introduce the module and the objectives of the session (slides 1-3). Class characteristics should be considered when determining how best to present the expected outcomes from above.

B. Begin exploring learning styles through discussion of the module’s utility (slides 4-5). This section is designed to encourage thought about learning styles. The activities will appeal to the divergers in the class, who are driven to learn by asking the question, “why?”

*Learning Activity 1:* Higher level/Socratic questions asked by instructor for answer by students could include:
- i. Why is lifelong learning part of the ABET accreditation criteria for this institution’s engineering program?
- ii. Why is it hard to explain something about engineering to someone in a non-technical field?
- iii. How can some of your friends tell you are an engineering student just by the way you explain a topic?

*Learning Activity 2:* Sharing personal experience
Instructor relates a personal experience where s/he was having difficulty communicating an idea to a student in class. Finally, together during office hours, the instructor finds a way to make the connection and the concept becomes clear to the student. For example, in my experience, it is sometimes useful to have students draw a diagram so that I figure out their question. Sometimes we try to find a specific example to illustrate their area of confusion.

We all perceive, learn, and experience reality differently. Team members are challenged to use these differences to their advantage in the completion of the team project.

C. Administer the Kolb LSI and provide background information for students (slides 6-15). Information delivered in this section will demonstrate the larger theoretical framework within which Kolb’s work rests, as well as lead students to see the way this material may be utilized in their own lives and teamwork experiences. The activities will appeal to assimilators in the class, who are driven to learn by asking the question, “what?”

*Learning Activity 3 (slide 6):* Taking the LSI
Have students follow instructions on “The Cycle of Learning” page in the instrument. Students should determine CE, RO, AC, and AE scores and plot their scores, resulting in a 4-sided “kite” shape. Have students hold up their kites to demonstrate the visible differences in learning styles as captured by the Kolb LSI.

*Learning Activity 4 (slides 7-15):* Formal lecture on Kolb
Resources for this lecture include PowerPoint presentation slides (available at [http://www.enme.umd.edu/labs/BESTEAMS/](http://www.enme.umd.edu/labs/BESTEAMS/)) and background reading materials provided in this supplement. Much has been published on Kolb. If you desire more information on his research, refer to the section in this book on his work; the learning style references list at the end of this MIP; or search “David A. Kolb” on your preferred Internet search engine.
Each of us has a preferred learning style. Knowing that style and its strengths can assist us in structuring our learning of new material. In the same way, knowing the strengths of other styles can guide us in trying out new ways of learning materials.

D. Divide class into groups with similar learning styles for further analysis of how learning styles can influence individual perceptions and comfort zones (slides 16-17). Material in this portion encourages critical thought regarding learning style preferences and should lead students to consider how individual differences may play a part in a successful working team. This section will resonate with convergers, who are driven to learn by asking the question, “how?”

Learning Activity 5 (slides 16-17): Activity in learning style groups
Group class by learning style type and ask them to describe how they would like a course instructor to teach material on a particular topic based on different learning styles. Ask a recorder from each group to write the descriptions on the board (or on slide 16 of the PowerPoint presentation) for each learning style. Ask for observations of different preferences by type… what do they see?

Each learning style has very different expectations about teachers and the teachers’ responsibilities for helping students learn. These differences in perception impact how students view their team experience as well.

E. Discussion of how to use the knowledge gained from this module (slide 17). This section’s format will appeal to the accommodators in class, who are driven to learn by asking the question, “what if?”

Learning Activity 6 (slide 18): Making sense of what was learned
Ask students to reflect on a time they had difficulty learning a particular subject and recall what steps they took to learn the material. What if they had known about their Kolb Learning Styles: how might that have made a difference? Could they have asked their instructor for more helpful guidance? Share reactions to exercise at beginning of next class session.

Knowing our own preferred learning style and its strengths can assist us in structuring our learning of new material. In the same way, knowing the strengths of other styles can guide us in trying out new ways to learn material.

F. Wrap Up (slides 19-20). Class session wrap-up will depend on the class size, content, and classroom culture. See “Class Adaptation Strategies” at the end of this MIP.

Delivery Plan Part II (slides 21-29): Designed for a 90+ minute class period

G. Work with students to identify expected behavior in teams (slide 22-25). This section encourages students to use their newfound awareness of learning style to create a deeper understanding of team processes.

Learning Activity 7 (slides 22-24): Team formation
Show the students the slide on the different learning style strengths (slide 21). Place students in groups by style preference and ask: based on this information, how would you
suggest forming teams in an engineering class (slide 23)? Ask the student groups to answer by filling in the boxes for the different learning styles (slide 24). End with discussion of comments and/or observations. Typical answers for this activity are shown in slide 25.

Understanding the ways that teams form, and their personality components, will allow everyone to function in more productive teams.

H. Introduce the idea that teams themselves have learning styles. This section encourages students to think of teams as something more than a group of individuals, and asks them to consider: what if the team really is a more effective vehicle for process and project completion (slides 26-27)?

**Learning Activity 8 (slides 26-27): Identifying Team Learning Style**
Through lecture or question and answer, demonstrate the ways that different learning styles show up in team actions (slide 26). In their project teams, ask students to discuss how their team performs and determine if there is a predominant style. If they determine there is a predominant style, ask students for the positives and negatives of that situation. Please note: This exercise can only be done with a team who has been together a while and whose members are familiar with each other.

Truly understanding the way your group functions is invaluable when working toward project completion.

I. Discussion and group activity designed to flesh out team strengths and weaknesses (slides 28). This section asks the teams to organize in a way that will take advantage of team strengths and protect against team weaknesses.

