

TEAM BASED LEARNING

COLLABORATIVE

**12th Annual TBLC Conference
February 28 - March 2, 2013**



**San Diego Marriott Mission Valley
San Diego, California**

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Meeting Program

Thursday, February 28, 2013

Pre-Conference Workshops

(separate registration required)

8:00am - 5:00pm	Registration Desk Open	Lobby
8:00am - 9:00am	Light Breakfast for Workshop Participants	Cabrillo Foyer
9:00am - 4:00pm	Becoming a Consultant-Trainer in Team-Based Learning <i>TBLC Trainer-Consultant Workshop: Creating a Module & Peer Evaluation</i> Mary Sinclair, Richard Sabina, and Ed McKee <i>TBLC Trainer-Consultant Workshop: Facilitation Skills and Mentoring</i> Gail Feigenbaum, Rick Goedde, Paul Koles	Cabrillo Salon 2
9:00am - 12:00pm	<i>Team-Based Learning 101*</i> Ruth Levine, Kevin Krane	Cabrillo Salon 1
12:00pm - 1:00pm	Lunch Pre-purchased lunchbox tickets required	Cabrillo Foyer
1:00pm - 4:00pm	<i>The Specific Choice: Making Your TBL Module Successful*</i> Larry Michaelsen , Dean Parmelee	Cabrillo Salon 1
4:00pm - 5:00pm	Meet & Greet Reception	Fountain Terrace
6:00pm	Dine-Around Meet up at the Registration Desk	

* Qualifies for nursing CEU's

Meeting Program

Friday, March 1, 2013

7:00am - 5:00pm	Registration Desk Open	Rio Vista Foyer
7:00am - 8:00am	Light Breakfast	Sunroom
8:00am - 8:15am	Introduction & Welcome	Pavilion
8:15am - 9:00am	Plenary Session 1 <i>Team Cognition in the Context of Team-Based Learning</i> Steve Fiore	Pavilion
9:15am - 11:15am	Workshop Session 1 NOTE: Tickets required for workshop attendance	
	FUNDAMENTALS TRACK	
	<i>Beyond Basics: Becoming an Expert in TBL Facilitation*</i> Peter Clapp	Rio Vista E
	<i>Practical Strategies: Enhancing TBL in Your Classroom**</i> Lauren Burt	Rio Vista F
	INNOVATION TRACK	
	<i>Implementing TBL in Team Taught Courses*</i> Jennifer Robinson`	Rio Vista H
	<i>TBL Roundable Discussions</i>	Sierra 5-6
	<i>TBL in Quantitative Sciences</i> Judy Paterson, Marie Thomas, & Lorrie Comeford	
	<i>TBL in Graduate Medical Education</i> Eric Wallace, John Schumann, Shelia Crow, & Lane Bruner	
	<i>TBL in Humanities/Social Sciences</i> Henry Bayerle & Elizabeth Winter	
	SCHOLARSHIP TRACK	
	<i>Turning Teaching Into Educational Scholarship*</i> Wayne McCormack	Rio Vista G
11:30am - 12:30pm	Going Global Lunch Panel Discussion Moderated by Karla Kubitz	Pavilion
	Sylvester Oppong & Yao Tetty University of Ghana Medical School	
	Anzibert Rugakingira, Denis Katundu, & Esther Lisasi Kilimanjaro Christian Medical University College	
	Ernesto Ocampo, Alvaro Ruibal, Ignacio Alvarez, & Pablo Garin Universidad Catolica del Uruguay	

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Meeting Program

Friday, March 1, 2013

12:45pm - 2:45pm	Workshop Session 2	Lobby
	FUNDAMENTALS TRACK <i>Writing Good RAT Questions*</i> Sarah Mahler	Rio Vista E
	<i>Facilitating the Discussion Prompted by TBL Application Exercises*</i> Joël Dubois	Rio Vista H
	INNOVATION TRACK <i>To Boldly Go Where No One Has Gone Before: Successful*</i> Implementation of TBL Chris Burns & Wayne McCormack	Rio Vista F
	<i>Navy SEAL Workshop</i> Duncan Smith & Larry Michaelsen	Sierra 5-6
	SCHOLARSHIP TRACK <i>Using the Scholarship of Teaching and Learning to Get a TBL-Based Research Program Up and Running*</i> Kelly Ottman & N. Kevin Krane	Rio Vista G
3:00pm- 4:30pm	Oral Presentations 1 Moderated by Tatanya Pashnyak	Pavilion
	SCHOLARSHIP TRACK <i>TBL Assessed for Business Courses at SUNY-Delhi</i> Akira Odani	
	INNOVATION TRACK <i>Use of Myers-Briggs Personality Types in the Distribution of Students to TBL Groups</i> Tracy Frame	
	SCHOLARSHIP TRACK <i>Using TBL Strategies to Promote Adolescent Comprehension of Text in Secondary Social Studies Classrooms</i> Martha Haynes	
	INNOVATION TRACK <i>Bringing Classes Together: Developing Integrated, Team-Taught TBL Modules</i> Charlotte Ricchetti	
4:30pm - 6:00pm	Poster & Exhibit Viewing – Wine & Hors D'oeuvres	Rio Vista A-C

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Meeting Program

Saturday, March 2, 2013

7:00am - 2:00pm	Registration Desk Open	Rio Vista F
7:30am - 9:00am	Poster & Exhibitor Viewing with Light Breakfast	Rio Vista A-D
9:15am - 11:15am	Workshop Session 3	Pavilion
	FUNDAMENTALS TRACK	
	<i>Peer Evaluation Workshop*</i> TEAM: Paul Koles and Chris Burns	Rio Vista H
	<i>From TBL Novice to TBL Master*</i> Amy Lin, Kevin Krane, Abbas Hyderi, and Peter Clapp	Rio Vista F
	INNOVATION TRACK	
	<i>TBL Modules for Dissemination: A Faculty Guide*</i> Sandy Cook	Sierra 5-6
	<i>TBL and the Unfolding Case Study*</i> Deborah Ulrich	Rio Vista E
	SCHOLARSHIP TRACK	
	<i>Facilitating Team Adaptation in TBL*</i> Karla Kubitz	Rio Vista G
11:30am - 12:30pm	Lunch – Business Meeting – Poster Awards	Cabrillo 1-2
12:45pm - 2:15pm	Oral Presentations 2 Moderated by Peter Clapp	Cabrillo 1-2
	SCHOLARSHIP TRACK	
	<i>Student Engagement with TBL in Undergraduate Entrepreneurship Courses: An Exploratory Study</i> Peter Balan	
	<i>Implementation and Assessment of TBL Across a Variety of Disciplines at a State University</i> Lorrie Comford	
	<i>Promoting TBL Around the World: Duke-NUS TBL Fellowship</i> Sandy Cook	
	<i>TBL, Team Composition, and Team Success</i> Molly Espey	
2:30pm - 3:30pm	Plenary Session 2 <i>Team-Based Learning: Extending the Practice and the Community</i> Larry Michaelsen	Cabrillo 1-2
3:30pm	Adjourn	

* Qualifies for nursing CEU's

Business Meeting Agenda

Welcome & President's Address
Wayne McCormack

- Outcomes of the Annual Board Meeting & Retreat
- Introduction of Steering Committee
- Update on 2013 Elections

Election of Members for the Nominating Committee
Julie Hewett

Annual Financial Report
Ed McKee

Committee Updates

- Membership Committee
Michele Clark
- Editorial Board (Module Bank)
Ruth Levine
- Educational Development
Rick Sabina
- Scholarship Committee
Kelly Ottman
- Training & Certification Committee
Paul Koles

Training & Certification Committee Awards
Paul Koles

Membership Forum

Adjournment

About the Team-Based Learning Collaborative (TBLC)

Team-Based Learning Collaborative Vision:

The Team-Based Learning Collaborative is a leading catalyst for transforming and supporting education through Team-Based Learning at all levels and in all fields.

Team-Based Learning Collaborative Mission:

The mission of the Team-Based Learning Collaborative is to promote the understanding and evolution of Team-Based Learning across the educational community.

Team-Based Learning Collaborative Core Values:

We value passion for teaching, student centered learning, advocacy, and the key principles of TBL:

- Effective team formation
- Individual and team accountability
- Team decision making

Board of Directors 2012-2013

President: Wayne McCormack

Past President: Dean Parmelee

President Elect: Michele Clark

Treasurer: Ed McKee

Member-at-Large: Kevin Krane

Member-at Large: Karla Kubitz

Member-at Large: Martha Haynes

Expert Adviser: Larry Michaelsen

Technology Adviser: Jim Sibley

Executive Editor of Publications: Ruth Levine

Annual Program Chair (2013): Karla Kubitz

Annual Program Chair (2014): Peter Clapp

Collaborative Manager: Julie Hewett

Program Committee

Karla Kubitz, 2013 Program Chair
Towson University

Robin Lightner
University of Cincinnati

Wayne McCormack
University of Florida

Dean Parmelee
Boonshoft School of Medicine

Tatyana Pashnyak
Florida State University

Matthew VanSchenkfof
University of Central Missouri

Peggy Weissinger
Georgetown University School of Medicine

Peter Clapp, 2014 Program Co-Chair
Regis University

Rebecca Moote, 2014 Program Co-Chair
Regis University

Plenary Session 1

Team Cognition in the Context of Team-Based Learning

Steve Fiore

About the Speaker



Stephen M. Fiore, PhD, is President of the Interdisciplinary Network for Group Research and a founding Program Committee member for the annual Science of Team Science conference. He is faculty with the University of Central Florida's Cognitive Sciences Program in the Department of Philosophy and Director of the Cognitive Sciences Laboratory at UCF's Institute for Simulation and Training. He maintains a multidisciplinary research interest that incorporates aspects of the cognitive, social, organizational, and computational sciences in the investigation of learning and performance in individuals and teams. Dr. Fiore's primary area of research is the interdisciplinary study of complex collaborative problem solving and he has taken a leadership role in the development of the field of team cognition, a melding of cognition with understanding how humans interact socially and with technology. At the international level, Dr. Fiore has been a visiting scholar for the study of shared and extended cognition at École Normale Supérieure de Lyon in Lyon, France (2010) and he was a member of the expert panel for the Organisation for Economic Co-operation and Development's 2015 Programme for International Student Assessment (PISA)

which focuses on collaborative problem solving skills. At the national level, he has contributed to working groups for the National Academies of Science as well as participated in panel reviews for the National Science Foundation's Science and Technology Centers. As Principal Investigator and Co-Principal Investigator he has helped to secure and manage over \$20 million in research funding from organizations such as the National Science Foundation, the National Aeronautics and Space Administration, the Office of Naval Research, the Air Force Office of Scientific Research, and the Department of Homeland Security. He is co-Editor of recent volumes on Shared Cognition (2012), Macrocognition in Teams (2008), Distributed Training (2007), Team Cognition (2004), and he has co-authored over 150 scholarly publications in the area of learning, memory, and problem solving at the individual and the group level.

Plenary Session 2

Team-Based Learning: Extending the Practice and the Community

Larry Michaelsen

About the Speaker



Larry K. Michaelsen (Ph.D. in Organizational Psychology from The University of Michigan) is David Ross Boyd Professor Emeritus at the University of Oklahoma, Professor of Management at the University of Central Missouri, a Carnegie Scholar, a Fulbright Senior Scholar (three awards) and, former Editor of the Journal of Management Education. Dr. Michaelsen has also received numerous college, university and national awards for his outstanding teaching and for his pioneering work in two areas. One is the development of Team-Based Learning (TBL). The other is an Integrative Business Experience (IBE) program that links student learning in three core business courses to their experience in creating and operating an actual start-up business whose profits are used to fund a hands-on community service project.

Workshop Session 1

FUNDAMENTALS TRACK

Beyond Basics: Becoming an Expert in TBL Facilitation
Peter Clapp

Practical Strategies: Enhancing TBL in Your Classroom
Lauren Burt

INNOVATION TRACK

Implementing TBL in Team Taught Courses
Jennifer Robinson

Three Roundable Discussions
TBL in Quantitative Sciences
Judy Paterson, Marie Thomas, & Lorrie Comeford

TBL in Graduate Medical Education
Eric Wallace, John Schumann, Shelia Crow, & Lane Bruner

TBL in Humanities/ Social Sciences
Henry Bayerle & Elizabeth Winter

SCHOLARSHIP TRACK

Turning Teaching Into Educational Scholarship
Wayne McCormack

WORKSHOP ABSTRACTS

Beyond Basics: Becoming an Expert in TBL Facilitation

David Clark PharmD, Peter Clapp Ph.D., Miki Goldwire PharmD, Rebecca Moote PharmD, Michael Nelson Ph.D.

BACKGROUND: Providing student teams with quality learning materials is only the beginning of the TBL experience. One early challenge new TBL faculty face is facilitating discussions that reinforce the significance of application exercises and assess mastery of learning objectives. This workshop will provide useful facilitation strategies to faculty who are new to TBL as well as those who have used TBL extensively. It will also provide examples of application exercises that participants can use in mentoring other faculty who are new to TBL. The applications created for this workshop draw on the experience of a School of Pharmacy that has utilized TBL as its exclusive teaching methodology for four years.

OBJECTIVES:

1. Discuss facilitation strategies which enhance teaching interactions among team members and between teams, support complete understanding of learning objectives tied to the exercise and promote good classroom time-management.
2. Identify ways to manage the classroom when a student presents a grievance with an iRAT question, a team explains an answer incorrectly to the class or a student speaks too softly to be heard by the class.

FORMAT/METHODS: The workshop will be conducted using a team-based learning format. Following a brief introduction, workshop attendees will be divided into groups. They will be given several application exercises concerning the facilitation of classroom discussions in TBL. Application topics include: addressing RAT concerns in the classroom, facilitating inter-team and intra-team discussions, incorporating all teams/students into classroom discussion. For each exercise, groups will be asked to discuss the question, come to a consensus and choose from the answers provided. Groups will be given approximately 10 minutes to make a specific choice. Groups will then be prompted to simultaneously reveal their answer. The facilitator will encourage debate, enabling the groups to discuss the advantages and disadvantages of each choice. For the last 20 minutes the facilitators will discuss their own experiences with TBL facilitation and provide a summary of the facilitation tools that were used during the workshop.

PRODUCTS/MATERIALS: Each participant will receive content information in the form of application exercises.

LEARNER ASSESSMENT: Group discussion will assess if participants have identified key strategies to improve TBL facilitation.

Practical Strategies: Enhancing TBL in Your Classroom

Dan Berlau, Ph.D., Lauren Burt, PharmD, Michele Hanselin, PharmD
Jeffrey Lalama, PharmD, Leah Sheridan, Ph.D., Brandon Sucher, PharmD

BACKGROUND: TBL has been the primary method of instruction in the Regis University School of Pharmacy since 2009. In this session we will present strategies for practical issues in TBL and provide a forum for audience members to share institution specific strategies.

SPECIFIC OBJECTIVES: By the end of this workshop, the learner will identify strategies to enhance classroom efficiency, academic integrity, achievement of learning objectives, and assessment of qualitative educational outcomes.

FORMAT/METHODS: The workshop will be conducted using a TBL format. Following a brief introduction, attendees will work in teams to complete application exercises, determining the best strategies to address the following:

- Upholding Academic Integrity
- Ensuring Achievement of Learning Objectives
- Assessing Qualitative Educational Outcomes

Following each application exercise, facilitators will incorporate audience member experience into a dynamic discussion.