**Learning Activity 9 (slide 28): Using the Kolb information to enhance team strengths and minimize weaknesses**
Ask teams to identify their strengths and weaknesses by looking at the team’s learning style type. The instructor can seed the conversation by touching on specific questions/topics: does the team focus on actions (and task completion) rather than personalities (and inter-group behavior)? Are the meetings well organized or do they lack clarity regarding what must be completed? Is there little action between meetings?

After teams have identified strengths and weaknesses, ask them to organize the team to address them. For example, if team members have a poor record of task completion, enact a better reporting system that includes the need to respond to messages and remain in communication. If inefficient meetings are the problem, make sure team members have an agenda outlined before the meeting.

Working to prevent problems, rather than being forced to respond to them, will result in a smoother team experience.

J. **Summary and Wrap-Up (slide 29).** Class session wrap-up will depend on the class size, content, and classroom culture. See “Class Adaptation Strategies” at the end of this MIP.

Teaching to the Learning Styles
CONVERGERS

Learning Activity 4 (slide 7-15): The act of determining the scores and identifying the types will appeal to convergers who are driven to get a specific single answer or number. (Then they will argue with you about whether it makes sense.)

Learning Activity 5 (slides 16-17): This section will resonate with convergers, who are driven to learn by asking the question, “how?”

Learning Activity 9 (slide 28): This activity identifies specific ways that the team will be organized and the rules for members acting. This appeals to the Converger’s tendency of having a specific answer or way of acting.

DIVERGERS

Learning Activities 1 (slide 4) and 2 (slide 5): These activities will appeal to the divergers in the class, who are driven to learn by asking the question, “why?” The answers to the questions asked in Activity 1, particularly iii, will illustrate the differences between Kolb Learning Styles. Learning Activity 2 demonstrates two different learning styles having difficulty understanding each other.

Learning Activity 7 (slides 22-24): This activity allows for the act of being concerned with what other types would respond. This appeals to the diverger’s characteristics of being aware of other’s feelings and that are many possible ways to solve a problem.

ASSIMILATORS

Learning Activities 3 (slide 6) and 4 (slide 7-15): The activities will appeal to assimilators in the class, who are driven to learn by asking the question, “what?”

This exercise gives them the general concepts in which the learning styles fit.

Learning Activity 8 (slides 26-27): This activity appeals to this type because it provides an overall conceptual picture to the nature of the team from which an assimilator would understand why the team is acting in specific ways.

ACCOMODATORS

Learning Activity 6 (slide 18): This section’s format will appeal to the accommodators in class, who are driven to learn by asking the question, “what if?”

Class Adaptation Strategies

A) Size: In larger size classes, give LSI as a homework assignment and ask students to bring the completed and scored instrument back to class. Assign sections of seats to each learning style and have students directly take seats in those sections for exercises. Alternatively, some exercises might be completed individually by having students write down their thoughts and perhaps share with the people seated close by.

B) Content: Link the notion of learning styles to specific aspects of course content if possible. For example, if the course involves a project such as building a submarine, robot, highway construction, etc., ask which learning styles types are likely to prefer being involved with which aspects of the projects. For example, accommodators might be more interested in the “human” factors or marketing aspects of the project, the assimilators in the science aspects (e.g. work regarding increasing fuel efficiency), whereas the convergers might prefer designing and building alternative power shaft components and the divergers will like to work on the overall plan to complete the project.

C) Classroom Culture: Depending on academic culture, individual differences may be accentuated or minimized. Kolb preferences are independent of race and gender and independent of team role (leader, follow-through person, etc.). All types can play all roles.

Difference is good; variety contributes greatly to the success of team activities, etc.
Follow-Up Materials

A) Homework: Reading assignment—Instructor choice (see instructor readings and references)

B) Homework: Reflective writing assignment or journal entry—“Do you see your own learning style preferences at work in how you approach your tasks in this course? What one activity could you try that is the opposite of how you normally learn something? Try it and comment on how it felt to learn that way.”

C) Classroom Follow-Up: At beginning of next class, ask for volunteers to read their journal entries aloud. If posted electronically to the instructor, have the instructor read anonymous entries and discuss with the class. When possible, instructor notes if learning activities are especially appropriate to a specific Kolb style to increase students’ appreciation that “teaching around the cycle” is occurring.

D) Exam or quiz items: add questions such as the following to course quizzes or tests: “What strengths does your learning style give you for understanding the course material?” or “What suggestions can you make to me, the course instructor, on how to communicate information on <insert a specific topic covered in your course> to someone with your learning style and habits? Please explain why this method would be useful to you.”

Due to the cost of the Kolb Learning Style Inventory (LSI), BESTEAMS recommends contacting your school bookstore to order the LSIs from Hay Group. Students may then buy themselves a copy as one of the required “texts” for the class—included in the packet is a thorough booklet on Kolb’s Learning Style Inventory and the instrument itself. Alternately, an online version of the instrument exists at the Hay Group website—students may pay Hay Group directly and take the instrument online, and gain access to electronic versions of the Kolb packet.

The material included in the Kolb packet can be assigned for homework. In addition, the booklet includes useful information on how learning style has been linked to careers and other behaviors of interest to students. Please note that this material makes clear the dominance of Convergers in engineering; this might be discouraging or intimidating to non-Convergers in the classroom. The instructor should reiterate that ALL TYPES are needed and important to the field of engineering, despite the fact that some learners gravitate to the area.

Source for Purchasing Kolb Learning Style Inventory Test Materials
The Hay Group/TRG
116 Huntington Ave.
Fourth Floor
Boston, MA 02116

http://trgmecber.haygroup.com/Products/learning
Phone: 800.729.8074
Fax: 617.927.5060