PRODUCTS/MATERIALS: Regis University School of Pharmacy will supply the teams with application materials and a handout summarizing the take home points of each application exercise.

LEARNER ASSESSMENT: Learners will evaluate strategies to overcome practical issues in implementing TBL.

Implementing TBL in Team Taught Courses

Jennifer D. Robinson PharmD, Washington State University
Michelle Zingone Farland, PharmD, BCPS, CDE, University of Tennessee Health Science Center
Andrea S. Franks, PharmD, BCPS, University of Tennessee Health Science Center
Brigitte L. Sicut, Pharm.D., BCPS, BC-ADM, Virginia Commonwealth University

BACKGROUND: When you are involved in a team taught course that utilizes team based learning (TBL), how do you encourage course instructors to implement TBL in a manner that promotes consistency and quality? This session will provide attendees with strategies to utilize when implementing TBL into a team taught course, to maximize consistency between class sessions, and to enhance the quality of TBL sessions.

SPECIFIC OBJECTIVES: By the end of this workshop, the learner will be able to:

1. List common barriers to using team based learning in a course with multiple faculty facilitators.
2. Identify a strategy to implement a TBL approach in a historically team taught traditional lecture style course.
3. Develop strategies to maintain consistent classroom procedures among faculty facilitators.
4. Critique different methods of evaluation used to promote consistency and quality of the readiness assurance process and application exercises.

FORMAT/METHODS: A “team based learning” format will be utilized for the workshop.

Following a five minute introduction, attendees will be separated into learning teams. Teams will be provided with application exercises concerning issues encountered within team taught courses utilizing TBL.

During the first application exercise, the teams will be presented with various strategies used to implement TBL in a team taught course. Different options will be provided and discussed. Teams will be asked to reach consensus about which approach would be the most effective. Fifteen minutes will be provided for intra-team discussion, followed by simultaneous reporting of responses and 10 minutes of inter-team discussion.

Teams will be given two additional application exercises following the same process as described above. The discussions will focus on different approaches to maintain consistent classroom procedures, quality assurance through evaluation of course materials, and faculty facilitation skills.

For the last 20 minutes presenters will share their own experiences with TBL and facilitate discussion in an interactive question and answer session.

PRODUCTS/MATERIALS: Each participant will receive:

1. Implementation Scenarios Case
2. Setting the Ground Rules Handout
3. Quality Assurance Scenarios Case
4. Contact information for the presenters and information regarding access to additional resources.

LEARNER ASSESSMENT: Learners will be asked to identify what approach they are willing to use to implement TBL in a team taught course, maintain consistent classroom procedures, and institute a continuous quality improvement approach to assure consistent quality of materials used for application exercises and questions for the readiness assurance process.

TBL Roundtable Discussions

Allyson Brown, Judy Paterson, Wallace Bruner, Bayerle, Winter

The Innovations Roundtable Discussions are focused on applications of TBL in innovative, including TBL in the Quantitative Sciences, TBL in Graduate Medical Education, and TBL in the Humanities and Social Sciences. Each of the three roundtables will be collaboratively led by individuals currently implementing TBL in those areas. Each roundtable will include initial presentations by roundtable leaders as well as discussion and sharing of TBL-related challenges and solutions in these uniquely challenging areas.

Turning Teaching Into Educational Scholarship

Wayne T. McCormack, Ph.D., University of Florida College of Medicine

BACKGROUND: Teaching is an important part of any faculty member's job assignment, and being an effective teacher can greatly influence promotion and/or tenure decisions. Taking a scholarly approach to teaching takes teaching to a "higher level". Although most faculty members involved in research activities can describe research scholarship and how to assess it, describing educational scholarship and how to assess it can be challenging.

SPECIFIC OBJECTIVES: By the end of this workshop, the learner will be able to:

1. Describe Boyer's four separate but overlapping dimensions of scholarship: discovery, integration, application, and teaching;
2. Describe Glassick's criteria for scholarship in the context of education;
3. Describe major distinguishing characteristics in practice between teaching, scholarly teaching, and the scholarship of teaching; and
4. Identify teaching behaviors and related activities that distinguish between scholarly teaching and teaching scholarship.

FORMAT/METHODS: Following a 20-minute introductory discussion about the definition of educational scholarship and Glassick's criteria for assessing scholarship, workshop attendees will be divided into teams. Teams will then work on an application exercise consisting of nine profiles of faculty members at different career stages. Teams will be asked to identify whether each faculty profile represents teaching, scholarly teaching, or teaching scholarship. The facilitator will then engage the teams to debate each profile, and possible ways for such a faculty member to "improve" their scholarly performance. Throughout the workshop there will be ample opportunity for questions.

PRODUCTS/MATERIALS: Each participant will receive:

1. A copy of the booklet "MedEdPORTAL Educational Scholarship Guides", which is a series of educational documents that describe the definition, peer review, publication, and recognition of educational scholarship in higher education. Drawing on the educational scholarship literature, the documents illustrate how published educational works are comparable to other forms of scholarship that are commonly used for promotion and tenure purposes. The four documents include: Educational Scholarship Guide for Faculty, Educational Resources as Scholarship for Promotion/Tenure, Evaluating Educational Scholarship, and Author Checklist.
2. TBL session materials, including the nine faculty profiles of teaching, scholarly teaching, and/or teaching scholarship.

LEARNER ASSESSMENT: Learners will apply their knowledge of the definition and assessment of educational scholarship to identify the level of scholarship exemplified by faculty profiles provided. Group discussion will assess if the participants are able to develop strategies to improve their scholarly approach to teaching.

Workshop Session 2

FUNDAMENTALS TRACK

Writing Good RAT Questions

Sarah Mahler

Facilitating the Discussion Prompted by TBL Application Exercises

Joël Dubois

INNOVATION TRACK

To Boldly Go Where No One Has Gone Before: Successful Implementation of TBL

Chris Burns & Wayne McCormack

Navy SEAL WORKSHOP

Duncan Smith & Larry Michaelsen

SCHOLARSHIP TRACK

Using the Scholarship of Teaching and Learning to Get a TBL-Based Research Program Up and Running

Kelly Ottman & Kevin Krane

WORKSHOP ABSTRACTS

Writing Good RAT Questions

Lead Facilitators & RAT/MCQ Experts: Marie Thomas, Chris Burns, & Molly Espey
Disciplinary Facilitators: Sarah J. Mahler, Judith Bradetich, Deepti Vayas & Sandy Cook

Workshop One:

The two target audiences for this workshop are

1. Those new to TBL and
2. Those who feel they could learn more about writing quality RAT questions.

Guidelines for writing & evaluating multiple choice questions (MCQs) in general will be discussed and then applied toward use within TBL courses. To the degree possible, advance registrants for the workshop will be emailed some key materials about writing RAT question (such as those circulated by Jim Sibley). The workshop will be conducted using a “team based learning” format. Following a 10-minute introduction, workshop attendees will be divided into teams. Teams will be formed such that both those with and those w/o TBL experience will be members and each facilitator will participate in a team. Attendees will be asked in advance to bring to the workshop the top 3 problems they have encountered when writing RATs or when trying to write RATs and these will be shared. Those who do not can brainstorm them on the spot. Teams will be given 15 minutes to share issues and then proceed to rank their top three issues. They will share their rankings by writing the list on a large sheet of paper and sticking it to the wall (gallery style). This will be followed by a facilitated discussion of these issues until the top three for the whole workshop are identified.

Facilitating the Discussion Prompted by TBL Application Exercises in Humanities & Social Science Courses

BACKGROUND: In Michaelsen, Sweet & Parmelee (2008), Derek Lane examines skills needed for facilitating conversations that follow application exercises, promoting the four-step sequence of questioning promoted in Stanfield (2000). Jim Sibley expands on this description in Sweet & Michaelsen (2012), including a list of diverse “artifacts” that support such discussion, from the familiar voting cards and gallery walks to more specialized use of transparencies and Google docs. My own chapter in Sweet & Michaelson (2012), finally, addresses the challenges of facilitating such conversations in Humanities & Social Science courses focusing on culture.

This workshop builds on the insights of the above sources by engaging participants in ranking three classroom discussion scenarios featuring different types of student-teaching interaction: the lively debate; the slower discussion building on limited responses; and the more painful, uphill work required when most students are still puzzled by the concepts applied. The task will be to determine which of the three scenarios provides the most powerful example of the way post-application discussion guides students in high-level reflective and analytical thinking. In discussing team choices I will model and identify essential questioning and listening strategies.

OBJECTIVES: Participants who complete this workshop should be able to:

1. Understand the factors impacting student curiosity, energy & focus during TBL discussions.
2. Listen & pose questions to deal with varying levels of curiosity, energy, etc.
3. Accept breakthroughs & blunders as part of a long-term TBL experiment.

FORMAT/METHODS: I will ask participants in the workshop to prepare by reading the on-line scenarios. If the workshop slot is longer (2 hours is preferred) I can include a longer period for catch-up reading and a RAT to set the stage for the application exercise (25-50 minutes), followed by the application exercise (40 minutes) and discussion (25-30 minutes)

PRODUCTS/MATERIALS: Participants will receive a handout with contact information and an annotated bibliography of relevant literature, including the works cited under "Abstract Authors."

LEARNER ASSESSMENT: I propose the following survey questions to assess the workshop's effectiveness:

- "One idea that I want to remember from today's workshop is:"
- "One thing that I am inspired to work on after participating is:"
- "One thing I would like to learn more about is:"

Christensen, C. Roland, David A. Garvin, and Ann Sweet. Education for Judgment : The Artistry of Discussion Leadership. Boston, Mass.: Harvard Business School Press, 1991.

Michaelsen, Larry K., Michael Sweet, and Dean X. Parmelee, eds. Team-Based Learning : Small Group Learning's Next Big Step. San Francisco: Jossey-Bass, 2008.

Sweet, Michael, and Larry K. Michaelsen. Team-Based Learning in the Social Sciences and Humanities : Group Work That Works to Generate Critical Thinking and Engagement. Sterling, Va.: Stylus Pub., 2012.

Stanfield, R. Brian (ed.). The Art of Focused Conversation: 100 Ways to Access Group Wisdom in the Workplace. Gabriola Island, B.C.: New Society Publishers, 2000.

To Boldly Go Where No One Has Gone Before – Successful Implementation of TBL

Chris Burns, Wayne McCormack

BACKGROUND: Adopting TBL at the course or curricular level is a challenge. Many potential pitfalls are predictable, while others only become apparent after implementation. Early adopters would benefit from understanding likely and developing problems so they can be avoided or quickly solved. Administrative concerns about cost and facilities, faculty insecurity developing TBLs and letting go of lectures, and student resistance to TBL because it is so different from the typical lecture style of learning used in their previous classes are some of the key obstacles. Knowing what to expect and how TBL has evolved at other institutions will help remove these barriers. The session will emphasize TBL principles in promoting successful TBL implementation: preparation, accountability, teamwork, and feedback.

OBJECTIVES: Explain the need to be proactive in nurturing new TBL implementations. Identify problems faced by faculty, students, and administrators, Describe ways to avoid or solve these problems

FORMAT/METHODS: TBL. A series of application exercises will help participants evaluate potential problems to TBL implementation and consider the effectiveness of different solutions. The session will include student and faculty training and buy-in, situational and environmental factors, and TBL evaluation and oversight. Facilitators and the participants will provide real world scenarios for troubleshooting.

PRODUCTS/MATERIALS: Participants will receive materials to reproduce the TBL at their home institutions to help other faculty and administrators understand the obstacles to TBL implementation.

LEARNER ASSESSMENT: Participants will demonstrate understanding of challenges to implementing TBL, ability to identify solutions and sources of assistance, and extrapolate to the unique culture and educational goals of their own institutions.

Navy SEAL Workshop

Duncan Smith & Larry Michaelsen

This workshop focuses on teams and team development in the Navy SEALS. It will be presented using a TBL format.

Using the Scholarship of Teaching and Learning to Get a TBL-Based Research Program Up and Running

Kelly Ottman, N. Kevin Krane

BACKGROUND: Ground in the Scholarship of Teaching and Learning (SoTL), this session is designed for those using Team-Based Learning who would like to understand how to create scholarly products from their teaching activities.

OBJECTIVES: By the end of this workshop, the learner will:

1. Apply a working definition of the Scholarship of Teaching and Learning and the importance of SoTL to academic work and TBL
2. Be able to describe the different levels and taxonomy of scholarly work and the relevance of each level to professional life and their institutional activities
3. Develop potential research ideas from their own activities
4. Network with other potential collaborators to discuss research projects and/or programs
5. Identify publication sources

FORMAT/METHODS: This workshop will be conducted using the Team-Based Learning approach. Following an introduction, attendees will be divided into teams and the TBL format will be integrated into the workshop. Attendees will be presented a brief overview of the Scholarship of Teaching and Learning and given reading materials. Attendees will complete the readiness assurance process and participate in group application exercises. Group brainstorming and discussion will occur within teams to promote a community of learners and networking. Throughout the workshop there will be significant discussion by participants among and between teams with ample opportunity for questions.

PRODUCTS/MATERIALS: Attendees will receive handouts to support their discussions

LEARNER ASSESSMENT: Attendees will develop a strategy to apply the Scholarship of Teaching and Learning given their educational and professional interests. Learners will have achieved the workshop goal if they leave this session with research ideas based on their teaching activities and an understanding of how to turn these into research output in the form of papers and conference presentations, with particular reference to Team-Based Learning.

Oral Presentations 1

INNOVATION TRACK

Use of Myers-Briggs Personality Types in the Distribution of Students to TBL Groups

Tracy Frame

Bringing Classes Together: Developing Integrated, Team-Taught TBL Modules

Charlotte Ricchetti

Interactive Videoconferencing: Using TBL Strategies with AHEC Students Across North Carolina

Kathryn Smith

SCHOLARSHIP TRACK

Using TBL Strategies to Promote Adolescent Comprehension of Text in Secondary Social Studies Classrooms

Martha Haynes

TBL Assessed for Business Courses at SUNY-Delhi

Akira Odani

Oral Presentations

TBL Assessed for Business Courses at SUNY-Delhi

Akira Odani, Ph.D. (Business Department), Jack Tessier, Ph.D. (Liberal Arts and Sciences Division), State University of New York, College of Technology, Delhi, New York

BACKGROUND: A majority of classes in the Business Department are taught in the traditional method of instructors lecturing and presenting information to students. It has been a challenge for business instructors to overcome students' inertia and passivity. Beginning in the fall of 2011, the presenter adopted Team-Based Learning as an alternative to the traditional method in all classes.

DESCRIPTION: This research analyzed the students' performance data across all the courses taught in two separate academic years, one year taught in the traditional method and the other using the TBL method. Courses taught included Introduction to Business, Marketing, Advertising, and Small Business Management. The total number of students in pre-TBL classes was 259, while the TBL year had 251. Students' learning outcomes were assessed by students' course grade point average (GPA) and the missed hours per class.

EVALUATION: The statistical analyses were conducted using Minitab Version 16 (Minitab, Inc., State College, PA USA) at $\alpha = 0.05$. Overall for all classes, in the Pre-TBL classes, students achieved the GPA of 1.93 (0.08), while Post-TBL classes gained the GPA of 2.40 (0.08) with $P < 0.0001$. The improvement in GPA is a significant 24%. In terms of number of missed classes per student, the Pre-TBL classes ($n = 243$) counted 6.12 (0.34), while the Post-TBL classes ($n = 197$) showed 3.04 (0.32) per student, with $P < 0.0001$.

CONCLUSION: In comparison to the traditional lecture format, students' academic performance and their attendance in TBL classes were significantly superior.

Notes: _____

Interactive Videoconferencing: Using TBL Strategies with AHEC Students across North Carolina

Kathryn W. Smith, Kenan Penaskovic, MD, Erin Malloy MD.

BACKGROUND: Students in the Psychiatry Clerkship at University of North Carolina School of Medicine can be located at UNC Hospitals in Chapel Hill, Carolinas Medical Center in Charlotte or Central Regional Hospital in Butner for the six-week block rotation. During the course, students are required to participate in a seminar series coordinated from the UNC Chapel Hill site. In January of 2012 the course was modified to facilitate active learning through team-based learning. To date over 120 students have experienced the modified curriculum.

DESCRIPTION: The course consisted of conventional didactic lectures, four TBL exercises, and clinical work. Students had a pre-class reading activity and individual and group readiness assurance tests. The students were divided into teams based on diversity, experience, and site location for the six-week block. Students would log into our proprietary testing system "MedStars" to take the iRAT and then convene to take the gRAT on IF-AT cards together through Skype, or Face Time and text messaging. Students all then complete the application questions and are able to show their Application colored cards through the video conferencing and share their ideas with peers from Butner, NC and Charlotte, NC.

EVALUATION: Videoconferencing in combination with Team-Based Learning has enabled us to provide a standardized curriculum to students even at remote sites and allow them to be involved with their peers on meaningful discussions. The use of TBL has increased NBME Shelf Scores from an average at all sites from 83.8 in 2010-2011 prior to the use of TBL to an average of 86.3 since January 2012 to present and the use of TBL. Individually at each of the sites: Charlotte Medical Center increased from 79.11 (pre-TBL) to 85.9 (post-TBL); Central Regional Hospital scores increased from 84.38 to 88.3; and UNC scores increased from 84.62 to 85.9.

CONCLUSION: Students are able to communicate and work effectively on team-based learning exercises in their groups through the videoconferencing. Even though students must become creative to get the opinions of the students who are at the distance locations, using Skype, Text Messaging or Face Time to communicate, they are still very successful. Furthermore, TBL scores at the remote sites have remained similar to those on-site which may allow further dissemination of TBL throughout medical education. Since the implementation of TBL in the Psychiatry Clerkship the Shelf Scores have risen.

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Use of Myers-Briggs Personality Types in the Distribution of Students to TBL Groups

Rebecca Gryka, Pharm.D., Ph.D.(1); Tracy Frame, Pharm.D.(2); Mary E. Kiersma, Pharm.D., Ph.D. (3); Lorin Sheppard, Ph.D.(4); Stephanie Cailor(5); Aleda M. H. Chen, Pharm.D., Ph.D.(2)(1)Associate Professor and Department Chair, Cedarville University, School of Pharmacy, Department of Pharmaceutical Sciences (2)Assistant Professor, Cedarville University, School of Pharmacy, Department of Pharmacy Practice (3)Director of Assessment, Manchester University, College of Pharmacy (4)Director of Instructional Design, Manchester University, College of Pharmacy (5)Pre-Pharmacy Student, Cedarville University, School of Pharmacy

BACKGROUND: Team-based learning (TBL) is a useful active learning tool but has had limited incorporation within schools of pharmacy. In a TBL course, students are organized into groups for a specified term. While research has shown the benefits of diversity in teams based on personality and gender, little data exists regarding the best method of distributing students into teams.

DESCRIPTION: TBL was utilized in two pharmacy courses, Introduction to Self-Care and Medicinal Biochemistry, during the fall semester of the first professional year (P1). Prior to the start of the 2012 academic year, P1 students completed the Myers-Briggs Type Indicator® (MBTI®) personality test. Students were separated into nine teams comprised of a diversity of MBTI© types and gender. Pre- and post-tests will be utilized to assess the students' perceptions of TBL and the level of confidence associated with the learning format. Pre-post differences will be analyzed using Wilcoxon Rank-Sum Tests and group comparison using Chi-squared or McNemar's test, as appropriate.

EVALUATION: A total of 53 students were distributed into TBL teams. While post-test data will be assessed prior to presentation, pre-test data indicated that 26 students (50%) were extroverts, and a total of 21 students (40%) were identified as Sensing-Thinking-Judging MBTI© type. Most students somewhat- to strongly-agreed that they prefer to work alone (39, 74%) and groups should be diverse in personality (40, 75%).

CONCLUSION: Preliminary data indicate that pharmacy students prefer to work with diverse personalities. Given their preference for individual work, post-test data will be utilized to assess if TBL impacted their perception of teamwork, since it is an essential component of healthcare practice.

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Using Team-Based Learning Strategies to Promote Adolescent Comprehension of Text in Secondary Social Studies Classrooms

Martha Haynes, Shawn Kent, Greg Roberts, Michael Solis, Stephanie Stillman-Spisak, Elizabeth Swanson, Sharon Vaughn, Jeanne Wanzek

BACKGROUND: The Florida Center for Reading Research at Florida State University is partnering with three universities in Texas to develop and test instruction to assist students in middle and high school in better comprehending and understanding material in the content areas of social studies and English language arts. In the first year of the study, 2010-11, experienced teachers assisted in development of strategies, including Team-Based Learning (TBL) strategies, for helping students to be more engaged in content and understand text they read in the content area. During the 2011-12 school year, 13 social studies teachers implemented an experimental, pilot study in their 8th and 11th grade U.S. History classes of the TBL strategies developed in Year 1.

DESCRIPTION: Each teacher's class period were randomly assigned to 2 conditions: a) Typical content with TBL strategies (treatment), or b) Typical content (comparison). TBL comprehension checks and knowledge application strategies were aligned with the social studies curriculum to help inform teachers about what students understood and facilitate student team discussions of the content. During three 15-day units, the students worked in permanent, purposefully formed teams in the treatment classes. Pre- and post-assessments formed the basis for analysis of the research question. An additional assessment was administered between 2-4 weeks after the conclusion of the third unit to measure retention of content.

EVALUATION: 821 students participated in the Year 2 experimental, pilot study. At the conclusion of the implementation of three 15-day units, preliminary means and data suggest that the students in classrooms where the TBL strategies were implemented outperformed students in the comparison classrooms on social studies content knowledge.

CONCLUSION: Based on the results of the Year 2 research, TBL has been included as one strategy in a larger, experimental study of content knowledge and reading comprehension in two states.

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Bringing Classes Together: Developing Integrated, Team-Taught TBL Modules

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BACKGROUND: Integration of basic sciences with clinical sciences is a growing trend in health care curricula, and doing so has been shown to provide numerous educational benefits. Integration equips students with the tools needed to deliver evidence based health care while ensuring the fundamental knowledge base necessary to incorporate new science research into their practice environments. The value to integrating basic sciences into clinical education has been noted in dental, medical, nursing, and pharmacy literature. In addition, integration can promote Interprofessional Education by removing barriers between disciplines, expanding the contributions from multiple disciplines and ultimately resulting in improved retention of knowledge. Developing integrated, team taught modules can present a number of challenges and barriers for educators. Regis University School of Pharmacy uses integrated Team Based Learning (TBL) as the primary instructional method across the first three years of the curriculum. Faculty from multiple disciplines with representation from both pharmaceutical sciences and clinical practice work in teams to develop and facilitate team taught TBL modules. The intent of this workshop is to share strategies to successfully collaborate across Departments and/or Colleges, engage multiple disciplines in the development of educational materials, manage workload associated with team teaching, and address potential barriers to integrated and Interprofessional team teaching. The facilitators will share their experiences delivering curriculum within a school of pharmacy, however, the strategies presented can be applied to a variety of programs and disciplines.

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Poster Abstracts Session 1

Track: *Scholarship*

Poster ID: 101

The Difference in Perception Toward TBL Between New Entrant Students and Those Converted from Traditional System.

Ahmad Almeman Dean of Pharmacy School, Unaizah, Qassim University Saudi Arabia Mustafa Saleh Saeed, Pharmacy Practice Department, Qassim University Saudi Arabia Yaser Al-Worafi, Pharmacy Practice Department, Qassim University Saudi Arabia

INTRODUCTION: Team-based learning (TBL) is a new educational technique that is not widely applied in academic settings. TBL has resulted in more knowledge understanding compared to the traditional approach. However, shifting the students from the traditional methods to TBL might be less effective than to initiate TBL from the beginning. Aim: To compare the perception toward TBL between newly enrolled students and those who converted to the TBL after few years of applying the traditional system.

METHODS: This study was conducted in college of pharmacy, Qassim University, as we have been applying TBL in the teaching of pharmacotherapy, pharmacokinetic, pharmacy profession, and pharmacy practice classes for almost two years. To measure the perception, Callegos's survey was conducted among the students of different levels. The participants has been divided into two main groups, newly enrolled students (level 3 and 4) and previously enrolled students (level 7,8, and 9). The previously enrolled students have been taught by the traditional methods for few years then converted to TBL. Mann-Whitney statistical test was used to measure the differences in perception between the two groups.

RESULTS: The result indicated that there is a statistically significant difference between the two groups in the response to following questions: learning more in courses ($p = 0.004$), improving their course grade ($p = 0.008$), and clinical reasoning skills ($p = 0.001$), ability to think through a problem ($p = 0.032$), and developing more respect for the opinion of other ($p = 0.003$). Otherwise, they behaved similarly in the rest of the questions. The result was in favor of the newly enrolled students.

CONCLUSIONS: We found that the perception of the new entrant students to the TBL was better than that of the converted students.

3D Virtual Team-Based Learning in an Online Regional Anatomy Course for Pre-Health Professional Students

April Richardson-Hatcher, PhD, Matt Hazzard, Christopher Bentley, Christena Gazave, and Jennifer-Brueckner Collins, PhD. The University of Kentucky, Anatomy & Neurobiology Department, Information Technology, and the University of Louisville, Department of Anatomical Sciences and Neurobiology

BACKGROUND: A new anatomy course for upper level undergraduates has been designed to feature the Team-Based Learning (TBL) approach in the 3D virtual world of Second Life™. The course is entitled ANA 309: An Introduction to Regional Anatomy, and it includes weekly synchronous virtual TBL exercises to reinforce anatomical concepts.

DESCRIPTION: ANA 309 is an online course that utilizes Blackboard™ (Bb), McGraw-Hill Apr 3.0 Revealed, and Second Life™ to deliver course content. Students study interactive power point modules of specific regions of the body to prepare for the weekly virtual TBL sessions in Second Life™. The TBL process for this course consists of an Individual Readiness Assurance Test (iRAT) administered via Bb prior to the virtual session, and a Group Readiness Assurance Test (gRAT) and clinical application administered via the Second Life™ interface. Upon arriving to the virtual anatomy lab, student avatars “teleport” to their respective group rooms to take the gRAT. Students are allotted 20 minutes to discuss the gRAT via instant message or voice chat and to indicate their answers via a virtual immediate feedback assessment technique (IFAT) form. The group score is calculated by a running script in the virtual world and automatically emailed to the instructor upon completion. Students are then directed to discuss a clinical case study consisting of 2-4 challenging multiple choice questions, and to agree upon a common answer for these questions before returning to the main virtual anatomy lab. In the main room, each group reports their answers by selecting from a virtual panel of color-coded letters (A, B, C, D, or E) that displays at the end of the time limit. This reporting is followed by class discussion of the material.

EVALUATION: Data regarding the students’ sequential and overall evaluation of the virtual TBLs will not be decoded until the close of the semester. The process of administering TBL in a 3D virtual environment will be discussed in this presentation.

CONCLUSIONS: Virtual TBL sessions may be used to enhance online learning experiences, as avatar representations allow for a sense of immersion in the online environment by enabling students to interact with their group members and class content in a dynamic 3D setting.

Living & Writing: Using TBL in a First Year Writing Course in a Learning Community

Carrie Dunham-LaGree

BACKGROUND: All Drake first year students are required to take a first year seminar (FYS) in the fall semester. The FYS emphasizes writing and students must write a minimum of twenty pages in the course. To foster a learning environment, FYS enrollment determines residence hall placement, so all students in an FYS live on the same hall. This fall, I adapted an FYS I previously taught to TBL. Class meets twice a week for 75 minutes.

DESCRIPTION: I had two main concerns: avoiding having roommates on the same team and effectively teaching writing using TBL (and thus without resorting to team writing assignments.) With 19 students, many of whom were in rooms of three, I opted to have four teams: three teams of five and one team of four. These teams are smaller than recommended, but given the large amount of in-class peer evaluation of writing I planned to implement, it seemed prudent.

RESULTS: Finding inventive ways to create application exercises around writing proved most difficult. Early in the semester, the most successful application exercises were separate from the writing. As the semester progressed, however, I began incorporating mini-application exercises based around writing. To do so, I had to modify the structure of TBL units. Using the spirit of iRats as a ticket to class, I created mini-writing units where individual out-of-class writing assignments or brief in-class writing assignments served as a ticket to class. By evaluating samples of writing first in teams and then as a class, I was able to micro-lecture about structure and mechanics as I would about Rat questions. Students were polled at several points throughout the semester and felt in-class writing and evaluation were most useful to their development as writers.

CONCLUSIONS: The most challenging piece of incorporating TBL into a writing intensive course was designing application exercises based around individual writing. I found success by not simply thinking of my course in units that begin with iRats and end with application exercises. By using both in-class writing exercises and out-of-class homework exercises as a 'ticket to class', writing functioned as iRats and tRats for mini-units on writing, self-evaluation, and peer evaluation. These mini-units enhanced the overall structure of the class and eliminated the result of writing, the course's focus, feeling like a TBL orphan.

Team Based Learning Activities To Illustrate Bonding Concepts in a First Year Chemistry Classroom

Chris Addison

BACKGROUND: The forming of molecules from atoms represents a key component of the standard first year Chemistry curriculum. Students are presented with different bonding theories, but students have difficulty relating these bonding theories to experimental molecular structure and properties. Therefore, the goal of this project was to develop a suite of Team Based Learning (TBL) activities that could enhance student learning in the chemical bonding component of the first year Chemistry curriculum.

DESCRIPTION: TBL activities were developed to examine different bonding theories commonly taught in first year Chemistry. Teams use a computational Chemistry program (Gaussian) to calculate relevant properties for a molecule assigned by the instructor, and then use the results to reach a decision about the bonding theories. In certain activities students were required to decide which data from their calculations would best support their decision making as part of the TBL activity. These choices provided opportunities for discussion during the reporting phase of the activities.

RESULTS: Students reported that the use of TBL activities promoted team discussions, and allowed them to apply important course concepts in an interactive environment. Ambiguity in the application of the calculated properties led to fruitful discussions within each team and during the reporting phase of the TBL activity.

CONCLUSIONS: The coupling of TBL activities with computational calculations to examine chemical bonding represents a worthwhile approach to enhance student learning. Students can use modern methods in order to relate experimental quantities to important bonding theories in the first year curriculum.

Fostering Team Cohesion: Group Branding

David R. Neumann, Professor of Communication, Rochester Institute of Technology, Rochester NY

BACKGROUND: Creating and fostering group cohesion is an essential element of team-based learning. Common techniques such as icebreakers, group contracts, and impromptu presentations all help to move groups in the right direction. Providing a formal assignment where teams engage in introspection, long-range planning, and strategic communication can help to propel the development of cohesion even further.

DESCRIPTION: Group Branding is an assignment that charges teams to present themselves to the class as a brand. Each team creates a brochure or some other printed document including their team name, team logo, mission statement, and photographs of the individual team members and the group as a whole. These brands are formally presented in class with the goal of being perceived as a competent, confident, creative, and cohesive group.

RESULTS: The process groups go through to create brands engages them in detailed discussions about project management, task allocation, and group priorities, all embedded into a highly creative assignment. The results of students' work from the past five years will be visually presented in this poster. The examples will show the breadth of brands and the variety of creativity used to meet the requirements of the assignment. Student evaluations of the assignment will also be presented attesting to the success of this effort in fostering the development of cohesive groups in a team-based learning class.

CONCLUSIONS: Providing newly formed student groups with this formal introspective assignment helps them to begin the team-based learning process with enthusiasm and confidence.

Applying Team Based Learning in a Computer Science Course – First Experiences in Uruguay

Ernesto Ocampo Alvaro Ruibal Ignacio Alvarez Pablo Garín

BACKGROUND: “Programming II” is a CS course taught in the third semester. In the last 5-6 years we have witnessed a steep descend in overall students’ performance. After attending a conference by Larry Michaelsen we decided to completely redesign the course using TBL

DESCRIPTION: The course covers basic programming data structures. Its objective is to present a set of tools that can be applied in daily tasks of CS or SE professions. Formerly, students were asked to produce 5 programming projects during the course in groups of 2. They met out of class to perform this task. Current course is being redesigned to follow TBL methodology. It will last 15 weeks. The content has been divided in 10 learning units, with 3 to 5 sessions each. iRats, tRats and applied team-work for each learning unit are being designed from scratch. Application tasks are now done in teams, in the classroom. Smaller pieces of programming work are being designed, to allow teams to complete a meaningful task in the available class-time. Several shorter, more abstract exercises that can be solved just with pen and paper and require all team heads to work together are being applied.

EXPERIENCES: While developing this new course, experiences are being recorded and analyzed. A lot of effort and creativity is needed to develop the new iRATs and tRATs, and design applied team-work pieces that comply with the TBL objectives. Most students are dedicating more studying time to this course. However, the individual tests results until now aren’t yet good. tRATs taken in the course have obtained very high grades. Student’s involvement and energy in the group discussions are remarkable.

APPLIED TEAM-WORK PROJECTS: Different experiences. An issue with programming projects is that laptops are disruptive of team work. Screens interrupt line-of-sight and students tend to isolate themselves. A limit of 2 computers during team work has been established.

EVALUATION: iRAT and tRAT grading obtained are very high, compared to previous courses. Attendance has improved significantly. Same series of partial exams are being taken (3 in the course), and results compared to previous ones. Empiric evaluation shows that students are studying a lot more than before, discussing the concepts in their teams, and competing between teams to develop better solutions. This indicates a much deeper level of learning. Energy levels in the classroom have changed dramatically.

Implementation of Team-Based Learning in Zimbabwe: Interactive Learning During a Faculty Shortage

Jacob Gray M.D., Golden Fana MBChB M.Med, Thomas Campbell M.D., James Hakim FRCP, Margaret Borok FRCP, and Eva Aagaard M.D.

BACKGROUND: The University Of Zimbabwe College Of Health Sciences (UZ-CHS) lost a considerable number of medical faculty in the midst of the country's human immunodeficiency virus (HIV) epidemic. To address the need for consistent high quality training in HIV medicine with a low faculty compliment, we developed and implemented an HIV course for final-year medical students using team-based learning (TBL).

METHODS: A competency-based HIV curriculum was developed by the Novel Education Clinical Trainees and Researchers (NECTAR) Medical Education Partnership Initiative (MEPI) program and delivered in a TBL format to final-year medical students during their medicine rotation. The course was delivered in ten weekly sessions covering various aspects of HIV medicine. The class was divided into ten groups of 5-7 students. An individual readiness assurance test was administered at the start of each session, followed by a case based group activity. A questionnaire based student survey was designed to qualitatively and quantitatively assess the students' TBL course experience and self-perceived knowledge gained in the course topics. The survey was administered anonymously at the end of the course.

RESULTS: Thirty-six of 60 (60%) surveys were completed. All students agreed, of which 64% strongly agreed that TBL was an effective way to learn about HIV. The majority of students agreed that TBL was stimulating (94%), fostered enthusiasm for the course material (91%), improved teamwork (91%), and solidified challenging HIV concepts (97%). Students perceived improvements in knowledge gained across all of the HIV subjects covered with the largest amount of knowledge gain perceived in the applied clinical topics, such as management of HIV treatment failure (71% with at least a "large improvement") and HIV drug resistance (74% with at least a "large improvement").

CONCLUSIONS: Team-based learning is feasible in resource-limited settings. It is a promising way to teach challenging clinical topics in a stimulating and interactive learning environment despite a depleted number of teachers.

Elimination of Individual Readiness Assurance in a Mixed Law and Medical Student Seminar May Foster Professionalism

Ken M Gatter

BACKGROUND: Conventional Team Based Learning (TBL) uses Readiness Assurance Process (RAP) to ensure preparation of participants and includes individual RAP (iRAP). iRAP has drawbacks. It takes time, focuses students to a correct answer, and directly encourages preparedness. It fosters part of professionalism, but not other aspects like being prepared because group members depend on you and because you are a professional; it doesn't wholly internalize professionalism. A seminar of law/medical students was an opportunity to assess advantages/disadvantages of eliminating the iRAP.

DESCRIPTION: Seminar had a mix of 20 law and medical students with each profession represented in every group. Entitled Legal issues in human subject research, each profession enjoyed areas of relative expertise. Readings included legal cases, statutes, medical journal essays and reports of clinical trials. The 13 weeks (2 hours weekly) included 3 weeks of student group presentations, and the rest used TBL. No iRAP was used, but the instructor questioned groups during discussions and asked groups to advocate for answers they did not choose.

RESULTS: TBL discussions were vibrant and knowledgeable. Students' evaluations positive. Typically not all students in the groups had read all the material, but most law students read the legal material (cases, statutes, regs) and most medical students read the medical material. Written material was highlighted, students were knowledgeable, and frank about what material they read. Asking groups to advocate for an answer different from the one they chose was an effective to judge depth of preparedness, helped develop lawyerly skill, increased the depth of discussion, and showed medical students the value of articulating competing views.

CONCLUSIONS: In the setting of mixed professional students and mutual dependence, elimination of iRAP works. It may depend on a knowledgeable instructor asking informed questions during discussion, which functions to pressure students' preparedness.

Integrating Graduate Biomedical Courses Through a Common TBL Experience

Jay Campisi, Marie-dominique Franco, Lara S. Shamieh, Melanie Badtke, Kristi Penheiter

BACKGROUND: Our M.S. in Biomedical Science program prepares students for entry into graduate health programs or careers in biomedical research. In order to increase student engagement, active participation/learning, and integrate our curriculum, a shared Team Based Learning (TBL) was incorporated into all of the 5 required courses within the Fall semester curriculum.

DESCRIPTION: We integrated content in Anatomy, Biochemistry, Genetics, Physiology and a Research/Literature seminar course so that overlapping content areas were covered at the same time in the 5 separate courses. We incorporated TBL into our predominately lecture-based classes on 4 separate occasions (n=19 students). Our form of TBL utilized the Readiness Assurance Process to ensure preparation for the Application Exercise (AE), and consisted of the Individual Readiness Assessment Test (iRAT), Team Readiness Assessment Test (tRAT) (both closed book), and a discussion led by an instructor. Four courses (Anatomy, Biochemistry, Genetics, Physiology) conducted separate iRAT/tRAT and then a joint AE was completed covering material from all 5 courses. We examined student perceptions of individual course based-TBL and the shared, 5-course integrative TBL.

RESULTS: 47.1% of students believed individual course based-TBL improved their learning by a moderate to great amount while 52.9% believed individual course based-TBL improved their learning a little. This is compared with 52.9% of students who stated that integrative TBL improved their learning by a moderate to great amount and 41.2% who stated that integrative TBL improved their learning a little. In addition, 64.7% believed that the integrative TBL approach increased their ability to solve complex case studies by a moderate to great amount; and 76.5% stated the integrative TBL increased their ability for this task by a moderate to great amount compared with 47.1% and 62.5% as a result of the course based-TBL. Faculty observations were consistent with student survey results and also noted they enjoyed having both course-specific as well as integrative TBL experiences. Overall, faculty noted increasing student awareness of the connections among anatomy, biochemistry, genetics, and physiology.

CONCLUSIONS: Instructors found both TBL activities to be an effective way to engage students. Departments that wish to integrate curriculum should consider using a shared TBL experience as a mechanism to unify various courses.

Enhancing Critical Thinking in Economics Using Team-Based Learning

Molly Espey

BACKGROUND: TBL engages students with course material and each other, challenging them to think through issues and problems relevant to the real world, skills designed in part to enhance critical thinking. Engagement or problem solving alone, however, does not guarantee improved critical thinking; thus evaluation of the impact of TBL on critical thinking skills is important in promotion of such methods and support and promotion of faculty engaging in such alternatives.

DESCRIPTION: Surveys about various aspects of learning were administered to students in six undergraduate economics classes between Fall 2011 and 2012, at the beginning and again at the end of the semester. The initial survey asked students to rank the extent to which they felt the average college class they've completed enhanced certain academic and critical thinking skills. The end-of-semester survey asked the students to rank how the use of TBL in my class enhanced their learning in these same categories. The students were then asked to compare the effectiveness of TBL to that of lecture-based courses in improving these same skills. Demographic data (gender, class level, grade point average, age, and major) was also collected to determine if responses vary systematically based on any of these categories.

RESULTS: Students in both classes rated TBL significantly more positively, in comparison to the typical college course, in terms of enhancing their ability to solve problems relevant to the course material and in terms of all of the critical thinking skills except the ability to draw conclusions after researching a topic. When asked to directly compare to lecture-based courses, TBL was rated significantly more positively in both classes for all ten skills.

CONCLUSIONS: Active learning techniques engage students with each other and with course material and are generally thought to promote critical thinking more than lecturing, but few have attempted to measure improvements in critical thinking, or even students perceptions of improved thinking.

Student engagement with Team-Based Learning in undergraduate marketing courses: an international exploratory study

Peter Balan, University of South Australia School of Management, Australia Mark Harrison, Randolph College, Virginia

BACKGROUND: High levels of student engagement have been demonstrated to be related to positive learning outcomes and student retention. Well-established tools are used to measure student engagement with their institutions (National Survey of Student Engagement, or NSSE), and approaches have been developed to measure student engagement at the course level (Classroom Survey of Student Engagement, or CLASSE). There do not appear to have been attempts to systematically investigate student engagement at the level of individual teaching activities. Our study asks: (1) what are the dimensions of student engagement in Team-Based Learning as a specific teaching methods in undergraduate marketing classes, and (2) are these dimensions of engagement consistent for students in different countries.

DESCRIPTION: Undergraduate university students in two marketing classes in Australia, and one in the US, were asked to describe their engagement toward Team-Based Learning. The data was collected using a “minute paper” methods, and consisted of anonymous, voluntary and unprompted qualitative comments made by students in the class. Comments were analyzed using a concept mapping methods a rigorous mixed-methods approach that combines qualitative and quantitative research methods, and produces maps showing links between the comments and clusters of similar comments. These maps reveal the underlying structure of, and connections between, the comments being examined, and identify the themes of engagement by marketing students in the Team-Based Learning methods.

RESULTS: The classes with 48, 51 and 11 students generated 97, 116 and 37 statements respectively, and these were analyzed to produce separate maps with between 6 and 13 clusters explaining their engagement in TBL. These clusters can be described as dimensions or themes of engagement with descriptors including “helps us learn”, “makes learning easier”, “everyone participates”, “learn teamwork”, “learn from others”, “enjoyable”, “interesting” and “self-improvement”. Most of these themes were common to all three classes.

CONCLUSIONS: The results clarify our understanding of student engagement in TBL as a teaching method for marketing students. This research will contribute to the engagement literature, and can be used to develop quantitative survey tools for further research. Results already have demonstrated practical value in revealing ways to increase student engagement in class activities and hence improve learning outcomes.

Utilizing Team-Based Learning for Teaching Parasitology in 2nd year MD & Bsc. HLSc Students at KCMUCollege Students' Perspective

Anzibert A. Rugakingira, MD year 4, Denis R. Katundu, MD year 4, Dr. Esther Lisasi, MD, MPH, Dr. Mramba B. A. Nyindo – B.Sc (Anim. Husb.), BVM (E.A.), MS, PhD (Microbiol. & Immunol.).

BACKGROUND: For more than a decade since the college was established, traditional lecturing and problem-based learning (PBL) methods have been used as the main teaching tools for basic science courses. In an attempt to promote a more active learning process and to cope with faculty shortages in number and available time, several faculties in the College have adopted the Team-based Learning (TBL) methods as a novel approach. Ectoparasites, a component topic within Parasitology course, was used as a pilot study. The present study was intended to evaluate students' perceptions and preferences for team-based learning as a teaching method in ectoparasitology.

DESCRIPTION: 154 MD year 2 and BSc.HLSc year 2 students were randomly divided into small groups. Each student was provided with study materials on ectoparasites for a month, then students took individual Readiness Assessment Tests (iRAT) individually followed by the same test in groups (gRAT). At the course conclusion, students were surveyed to assess their perceptions and preference for TBL using self-administered questionnaires on TBL learning process, knowledge & skills, TBL assessment and TBL instructors. The responses were measured using 5-point Likert type rating scale. Then data were analysed using SPSS v. 17.

RESULTS: Of the 153 students, who responded the survey, 24% were BSc.HLSc 2 while 76% were MD 2 students. About 11% of them had previous exposure to TBL. 87% were satisfied with the learning process in TBL and agreed that, iRATs and gRATs were appropriate to the objectives and useful learning activities, they were more attentive during TBL sessions than the traditional parasitology lectures and they learned more useful additional information during TBL sessions than the traditional parasitology lectures. 85% of the students were satisfied with the TBL instructors. 97% of students agreed that solving problems in a group is an effective way to practice what they have learnt.

CONCLUSIONS: Students' perceptions on TBL were extremely positive and recommended that it should be extended to other subjects.

What do Students Think About Group Work? A Study of Experiences Before and After Team-Based Learning

Simon Tweddell

BACKGROUND: Good Group learning experiences do not happen automatically and are more likely to occur when faculty attend to group dynamics and the design of group tasks. Out-of class group work has been used in our pharmacy curriculum for many years. A TBL module with in-class group work has now been introduced.

DESCRIPTION: A focus group of pharmacy students elicited the experiences of group work prior to a new TBL course and was repeated towards the end of the TBL course. The aim was to determine whether opinions on group work had changed or remained the same. Transcripts of each focus group were analysed for emerging themes

EVALUATION: All students had mainly experienced 'out-of-class' group pre-TBL. The positive aspects of this were: peer learning; peer support; getting to know each other. Negative aspects were: it was hard to get everyone together; motivation; difficulty in booking rooms. Students reported disparity of workload and some students regularly not turning up. For out-of-class group work to be successful, rooms should be allocated into the timetable. It was common practice to divide up the work and complete their component on their own. Post-TBL, students were much more positive about group work. These positives included: virtually all students come to class; they participate in group discussions; they learn from each other and from other teams; they don't have to meet up out of class; team dynamics are improving. The negatives include: 1 or 2 team members don't contribute as much as the rest; some members get distracted.

CONCLUSIONS: Students reported an increase in satisfaction in group work using team-based learning.

Individual Performance and Peer Evaluation Grades

Scott Compton PhD, Sandy Cook PhD, Shirish Shenolikar PhD, Robert Kamei MD

BACKGROUND: The inclusion of a peer evaluation grade component is thought to be an important part of the TBL process. Students, however, often fear that individual academic performance may impact their peers' perceptions of their contribution to the team. Therefore, the purpose of this study is to determine the extent that student peer evaluation grades are associated with performance on individual readiness assurance (IRA) test scores.

DESCRIPTION: This is a retrospective, observational study of academic year 2011/12 and 2012/13 Duke-NUS Graduate Medical School (Singapore) students' performance and peer evaluation grades during the first year course entitled "Molecules & Cells". This first course of the curriculum is comprised of 8 TBL sessions, and each includes an IRA and a group readiness assurance test, followed by an application session. At the end of the course, students provide peer-evaluations of their team members. We categorized peer evaluation grades in terms of low, medium, or high using cutpoints established at the 33rd and 66th percentile scores. Mean IRA scores were compared across the three categories using one-way analysis of variance. Mean and 95% confidence intervals (95CI) of IRA scores are reported for each peer-evaluation category.

RESULTS: In total, there were 110 students during the two study years, nestled within 14 groups of 7 and 2 groups of 6. On a team level, mean team IRA scores and team peer evaluation scores ranged from 66.5% to 77.1% and 71.4% to 80.0%, respectively. On the individual level, IRA scores did not differ significantly ($p=0.160$) between students receiving low (70.2%; 95CI: 67.7% - 72.7%), medium (73.3%; 95CI: 70.7% - 75.8%), or high (72.1%; (70.8% - 73.5%) peer evaluation grades.

CONCLUSIONS: Based on the results of this study, there is no evidence to suggest that medical students' individual academic performance within TBL teams impacts the peer evaluation grade. This finding may suggest that medical students value contributions to team processes over individual academic performance.

Team-Based Learning and Inpatient Ward Teams: Is the Time Commitment Worth the Improvement in Learning?

Steven E Bishop, Shaun Bhatta, Stephanie A Call

BACKGROUND: The use of TBL in graduate medical education has been limited to date; additionally, use of TBL with learners from many levels (medical students through senior residents) has been minimally explored. To our knowledge, this is the first use of TBL as an educational strategy based in the inpatient graduate medical education setting.

DESCRIPTION: Internal medicine residents were divided into three groups: conference/TBL (ward teams), conference only, and no conference. Prior to the start of the study, all residents were asked to complete a pre-self assessment test (SAT). Residents on inpatient teams were asked to complete two TBL modules (with online discussion) based on the material covered in conferences. Given residents' schedules, attendance at conference was considered the "preparatory work" for the TBL modules. At the end of the study period, all residents were asked to take a post-SAT.

RESULTS: There were 36 residents in the conference/TBL group, 32 in the conference only group, and 55 in the no conference group. Pre-SAT scores were 52.4%, 56.4%, and 57.0% respectively and there were no significant differences (p values all >0.1). Four of eleven teams completed both modules and participated in the online discussion board. Post-SAT scores were 63.2% (p value <0.001 vs. pre-SAT), 64.2% (p value >0.1 vs. pre-SAT), and 61.6% (p value >0.1 vs. pre-SAT) for conference/TBL, conference, and no conference groups. The 25th percentile raw scores increased by 25 points for the conference/TBL group, 10 points for the conference group, and zero points for the no conference group.

CONCLUSIONS: Supplemental TBL modules likely improve test performance among inpatient ward teams, especially the lowest quartile of performers. Our results show that the TBL group had a significant difference between pre- and post-SAT scores (with no such difference shown for other groups); and, our data indicate stronger knowledge enhancement among the lowest performers in the TBL group. Overall participation in the TBL modules and the post-test were low and likely reflect competing priorities of residents on busy inpatient services. Structural changes to ward teams to include clinical coverage for educational time will be implemented in order to improve resident participation. Given this pilot's encouraging results, a similar study will be repeated utilizing eight TBL modules across two inpatient rotation blocks.

Why Not Try Team-based Learning to Improve Student Nurses Clinical Reasoning and Communication?

Tracy L. Brewer, DNP, RNC-OB, CLC Crystal R. Hammond, MSN, CNM Deborah Ulrich, PhD, RN

BACKGROUND: Nursing has long been searching for creative ways to assure students' abilities to improve clinical reasoning and communication. Finding strategies to relate didactic content to clinical application has been a challenge for educators, resulting in students entering the clinical site ill prepared to connect concepts from didactic lecture for clinical application. Medical education has found success in the use of team-based learning (TBL) as a pedagogically sound strategy in which to bridge the gap between course content and application from the classroom to the clinical site. An immediate need for change in pedagogical strategies was identified resulting in a redesign of a Baccalaureate obstetrical (OB) nursing course to an interactive, student-accountable environment of TBL.

DESCRIPTION: Readiness assurance testing (RAT) of individual and team mastery was used as a means of evaluation. Using the immediate feedback-assessment technique (IF-AT), teams were able to receive immediate feedback of content proficiency. Students were introduced to class application exercises including, unfolding case studies, NCLEX style-questions, and concept maps. In addition, students completed an individual midterm and final exam and a standardized specialty exam (HESI).

RESULTS: Team performance on group RAT's indicated improved learning and mastery compared to individual RAT scores. Class specialty exam (HESI) score was M=921 (national M=867). Class grade average was (M=88.9%), compared to the lecture only format (M=82.9%). Anecdotally, students' clinical reasoning and communication was improved.

CONCLUSIONS: Overall, students were receptive to the TBL learning environment state, "I felt like I really learned how to think like a nurse!" However, others felt there was too much time spent out of class for preparation. Oddly, there was more resistance to TBL by faculty colleagues than students. TBL strategies improved overall course grades and standardized test scores in one nursing course. Furthermore, clinical reasoning and communication were improved. Further assessment of student learning and performance in the TBL environment is needed.

Pharmacy Students Performance Comparing Team Based Learning and a Traditional Didactic Pedagogy

Heidi Diez, Tami Remington, Nancy Mason, Jeffrey Tingen, Trisha Wells, Vidya Ramaswamy, Peggy Carver, Barry E. Bleske, and Vicki L. Ellingrod. All are associated with the University of Michigan College of Pharmacy, Clinical Social and Administrative Sciences Department. Ann Arbor, Michigan.

BACKGROUND: In 2010, our school implemented a major curricular revision and changed our Pharmacotherapy course from a lecture format to Team Based Learning (TBL). This change was “phased-in” meaning 2nd year (P2) and 3rd year (P3) students were taught identical content using the different styles (Lecture vs. TBL).

DESCRIPTION: In May 2012, community pharmacy preceptors for the “Introduction to Pharmacy Practice Experience” were surveyed as to their impressions of student performance, in an effort to compare the curriculums. The preceptors had P2 and P3 (new and old curricula, respectively) on rotation simultaneously and were asked about the students’ confidence, ability, and autonomy to advise patients about using over the counter medications. Additionally preceptors’ ranked the student’s Team Skills using a 0-5 scale (with 5 being highest).

RESULTS: A total of 19 preceptors (58%) returned the questionnaire. Most preceptors (75%) felt there was ample opportunity for students to demonstrate their abilities on rotation. Overall preceptor responses indicate that TBL taught student performance and confidence was as good as or better than lecture based students much of the time (58%). The preceptors also felt the TBL taught students were able to work independently as much or more than the lecture based student much of the time (74%). As for the student’s ability to work as a team member, preceptors ranked the lecture based students similarly to the TBL students (4.3 vs 3.9).

CONCLUSIONS: Despite the additional year of training received by the P3 students, community preceptors felt students performed similarly. Additionally, little difference could be discerned between TBL taught students and lecture taught students on their rotations in regards to team skills. Thus, our new curriculum successfully prepares students for their community pharmacy practical experience a year earlier than our older curriculum. This likely reflects earlier introduction of content on OTC products, communications, and evidence-based medicine, as well as a large pedagogical shift toward active learning, including TBL.

Contributions of Cognitive and Non-Cognitive Factors to the Effectiveness of Student Teams in a First-Year Pharmacy School Biochemistry Course Using TBL for Content Delivery

Willie L. Davis

BACKGROUND: Within the conventional team-based learning (TBL) educational strategy, a significant component of the educational experience comes from the work that is done in the team setting. Our goal is to determine whether there are identifiable factors that determine the relative success of the teams.

DESCRIPTION: For the past two years, TBL has been utilized to deliver the biochemistry course content at the LLU School of Pharmacy. Prior to the beginning of the school year, students are given a number of validated instruments to assess cognitive and non-cognitive factors that may potential impact upon their academic success. The non-cognitive factors include "big-five" personality domains, self-control, and "Grit". Cognitive factors include 1) undergraduate cumulative and science GPAs and 2) performance on the Health Sciences Reasoning Test (HSRT). In each class meeting, student teams, after the members completed the Individual Readiness Assessment Test (I-RAT), the teams completed the Team Readiness Assessment Test (T-RAT) and team project. At two points during the quarter, students provided anonymous feedback on the performance of their team members through electronically-submitted peer evaluations.

RESULTS: The effectiveness of each team was calculated for the first seven TBL sessions based on the following formula: $\text{Team Effectiveness (TE)} = (\text{Team T-RAT Score} - \text{Team I-RAT}) / (\text{Class Average T-RAT} - \text{Class Average I-RAT})$ There were notable differences in the TE values for the teams over the course of these TBL sessions, but in the data analyzed at this point, there was no statistically significant correlation between each team's TE and their average cumulative undergraduate GPA, average undergraduate science GPA, or average HSRT score. Full analysis of the relationship of the non-cognitive factors is still pending, as is the analysis of data generated from the student peer evaluations.

CONCLUSIONS: While the data in the very early stages of analysis, it appears that cognitive factors related to students' academic background may not be essential factors in the overall performance of the teams at this stage in this particular course. It remains to be seen whether this is consistent throughout the biochemistry course sequence and whether the non-cognitive factors that were assessed are at all correlated with team effectiveness.

Poster Abstracts Session 2

Track: Scholarship

Poster ID: 102

Perception of Pharm D Students Towards Team-Based Learning Methods in College of Pharmacy, Qassim University

Almeman A, AlWerafi Y, Saleh M, AlOrainy M.

INTRODUCTION: Team-Based-Learning (TBL) has been firstly popularized by Larry Michaelsen. The College of pharmacy in Qassim University is the first to apply this approach, in the kingdom of Saudi Arabia. Objective: We sought to assess the perception of PharmD students towards TBL in our college.

METHODS: A survey was distributed among all Pharm D students (111 students) who experienced Team-Based-Learning in pharmacotherapy, pharmacokinetic, pharmacy profession, and pharmacy practice papers. The survey instrument was adapted and validated by Gallegos P et al, in 2011. The survey instrument composed of thirteen questions addressing their general perceptions towards the TBL-teaching methods.

RESULTS: The majority (80%) of the students agreed that working in a team is a valuable experience and more than two third (72%) of the students have learned more when they were involved as a team member. In addition, two third (65%) of the students agreed that being as a part of the team improve their grades. Eighty percent (80%) of the students agreed that their ability to think through a problem have improved and TBL also improved their clinical reasoning skills (62%). Importantly, the current study indicates that working in a team increases the student's respect (91%) one to another's opinion.

CONCLUSIONS: TBL approach has impacted positively on the perception of the students to build up a coherent team and encouraged individuals to work better in groups.

Trial of Team-Based Learning in Information Literacy Program for Nurse Managers.

Naoko Matsumoto; Toshiko Ibe, PhD, RN; Shigeko Horiuchi, PhD, CNM; Hiromi Eto, PhD, CNM; Kuniko Sato, MA; Kinya Tamaki, D Eng.

BACKGROUND: In Evidence-Based Practice (EBP), nurses need team collaboration skills in solving patients' problems while using electronic information resources and nurse managers especially need to perform team leadership. However nurse managers have less experience than staff nurses in using electronic resources. Various skills ranging from operation of literature databases to using data in solving clinical problems must be conducted in a short period. We introduced TBL to grow information literacy of nurse managers.

DESCRIPTION: Ninety three nurse managers, of mean age 39.8 years (SD=4.3 years) comprised 15 teams of 6 to 7 members each. The program included three 150-minute sessions: TBL, computer operation to access literature databases and follow up. A review test was conducted about 2 weeks after the sessions. TBL session comprised 6 chunks: (1) Definitions of information in nursing, (2) Role of nurses in the information society, (3) Interpreting health and medical information on the internet, (4) Clarification of problems, (5) Selection of information resources (background questions), (5) Selection of information resources (foreground questions).

RESULTS: Comparing IRAT, GRAT and mean post-sessions test scores; GRAT was higher than IRAT for all 6 contents. However, the post- sessions test mean score was higher than the GRAT for chunk (3) and chunk (4). The post- sessions test mean score was lower than the first conducted IRAT for chunk (5) and chunk (6). The contents of nurses' appeals during lessons enabled the teacher to quickly grasp the students' understanding, provide feedback during the TBL session, and reflect this in the post- sessions test and follow-up. Students of 58.5 % evaluated TBL as a teaching method as 'Effective' or 'Closer to effective'.

CONCLUSIONS: TBL was useful for information literacy acquisition by nurse managers. TBL was effective for promptly grasping the students' problems and state of understanding.

The Scalability of Team-Based Learning

Douglas Carrie, PhD

BACKGROUND: In 2011, The University of Auckland Business School introduced a Team Based Learning (TBL) delivery model for two core first year undergraduate courses. Students take BUSINESS 101 in their first semester, followed immediately by BUSINESS 102 in their second semester. This is a large-scale TBL delivery with an enrolment of about 2,200 students in each semester. The students are organised into 22 separate streams of about 100 students each. Within each stream, this means that there will typically be about 14 or 15 teams of 7 students. Students attend one two-hour TBL workshop session each week.

DESCRIPTION: Many scalability challenges arise when a large number of students is spread out across so many different streams of the same course delivered at different times across a week. As just one example, academic honesty and the sharing of answers/solutions between students becomes a real problem. This results in a need for many equitable (though not identical) versions of multi-choice tests for the Readiness Assurance Process, as well as a need for the development of many equitable (though not identical) versions of application exercises for each topic area. There are also many challenges in coordinating a large team of facilitators, in managing large volumes of team folders and workshop materials, and in ensuring the consistency of communications across 22 streams of 100 students.

RESULTS: As continuous improvements have been implemented to address a range of challenges, faculty and students are reporting better communication, consistency, and equity of experience within what remains a large-scale and dynamic delivery model.

CONCLUSIONS: Ultimately, within the case study that is represented by our experiences over the past two years, the key to resolving the scalability of TBL comes down to a question of balance. The desire to empower facilitators (staff) must be very carefully balanced against a need to retain an appropriate level of centralized control so as to ensure an equitable experience for all students.

Enhancing Teamwork Skills Development in Future Physicians Through Team-Based Learning

Donna T. Chen, Melanie A. McCollum, Elizabeth J. Bradley, Michelle H. Yoon, Barnett R. Nathan, Mary Kate Worden

BACKGROUND: Included among reasons to incorporate team-based learning (TBL) in medical school curricula is its purported ability to help students acquire skills necessary to function effectively in health care teams. At the University of Virginia School of Medicine we have sought to ensure this outcome through a number of innovations. Specifically, we have (1) modified the peer evaluation component of TBL to reflect recognized teamwork skills, (2) developed a TBL development & oversight process that ensures teams are provided sufficient opportunity to practice teamwork skills, and (3) developed student and faculty TBL session-level evaluation tools to provide additional insight into the extent to which each TBL session promotes quality teamwork.

DESCRIPTION: Our innovations include the following: (1) Identification and dissemination of cognitive and attitudinal objectives as well as behavioral teamwork skills that could be practiced in TBL and observed by others; (2) Enhancement of TBL sessions to increase task difficulty and development of wrap-around activities to meet explicit team-training focus; (3) Development of a TBL Education Group of instructional designers, expert facilitators, and experienced evaluators to oversee development, facilitation, and evaluation of TBL sessions and team-training wrap-around activities to meet defined teamwork training goals, in addition to content learning goals; (4) Development and deployment of a variety of session-level evaluation tools to track whether we are meeting our team skills development goals.

RESULTS: Our innovations show promise in achieving our aim to enhance teamwork training early in our curriculum. We remain vigilant that the primary principles of TBL remain intact during our modification process. We are in the process of systematic evaluation and hope to have results soon.

CONCLUSIONS: Cognitive, attitudinal, and behavioral aspects of teamwork can be identified in TBL and can guide specific enhancement of the methods to promote early teamwork skills development in the medical education curriculum.

Implementation and Evaluation of a Team-Based Learning Nutrition and Lifestyle Modification Course

Elizabeth Pogge, PharmD

BACKGROUND: Traditional training for healthcare professionals does not focus on disease prevention, but rather on disease treatment. An important aspect of disease prevention includes lifestyle changes, more specifically nutrition interventions. Pharmacists can play a significant role in disease prevention by educating patients. However, to do so they must be equipped with the necessary knowledge and skills. Team based learning (TBL) is able to address many professional competencies, including communication, interpersonal skills, teamwork skills, knowledge acquisition, and application of knowledge.

DESCRIPTION: The curriculum at Midwestern University College of Pharmacy-Glendale is primarily lecture and workshop based. The purpose of this study was to measure student's knowledge gained as well as attitude about an elective course that utilized TBL. A 15 contact hour course was developed and offered twice over 3 quarters. The course was split into 5 modules which covered nutrition and lifestyle modification in obesity, cardiovascular disease, cancer, diabetes, and athletes. TBL was introduced to the students over a 1-hour introduction session. At this session, students completed a pre course knowledge survey that was used to form student teams. Each module was 2.5 hours long and included the Readiness Assurance Process (RAP) as well as an in-class application exercise. At the end of the course, students were given a final exam and were asked to complete a voluntary course satisfaction survey.

RESULTS: Sixty-two students completed the course. Knowledge about nutrition and lifestyle modification was significantly improved by taking the course (58.7% versus 90.75%, $P < 0.001$). The satisfaction survey had a response rate of 97% and included 7 Likert scale questions with favorable responses being agreed or strongly agreed. The majority of students (greater than 85%) responded that the components of the RAP process and the application exercises enhancing their learning, they would recommend this course to other students, and they developed increased confidence in their ability to design, implement, and counsel patients on nutrition and lifestyle modification.

CONCLUSIONS: Students who are enrolled in a traditional lecture and workshop based curriculum respond favorably to a course which utilizes TBL.

Managing Online Discussions with A Participation Portfolio

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BACKGROUND: While most TBL activities focus on teams, individual assignments typically account for the largest percentage of the overall grade, and most of the writing rigor, since written assignments are difficult for teams. Are individual assignments just bolt-ons to TBL courses, or can they complement the TBL course design and learning goals? This presentation will focus on a novel approach to managing online discussions by having students submit an individual participation portfolio.

DESCRIPTION: Since 2005, UMBC's Hybrid Course Redesign program has encouraged more than 50 faculty to adopt a best of both approach by managing online discussions using an online participation portfolio. If instructors commit to a rubric that defines a quality post or reply, students can submit examples of their best work with a self-grade the instructor can raise, lower or accept. The students' "self-grade" is based on "evidence" they collect and provide in a portfolio "template" that fosters authentic conversation between students, not one-way posts that pander to the prof. Basics include the following: 1. Instructor defines grading rubric for good post & reply (this is THE hardest task for instructors. 2. Students propose a grade they feel they deserve, based on 3-5 examples of each. 3. "Evidence" is taken from separate weeks to avoid end-of-term "dog pile." Just assign and spread out a few portfolios, perhaps once a week to get started, and biweekly thereafter. 4. Students copy and paste their "evidence" into a portfolio "template" and submit electronically. 5. Instructor can accept, raise or lower grade based on quality of evidence as defined by the rubric (#1). Example: Student Orientation to Portfolio <http://screencast.com/t/MGayLIROsUNS>

RESULTS: To date, we've not surveyed instructors or analyzed courses using the portfolio, but a notable case study includes a research methods course that ranked 290th out of 1,502 LMS courses in Fall 2010 with an average of 289 hits per student (10% of all activity occurring on the discussion board). By contrast, the Fall 2011 iteration of the course was the 2nd most active of all 1,361 UMBC LMS courses, with an average of 2,426 hits per student (72% of all activity occurring on the discussion board).

CONCLUSIONS: This is a great individual writing assignment that helps prepare for or extend great discussions that occur naturally in TBL. For more info (including hyperlinks to examples) see: <http://tinyurl.com/fritztblcfp>.

Impact of Team-Based Learning on a Large-Enrollment Introductory Biology Course

Heidi Sleister, PhD

BACKGROUND: Failure rates in gateway science, technology, engineering, and mathematics (STEM) courses are reported to be greater than 25%. While a variety of active learning strategies improve student performance and engagement in undergraduate science courses, there are few published examples of team-based learning (TBL) in large introductory biology courses. In an effort to improve student learning and engagement in our first-semester introductory biology course for majors, the course was recently reformed to include four TBL units.

DESCRIPTION: Two 180-student sections of our introductory biology course were taught in the same semester by the same instructor. Both sections included a mix of lecture and active learning. Students in the non-TBL section interacted in small, informal groups to apply concepts (e.g., think-pair-share), whereas students in the TBL section worked in larger, permanent teams to complete four TBL units. Each TBL unit consisted of an individual assessment (iRAT), a team assessment (tRAT), and an application exercise. Students in both sections had access to the same learning materials and completed the same four exams during the semester.

RESULTS: Results will include data from both non-TBL and TBL sections of the introductory biology course. Initial data indicate that attendance is significantly better in the TBL section. At the end of the fall semester, data will be analyzed to assess the impact of the TBL approach on students' learning, performance, attendance, engagement, and satisfaction with the course. In addition, challenges and lessons learned while implementing TBL will be presented.

CONCLUSIONS: Summary conclusions will be drawn after complete data from fall courses are available. Informal feedback reveals that students like the TBL approach because it motivates them to prepare for class, it provides opportunities for active collaboration with peers, and the application exercises are interesting.

Teaching an Undergraduate Physical Chemistry Course with Team-Based Learning

John P. Hagen

BACKGROUND: Chemistry and biochemistry majors at our institution take a year-long sequence of courses in physical chemistry. At our institution, this course has been taught exclusively using a traditional lecture format and is divided into three 10-week courses.

DESCRIPTION: The first course in the physical chemistry, chemical thermodynamics, was taught to 55 students in the TBL format in the fall of 2012. Before the term started the students were sorted into teams of 5 or 6 using the Comprehensive Assessment for Team-Member Effectiveness (CATME) website. The CATME site was also used for peer evaluation twice during the course. The course was divided into four two-week-long units. Each unit began with a class devoted to a readiness assurance process that consisted of an individual readiness assurance test (iRAT), a team readiness assurance test (tRAT), and a group discussion. The study guide for each RAT consisted of screencasts, reading assignments, and exercises from the textbook. After the RAT, the next 4 to 6 class meetings in each unit were devoted to application exercises. Daily preparation guides were posted that consisted of screencasts, reading selections, homework problems, and learning objectives. On the last day of each unit, students took an individual comprehension assurance test (iCAT) and a team comprehension assurance test (tCAT).

RESULTS: Students usage statistics for the RAT study guides and daily study guides will be presented. CATME peer evaluation data will also be presented. The average for the American Chemical Society thermodynamics exam will be compared to the scores from previous years. Finally, survey data from the Student Assessment of Learning Gains (SALG) instrument will be presented.

CONCLUSIONS: Two lessons were learned during the term. PowerPoint mini-lectures were added to the beginning of every lecture to motivate students. Also, application exercises always took more time than expected. One challenge was apparent at the end of the term. Students found it difficult to transition from studying for an end-of-unit CAT to a beginning-of-unit RAT. In summary, the students were initially skeptical towards TBL pedagogy, but as their teams became cohesive they began to appreciate TBL.

Teaching Undergraduate Adolescent Development Using Team-Based Learning™ and Clickers™

Judi Rockey Bradetich, MS, MM, CFLE

BACKGROUND: Team-Based Learning™ format has been used (with increasing agility) to teach an Undergraduate course in Adolescent Development for the past 3 years. Last summer, I decided to implement the use of Clickers™ (Student Response System) to augment and enhance learning in the classroom. This was particularly effective when controversial subjects arose. By polling the class during discussions, for instance about culture, gender, family issues, or “typical adolescent angst,” students indicated their beliefs via Clickers™ without disclosing their identities. This led to candid, lively discussion on many potentially awkward topics. Additionally, Clickers™ were used to poll the students (as individuals or teams) and compare class results to graphs from research findings and/or other populations. Clickers™ were used to simultaneously report team results on specific questions after the teams had time to discuss “hot” topics and come to consensus. This sped up the team processing times, which helped keep some of them more on-track.

DESCRIPTION: The Team-Based Learning™ format of the course supports the students as they work to meet the overall objectives of the course, which is to provide the student with an in-depth study of issues surrounding physical, cognitive, social, and emotional development of the individual across early, middle, late adolescence as well as emerging adulthood. Through the combined use of teamwork and Clickers™ students apply theories of developmental science and brainstorm practical applications to everyday problems faced by adolescents and emerging adults.

RESULTS: Feedback from an informal survey of the students showed the use of Clickers™ engaged them, helped them keep focused, and was “a good way for students to have a voice when they are too shy to say something out loud.” Students found that Clickers™ “create a more interesting environment!”

CONCLUSIONS: I will continue to implement Clickers™ when I teach this class, and hope to add them to other human development classes that I teach. They are another avenue through which I can promote and support student engagement, even by the reticent students who choose to remain quiet within the team.

TBLs in Animal Physiology: Using the Primary Scientific Literature as Application Exercises

Mary Kate Worden PhD

BACKGROUND: Students should be able to apply the scientific concepts taught in biology courses to the analysis and interpretation of scientific data. In addition, they should be able to evaluate the interpretations others make of scientific data. These skills correspond to higher levels of Blooms taxonomy of learning, and are well suited to the general application exercise format of Team Based Learning exercises. My Animal Physiology course is designed in TBL format, with the pre-class preparation and RATs based on readings from a textbook, and the application exercises designed around excerpts from journal articles published in the Journal of Experimental Biology.

DESCRIPTION: Prior to class students master a set of instructor-written learning objectives that correspond to a chapter of Animal Physiology (3rd edition) by Hill, Wyse and Anderson (Sinauer Associates). Class begins with an IRAT/GRAT based on the learning objectives, followed by team discussion of potential appeals. Students then engage in an application exercise focused on data from an article published in JEB that relates to the text chapter.

RESULTS: The TBL format enables dynamic engagement of the students with each other and with the data, thereby mimicking the debate and discussion that occurs among scientists. Course evaluations show that students appreciate the opportunity to hone critical thinking skills while applying their knowledge to understanding the primary literature in biology, and enjoy developing a working relationship with their team members.

CONCLUSIONS: Using data from scientific journal articles as the basis for application exercises allows students to reach higher levels of Blooms taxonomy of learning while developing their skills in reading and interpreting the scientific literature.

Implementation of a Team-Based Learning Curriculum for Core Material in an Internal Medicine Clerkship

Nichole G. Zehnder MD Adrienne Mann MD Richard Miranda MD Michael Mohning MD Eva Aagaard MD

BACKGROUND: Core medical knowledge in internal medicine clerkships is often delivered in a traditional lecture-based format. With recommendations for increased medical school class size and learning preferences of today's medical students there is increasing need for learner-centered, time and resource efficient curricula such as team-based learning (TBL). We sought to determine the impact of implementation of a TBL curriculum covering core clerkship content on 1) end-of clerkship standardized exam scores in third-year medical students in an internal medicine clerkship and 2) end-of-block faculty evaluation of students' medical knowledge and ability to generate differential diagnosis. In addition we sought to determine if students prefer team-based learning compared to traditional lectures to learn core clerkship content.

DESCRIPTION: We implemented a novel, required TBL experience to cover core clerkship material for 3rd year medical students in a required, eight-week inpatient internal medicine clerkship over one academic year. All students participated in seven TBL sessions during the clerkship. Orientation to the basic principles of TBL and overview of session logistics was conducted in large-group format during the first week of the clerkship. Sessions covered core clerkship topics including: anemia, chest pain, pneumonia, pain management, altered mental status, renal failure, and hyponatremia.

RESULTS: Initial implementation of the curriculum is complete and data collection is on-going; preliminary results will be presented. Specifically, quantitative analysis will be conducted comparing of end-of-clerkship scores on the required National Board of Medical Examiners (NBME) exam pre- and post-TBL implementation. In addition, the impact of the TBL curriculum on end-of-block faculty evaluation of students' medical knowledge and ability generate differential diagnosis will be assessed.

CONCLUSIONS: In a 3rd year internal medicine clerkship, a TBL curriculum may be implemented to replace traditional lectures to cover core clerkship content.

Team Based Learning in Medical Education: Do One, See One, Teach One

Courtney West, PhD, Johna Pettit-Wright, MA, Terri Kurz, PhD, Bobbie Ann White, MA, & Lori Graham, PhD

BACKGROUND: After our institution's administration decided the integration of additional active learning opportunities was needed in medical education courses, various options were researched. Due to our large class sizes and small faculty populations, the teaching methods that appeared to be the best fit was Team Based Learning (TBL). The Office of Faculty Development was tasked with leading the integration of TBL. Knowing that when making curricular and/or instructional changes faculty buy-in is crucial, we decided to utilize a method of training faculty may be familiar with, but we modified it slightly to include: Do one, see one, teach one.

DESCRIPTION: Since success with using TBL appears to be directly related to acceptance from participating faculty (Thompson, Schneider, Haidet, Perkowski, & Richards, 2007), our first step was to locate interested faculty. Our next step was to demonstrate a TBL session by having interested faculty actively participate in a TBL session themselves at a Phase I (Year I) retreat. Initially, many were skeptical, but after a robust discussion, faculty acceptance increased. We provided similar demonstrations at the Phase II (Year II) and departmental retreats. Success was gauged by feedback and number of faculty who are piloting TBL during the current academic year.

RESULTS: The feedback received after the TBL demonstrations was largely positive and helped facilitate faculty buy-in. As a result of the training provided, 12 faculty members in various content areas are currently piloting TBL, and two faculty members are converting several lectures to TBL.

CONCLUSIONS: The TBL demonstrations that the Office of Faculty Development developed were well received and elicited interest in developing and integrating TBL sessions into the existing curricula.

Impact of Team-Based Learning on Medical Student Performance in Biochemistry and Cell Biology

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(*co-first authors)

BACKGROUND: TBL is gaining increasing attention as an effective and efficient method of actively engaging students in learning complex subject matter while reinforcing problem solving skills and teamwork. The UAMS College of Medicine adopted a strategy in 2012-2013 for all first and second year courses to reduce the number of traditional lectures and incorporate TBL into the curriculum. In this study we present comparative academic performance results following the first year of implementation in two courses, Medical Biochemistry and Medical Cell Biology.

DESCRIPTION: At UAMS, Medical Biochemistry and Cell Biology have been taught as an integrated 8-week "Molecules to Cells" block using traditional lecture and joint large group Problem-Based Learning exercises. Following conversion to the new TBL-based curriculum, biochemistry reduced traditional didactic lectures by over 40%, from 56 to 33 lectures and introduced 7 TBL modules. Cell biology introduced 3 new TBL modules and reduced lectures by 54%, from 31 to 14. Combined, these changes reduced total contact hours by 33% (107 versus 72, including PBL from previous years and an average of 2.5 hours/TBL). The TBL format included iRAT/gRATs (10-15 questions) and the application phase (4-8 questions). The number of students (n=174) and entering MCAT scores were similar. In both courses, RATs contributed 5% of the total grade for the course. The balance of the grade for the courses was based on three major exams, and for biochemistry, the NBME Shelf Exam accounted for 15% of the final grade. To effectively compare academic performance between the 2011-2012 pre-TBL and 2012-2013 post-TBL years, the three major exams utilized questions that were identical and/or very similar.

RESULTS: Students in the TBL curriculum scored better than the previous year on every major exam. The combined mean score for all three exams in biochemistry increased from 76.9% to 84.1%, and in cell biology from 77.5% to 82.5%. Additionally, the mean score for the NBME Biochemistry Shelf Exam rose from 52.4 to 60.8, representing an increase from the 59th to the 85th overall percentile.

CONCLUSIONS: It is recognized that these data represent only one year. The implementation year is still ongoing with data being collected for a more thorough comparison and evaluation. However, for these two courses, early analysis indicates that TBL is a very effective methods for teaching medical biochemistry and cell biology.

Comparing the Effectiveness of Error Avoidance, Error Management and TBL Programs

Sharon Hart, Ph.D. MBA Brigitte Steinheider, Ph.D. MBA

BACKGROUND: The implementation of large enterprise software systems introduces changes to business transactions and processes that have to be communicated and trained. SAP is one of the leading enterprise systems in the world, and is currently being implemented at an aerospace manufacturing company in Tulsa, Oklahoma. The traditional SAP training methods is an error avoidance (EAT) approach, which is based on scripted exercises that guide participants to the correct solution. This has for the most part successfully equipped people with the procedural knowledge to process transaction scenarios that were presented in the training materials. The effectiveness of this method with regards to analogical and adaptive transfer has had questionable results for the aerospace company. Recent studies suggest that error management training (EMT) and/or team-based learning (TBL) would be more effective and appropriate training approaches for analytical and adaptive knowledge transfer.

DESCRIPTION: The purpose of this research was to determine if an EMT and/or TBL training model would be more effective for the aerospace company than the existing EAT model for SAP related training. Using a sample of 69 employees, this study compared the effectiveness of EAT, EMT and TBL for SAP related procedural and adaptive knowledge transfer as well as business performance. Results suggest that for the company employee population a TBL training approach would be more effective than either EAT or EMT for procedural performance and adaptive knowledge transfer. Findings also revealed that an EMT training approach would be more effective than either EAT or TBL for declarative knowledge transfer. A better knowledge of training approaches and their effects on learners and business performance will help this company in the design and implementation of efficient and cost effective training programs for future SAP deployments.

Adapting Technology to Facilitate Application Phase Gallery Walks Improves TBL Discussions

David W. Rodenbaugh, Jennifer L. Eastwood, Richard L. Sabina, Kara E. Sawarynski, David M. Thomas.

BACKGROUND: One common TBL application exercise practice involves the use of gallery walks to review group work recorded on easel boards. There are logistical limitations to this process. For example, the work is not easily reproducible for student use after class. In addition, group discussions are difficult to facilitate since the class may not see information a student is referring to while discussing a question. Technological solutions can be adapted to promote the spirit of the gallery walk exercise while overcoming limitations outlined above.

DESCRIPTION: Two class TBL activities developed for a first-year medical class required gallery walks. As a technological solution, we first utilized the discussion board tool provided by our learning management system. This blog-style board permitted simultaneous photographic display of each team's model. Additionally, subsequent application questions were posted on the discussion board for teams to electronically respond to. The other TBL activity involved concept mapping. We required our five-member teams to use the concept map software "Vue" for TBL preparation. We reformulated the teams for a mini-gallery discussion. One teammate remained as a presenter. The four other teammates were assigned to four other teams. The brief reformulation of teams maintained small group discussions while preserving the chance for students to discuss and compare and contrast 5 different maps between each small group. The students reconvened with their original team and were given an opportunity to incorporate changes into their maps.

RESULTS: Using technological solutions that complement an application phase gallery walk promote individual engagement and group discussions. All students can use their personal computers to refer to the material being discussed on the discussion boards and/or their digital concept maps. Furthermore, these solutions provide a lasting resource the students can revisit for review or preparation for other classes or examinations.

TBL Orientation Activities in Lower-Division College Courses

W. Edward Chi

BACKGROUND: TBL involves activities that are unfamiliar for those new to college. These activities include: 1. independently learning new concepts in advance; 2. actively using new concepts in class; 3. seeing peers as legitimate sources of knowledge, and 4. collaborating with a highly heterogeneous cohort. New college students, on the contrary, are more familiar with: 1. learning new concepts during class; 2. using concepts infrequently in class; 3. seeing the instructor as the main source of knowledge; and 4. interacting with a more homogenous cohort. Taken together, these differences can be overwhelming, especially to new college learners. Acclimating these learners to TBL may be especially helpful.

DESCRIPTION: In addition to widely documented methods used to orient learners to TBL—practice RAP, transparent team formation, etc.—could more orientation activities help? In Fall, 2011, additional orientation activities were added to two lower division Economics courses that had been using TBL. Before, only the first week of the term was used to orient students. Beginning in that term, one additional week was added. It included exercises on critical thinking, teamwork, and studying skills from the learning sciences literature.

RESULTS: Three instruments were used to evaluate the effect of the additional orientation activities: scores on common final exam questions, retention rates, and mid-semester learner survey results. The results were mixed. For both classes, there was a slight increase in the average scores on the final exam questions. There was no discernable pattern, however, in the retention rate data. Same with learner survey results there was an increase in favorable responses in one class but not in the other.

CONCLUSIONS: Expanded assistance for first-time college learners in the first weeks of a TBL course may appear to help. But conclusive supporting evidence is not yet available. Further analysis and testing is underway. It may be that the various skills developed from an additional week of orientation may be just as well develop gradually over the entire term without any intervention. All that makes the TBL experience unique, after all, is how it can help learners improve their critical thinking, teamwork, and studying skills.

Team-Based Learning Approach and Classroom Attendance: A Mid-Semester Intervention

Tatyana G. Pashnyak

BACKGROUND: There have been several studies suggesting that team-based learning approach enhances the ability of non-traditional students to succeed in the classroom (Michaelsen, Knight, & Fink, 2004; O'Kelly & Noone, 2005; Hefley, 2012). This is why I advised a concerned instructor, who has experienced a low classroom attendance even prior to midterm, to implement the team-based learning approach in an attempt to remedy the problem.

DESCRIPTION: The undergraduate course used for this study has always been a primarily "lecture" course, led by the instructor. We implemented the Readiness Assurance Process (RAP) in an attempt to boost student motivation and, consequently, classroom attendance. The traditional components of team-based learning (Individual RAP, Team RAP, and Application Exercise) replaced the prior classroom lecture for the remaining six weeks of the semester. We interviewed students, both individually and as a group, at the completion of this study.

RESULTS: The classroom attendance improved from approximately 50% to nearly 80%. Most of the interviewed students (95%) reported an increased level of motivation and satisfaction with classroom learning methods as well as the course overall.

CONCLUSIONS: Team Based Learning approach appears to be very effective in addressing low classroom attendance, stemming from low student motivation. We will implement this instructional approach in other courses.

Comparison of Team Based Learning to Lecture on Learning Outcomes

Jeffrey Tingen, Kristin Klein, Michael P. Dorsch, Trisha Wells, Janice Stumpf, Sally Guthrie, Marissa Alaniz, Tami Remington, Vidya Ramaswamy, Peggy Carver, Vicki L. Ellingrod, and Barry E. Bleske. All authors as associated with the University of Michigan College of Pharmacy, Clinical and Social Administrative Sciences Department. Ann Arbor, Michigan.

BACKGROUND: Recently, the University of Michigan, College of Pharmacy (COP) has undergone an extensive revision of the curriculum. Our faculty chose to use team based learning (TBL) as the primary teaching pedagogy for our 5 semester Therapeutic Problem Solving course sequence, replacing a lecture based pedagogy. This change was made, to allow students more experience applying the knowledge learned in these courses. As we transition to the new curriculum, evaluation of learning outcomes between these two pedagogies is occurring.

DESIGN: For select topics, identical exam questions were administered to 2nd year pharmacy students (P2) taught by TBL and to 3rd year pharmacy students (P3) taught by lecture format. The exam questions were determined a-priori (by 3 independent reviewers) to test either recall or application. For this analysis we compared the overall percent of correct answers for the recall and application questions based on teaching pedagogy (TBL vs. lecture). A Chi-squared analysis was used to determine significance ($p=0.05$).

RESULTS: A total of 131 questions were evaluated; 79 tested recall and 52 tested application in 5 therapeutic areas (hypertension, heart failure, coronary artery disease, hyperlipidemia, and substance abuse). For the recall questions, the lectured based students scored significantly higher, compared to the TBL students (61% correct vs. 41% correct, $p=0.01$). For the application questions, no differences were seen between teaching pedagogies (77% correct vs. 81% correct, $p=0.24$). Students in the TBL classes scored similar or better overall on the exam compared those taught by lecture, particularly on questions assessing application.

CONCLUSIONS: Our curricular transition to TBL from the traditional lecture based pedagogy has allowed our TBL taught P2 students to perform at a similar level as a more advanced student in regards to application skills. This is evidenced by the P2 students doing as well or better on the individual assessments that used application type questions, which supports the overall goals of our curricular reformation.

Modification of the Peer Evaluation System in Clinical Therapeutics Modules

Veronica P. Shuford, M.Ed., Brigitte L. Sicut, PharmD., Cynthia K. Kirkwood, Pharm.D., Lisa B. Phipps, Pharm.D., Ph.D.

BACKGROUND: Peer evaluation, an essential component of Team-Based Learning™, allows students to provide important feedback to their team members regarding team interaction skills. Finding a system that promotes team learning power without the fear of retribution and also minimizes grade inflation is challenging. We revised the peer evaluation system to improve the quality of feedback and increase the skills of the evaluator in providing useful comments regarding team interaction skills and contributions.

DESCRIPTION: Second- and third-year pharmacy students at Virginia Commonwealth University completed a modified Koles Peer Evaluation to assess team members in 11 clinical therapeutics modules. The evaluation included two sections: 1) quantitative - rating peers on cooperative learning and interpersonal skills, and self-directed learning 2) qualitative - describing peers' contribution to the team. Based on student focus group data (spring 2011) faculty revised the evaluation to make the process more meaningful. An orientation to teamwork occurred in fall 2011 (characteristics of an effective team, team growth stages, tips for making feedback meaningful). Evaluation frequency was reduced from being offered after each module to a formative midpoint and summative final evaluation and the quantitative portion was removed. Students were instructed to describe the most valuable team contribution the person makes and the most important thing the person could do to more effectively. Eight faculty used a rubric to rate the quality of student evaluations.

RESULTS: The quality of student feedback improved compared with previous semesters. The effectiveness of the revised feedback process will be assessed on the fall 2012 final course evaluation. Focus groups will be used to assess if the revised process helped students learn to provide better feedback and gain insight into their team interaction skills.

CONCLUSIONS: We modified peer evaluation to prepare students to demonstrate appropriate intergroup behaviors and effective oral and written communication skills.

Workshop Session 3

FUNDAMENTALS TRACK

From TBL Novice to TBL Master

Amy Lin

Peer Evaluation Workshop

TEAM: Paul Koles & Chris Burns

INNOVATION TRACK

TBL Modules for Dissemination: A Faculty Guide

Sandy Cook

TBL and the Unfolding Case Study

Deborah Ulrich

SCHOLARSHIP TRACK

Facilitating Team Adaptation in TBL

Karla Kubitz

WORKSHOP ABSTRACTS

From TBL Novice to TBL Master: Pearls for Building and Improving Team-Based Learning in Your Program

Amy Lin, MD, University of Illinois at Chicago College of Medicine, Abbas Hyderi, MD, MPH, University of Illinois at Chicago College of Medicine, N. Kevin Krane, MD, Tulane University School of Medicine, Dean Parmelee, MD, Wright State University Boonshoft School of Medicine

BACKGROUND: With the shift in medical school instruction from lecture to more active learning methods, an increasing number of medical educators are becoming interested in team-based learning (TBL) as an instructional method. This workshop will elucidate best practices for TBL at any stage of experience, from novice to master.

OBJECTIVES: By the completion of the workshop, participants will be able to:

1. Apply knowledge of the major principles, purposes, and strategies for TBL
2. Apply knowledge of implementation issues related to TBL
3. Describe approaches for scholarship related to TBL, including evaluation of processes and outcomes
4. Apply knowledge of TBL instruction issues for the novice, the more experienced educator, and the master TBL educator

FORMAT/METHODS: This workshop will be conducted using a team-based learning format.

Workshop attendees will be divided into heterogeneous teams based on their self-identified level of experience (5 min). They will read a one-page summary of TBL for orientation (5 min). Presenters will provide a brief overview of where their respective schools are with regard to TBL experiences and implementation (24 min). Teams will then be given three applications concerning challenges for novice, experienced, and master TBL practitioners (10-15 min, each). Challenges that will be discussed include steps in initiation and implementation of TBL, helping healthy skeptics incorporate TBL into their practice, and measuring learning outcomes.

For each application, each team will come to a consensus regarding the best answer and simultaneously reveal their choice when prompted. The facilitator will engage the teams in discussion with each other to debate the issues surrounding the different challenges (15 min, each).

Throughout the workshop there will be opportunities for questions.

PRODUCTS/MATERIALS: Each participant will receive a handout with the one-page summary of TBL, synopsis of the presenters' experiences, application questions, and presenters' contact information.

LEARNER ASSESSMENT: Participants will be assessed on their ability to apply key concepts to practical problems through discussion of the application exercises.

Peer Feedback and Evaluation: All About Accountability

Chris Burns, Paul Koles

The purpose of this workshop is to demonstrate how peer feedback can be used to reduce student uncertainty, increase individual accountability, and improve team performance.

LEARNING OBJECTIVES: At the end of the workshop, participants will be able to:

1. Differentiate between formative and summative peer feedback.
2. Describe how peer feedback affects team performance.
3. Recognize how the quality of communication affects the outcomes of peer feedback.
4. Detail skills and justify procedures for helping students communicate constructive peer feedback--especially when such feedback contains negative messages.

BEHAVIORAL OURCOMES: Participants will be able to:

1. Describe five (5) goals of peer evaluation and prioritize these goals for students who give and receive feedback.
2. Identify criteria that can be used to effectively evaluate a teammate's performance.
3. Guide students in the art of giving and receiving honest and helpful feedback.
4. Develop peer evaluation strategies and processes that are appropriate for the institution's unique learning culture.

TBL Modules for Dissemination: Faculty Guide

Sandy Cook

BACKGROUND: The Duke-NUS Graduate Medical School in Singapore has developed and offered many professional development activities in TBL over the years. In order to enhance our own module development efforts, a Faculty Guide was created as a prototype in order to provide documentation of the running and implementation of a TBL module. The prototype is also useful in training others to run the same module with similar effectiveness. During this workshop, participants will focus on several aspects of the Faculty Guide. They will use one of their own existing TBL modules and concentrate on crafting a rationale, learning points, and application questions.

OBJECTIVES: By the end of this workshop, the learners will be able to:

1. Review and critique the components of The Duke-NUS Faculty Guide prototype/model.
2. Use the Duke-NUS Faculty Guide to begin to prepare a rationale, learning points, and application questions for one of their own modules.
3. Discuss plans to share the participants' own TBL module through the TBL Collaborative, MedEdPORTAL, peer-reviewed articles and other dissemination channels.

FORMAT/METHODS: The workshop will be conducted using a modified TBL approach, using only team applications.

Pre-reading: A copy of the Duke-NUS Faculty Guide

The first application will take approximately 15 minutes. Teams will work in small groups, review the Faculty Guide, generate ideas about the ways in which the Guide could be used and/or modified, and consider the development of their own learning points and application questions. The teams will share their discussions with the larger group.

During the second application, which will take approximately 30 minutes, teams will use the Duke-NUS prototype. They will select one of their team member's learning points and applications questions and refine them. They will also suggest dissemination plans. The drafts and plans will be displayed on poster paper in the workshop meeting room.

During the next 15 minutes, all participants will engage in a "gallery walk." Using sticky notes, the participants will offer written comments regarding the drafts and dissemination plans.

For the next 30 minutes, a large group discussion will be facilitated. The teams will be asked to share the successes and challenges of completing the drafts and the dissemination plans.

PRODUCT/MATERIALS:

Each participant will receive:

1. Duke-NUS Faculty Guide prototype
2. Examples of Duke-NUS Faculty Guides that have been developed
3. Summaries of the posters and dissemination plans will be sent to participants by email following the conference
4. Contact information of the presenters

LEARNER ASSESSMENT:

1. Learners will critique and begin to use the Faculty Guide.
2. Learners will become aware of the rationale, learning points, and application questions and dissemination plans of other workshop participants.
3. Learners will begin to develop a faculty guide using the Duke-NUS prototype.

TBL and the Unfolding Case Study: The Dynamic Duo for Critical Analysis & Clinical Judgment

Deborah L Ulrich PhD,RN Wright State University College of Nursing & Health
Tracy Brewer DNP,RNC Wright State University College of Nursing & Health

BACKGROUND: Nursing and other practice disciplines find it difficult to connect theory and practice so that students can function in clinical areas where they must constantly use critical clinical judgment as they care for patients. This combination teaching method of team based learning and unfolding case studies is an excellent solution for the educator.

OBJECTIVES: By the end of this presentation, the learner will:

1. Define the unfolding case model
2. List the advantages of combining team based learning and the unfolding case model, and
3. Participate in a learning activity utilizing team based learning to process an unfolding case.

FORMAT/METHODS: This workshop will be conducted using the team based learning format. Following introductions and division of the participants into groups, a 10 minute explanation of the unfolding case model will be presented, as well as the way team based learning will be used to process the case. Groups will be involved in a learning activity geared to solving problems related to student/faculty issues common to college educators. A 5 question IRAT will be administered and then a GRAT to generate discussion as to how faculty might react and problem solve certain situations common in college classrooms and clinical arenas. Participants will come to consensus as to the correct responses and will have the opportunity to challenge the questions as a group. This activity will last about 35 minutes. Groups will then complete the unfolding case scenario which will again deal with a student issue and how the faculty member might handle the issue. With the use of a gallery walk, groups will decide which group best responded to the scenario. A total group discussion will follow. This activity will take another 35 minutes. For the last 10 minutes, the facilitators will discuss their experiences with using the team based learning/unfolding case duo as a teaching strategy. Throughout the workshop there will be ample time for questions.

PRODUCTS/MATERIALS:

1. Reprint of an article on “unfolding cases”, which describes the strategy as it is used in nursing classes,
2. Contact information for the presenters.

LEARNER ASSESSMENT: Learners will identify at least one advantage and one challenge in using the team based learning/unfolding case duo as a teaching strategy. Group discussion will encourage learners to share ideas on specific ways this strategy could be used in their own classroom.

Facilitating Team Adaptation in Team-Based Learning

Karla Kubitz, Ph.D., Towson University, Towson, MD

BACKGROUND: Teams are, by nature, are adaptive entities. That is, teams respond to changes in their environment, their membership, and their task. Moreover, team adaptation is a key determinant of optimal team performance. Stagl, Burke, Salas, and Pierce (2006)'s model of the team adaptation/ team performance relationship focuses on two key phases of team adaptation. The first phase of the Stagl et al. model says that as a team works together, it moves through an adaptive cycle. During the adaptive cycle, a team participates in four dynamic processes. The team assesses the situation, formulates a plan, executes the plan, and learns from its activities/ experiences. The second phase of the Stagl et al. model says that the adaptive cycle results in the emergence of three important states. Teams develop shared mental models, team situation awareness and team psychological safety, and, depending on the quantity and quality of these emergent states, team adaptation is either facilitated or hindered. Team adaptation is facilitated, and performance is optimized, when high quality shared mental models, good team situation awareness, and a high level of team psychological safety emerge from the adaptive cycle. Team-based learning includes a framework (Sweet & Michaelsen, 2012) of proper team formation, readiness assurance, 4-S application activities, and student-to-student peer evaluation that, if implemented properly, facilitates team adaptation.

SPECIFIC OBJECTIVES: By the end of the workshop, the learner will:

- Explain team adaptation and describe how the four key elements of team-based learning facilitate team adaptation
- Distinguish strategies that enhance from those that diminish team adaptation in team-based learning
- Develop strategies to enhance team adaptation in their own team-based learning classes

FORMAT/METHODS: The workshop will be conducted using a 'team-based learning' format.

Workshop attendees will be provided with a 'pre-workshop' reading assignment on team adaptation.

Workshop attendees will be divided into teams and the workshop will begin with a Readiness Assessment Procedure. That is, the workshop will begin with an individual multiple choice quiz (an individual RAT) over the reading assignment. The individual RAT will be followed by a team RAT. The team RAT will be taken using an IFAT form.

Following a brief post-RAT mini-lecture to clarify confusing aspects of the reading assignment, workshop attendees will be given several team application exercises concerning team adaptation. In these, attendees will be challenged to use their knowledge of team adaptation to: (a) identify problematic aspects in hypothetical TBL classes related to team adaptation; (b) to use their knowledge about team-based learning and team adaptation to develop possible interventions; and (c) explore ways to build team adaptation in their own team-based learning classes.

PRODUCTS/MATERIALS: Workshop attendees will receive:

- A pre-workshop reading assignment on team adaptation
- An example of a RAP related to team adaptation
- Several examples of team application exercises related to team adaptation
- Contact information for the presenter and information regarding access to additional resources on team adaptation

LEARNER ASSESSMENT: Workshop attendees will:

- List at least one factor that would enhance, and at least factor that would diminish, team adaptation in a teambased learning class
- Develop at least one strategy to enhance team adaptation in their own team-based learning classes

Oral Presentations 2

SCHOLARSHIP TRACK

Student Engagement with TBL in Undergraduate Entrepreneurship Courses: An Exploratory Study
Peter Balan

Implementation and Assessment of TBL Across a Variety of Disciplines at a State University
Lorrie Comford

Promoting TBL Around the World: Duke-NUS TBL Fellowship
Sandy Cook

TBL, Team Composition, and Team Success: What Really Matters?
Molly Espey

ORAL PRESENTATIONS

Student Engagement with Team-Based Learning in Undergraduate Entrepreneurship Courses: An Exploratory Study

Peter Balan

BACKGROUND: The concept of student engagement is increasingly being related to the quality of education, and high levels of student engagement have been demonstrated to be related to positive learning outcomes and student retention. Well-established tools are used to measure student engagement with their institutions (NSSE). Although methods have been developed to measure overall student engagement at the course level (CLASSE), there do not appear to have been attempts to systematically investigate student engagement at the level of individual teaching activities. The research questions in this grounded research study are: (1) what are the dimensions of student engagement in Team-Based Learning as a specific teaching method, and (2) are these dimensions of engagement consistent for different groups of students.

DESCRIPTION: Undergraduate university students in three separate entrepreneurship foundation classes were asked to describe their engagement with Team-Based Learning. The data was collected using a “minute paper” method, and consisted of anonymous and voluntary qualitative comments made by students in the class. Comments for each class were separately analyzed using concept mapping. This is a rigorous mixed-method approach that combines qualitative and quantitative research methods. It produces maps showing links between the comments analyzed and clusters of similar comments. These clusters reveal the underlying structure of the concept being examined, in this case, engagement by students in a particular teaching method.

EVALUATION: Analysis of data for each of the classes with 36 to 66 students produced separate maps with between 8 and 11 clusters or themes explaining their engagement in TBL. These clusters can be described as dimensions of engagement with descriptors such as “competition between teams”, “improves marks/grades”, “good preparation for the workplace”, “fun and enjoyable”, “sharing ideas with others”, “makes me learn course content”, “helps me to get know other people”. A meta-analysis of the sets of results reveals the underlying dimensions of engagement in TBL as a teaching method.

CONCLUSIONS: The results of this grounded or abductive study clarify our understanding of student engagement with TBL as a teaching method. This research contributes to the engagement literature, and results already have demonstrated practical value for increasing student engagement in class activities and hence improving learning outcomes.

Implementation and Assessment of TBL across a Variety of Disciplines at a State University

Daniel Mulcare, Ph.D. Lorrie Comeford, Ph.D., Amy Everitt, Ed.D., Lorri Krebs, Ph.D.,
Sanjay Kudrimoti, Ph.D., Monica Leisey, Ph.D. MSW

BACKGROUND: TBL has been most thoroughly studied in the medical and health disciplines for students who are preparing to be health science professionals. There is less known about the effectiveness of TBL for students studying other disciplines. In an effort to explore the effectiveness of TBL for undergraduate and graduate students in diverse fields, this pedagogy was implemented in a variety of disciplines (chemistry, finance, geography, political science, sport and movement science, social work) in a state university.

DESCRIPTION: Pre-course course and post-course surveys were administered in each class to determine how the students felt about being in a TBL course and their perception of their ability to communicate and work in a group. Additional data gathered included: information regarding the level of the course, the year of the student, and whether or not the student had experienced a TBL course in the past.

EVALUATION: Comparisons of the pre-course survey and post-course survey data suggest that the TBL model was of value to the majority of students. Over half (56%) of the students would choose a team-based learning course in future over a traditional lecture based, a third (33%) suggested it would depend on the course topic and only a small fraction (6%) of students who would prefer the traditional teaching style of classroom. Qualitative data was gathered via classroom observations and through the reflection of the instructors who were part of the project. These data indicate the TBL model results in livelier classrooms and increased engagement. For many instructors, the TBL model required a few iterations to implement well.

CONCLUSION: Preliminary data seem to indicate that the TBL model is also effective for students in across diverse areas of study. Increased engagement, collaborative learning and the requisite pre-class preparation resulted in more effective, enjoyable, and positive learning experience. The benefits of the TBL model for state universities which often serve first generation college goers can be found in the areas of increased engagement, knowledge acquisition, and the ability to work in a team.

Promoting TBL around the World: Duke-NUS TBL Fellowship

Sandy Cook, Charles Gullo, Libby Cohen, Robert Kamei, Duke-NUS Graduate Medical School

BACKGROUND: In April, 2012, the Duke-NUS Graduate Medical School in Singapore initiated a Fellowship in Team-Based Learning (FTBL). The aims of the FTBL were to build a community of learners and leaders who are deeply immersed in the design, implementation, and evaluation of team-based learning (TBL) activities within their institution. The FTBL consists of 3 series, each lasting approximately one year. The first week-long series offers 6 modules covering the basic introduction to the mechanics of and skills needed to develop effective TBL modules. The second week-long series provides peer reviewing of modules, mentoring in facilitation, and honing research and evaluation skills. The third series is designed to be held after implementation of the participants' TBL modules and provides additional mentoring and an opportunity to share their experiences with others in the form of a presentation. A follow-up survey was conducted 4 months after the first series ended. This presentation will provide an overview of the FTBL action plans and the results from the follow-up survey.

DESCRIPTION: Twenty-five individuals, from 6 countries: Brunei, Cambodia, Philippines, Saudi Arabia, Singapore, and Tanzania participated in Series 1 in April 2012. In August 2012, a survey was distributed online using Enterprise Feedback Software (EFM) to the 12 individuals or teams who submitted an action plan regarding their progress to-date on their action plans.

EVALUATION: Responses were received from 8 of the 12 (66%) individuals and/or teams in four countries that had submitted action plans during the first series. The results of the survey indicated that the individuals/teams had met or exceeded their own action plan objectives. They made progress in key areas including: designing multiple choice questions and developing TBL modules in radiology, the treatment of acute burns, surgery, parasitology and entomology curriculum, and medical student rotations.

CONCLUSION: This initial series has proven to be a success. In just a few months, FTBL individuals/teams exceeded their original action plan objectives. The first series has had a positive ripple effect by generating additional localized TBL activities in at least 4 countries. The momentum for carrying the action plans forward is dependent on the individuals and the teams. Perhaps the FTBL participants were ready to move forward with TBL prior to attending the first series. However, without the knowledge, skills, and teamwork that were generated during the first series, their progress would likely have been limited. Furthermore, there is a genuine enthusiasm and sense of community shared by the FTBL participants. The participants are now a part of a nurturing TBL community and they have strong links to the Duke-NUS TBL "hotspot" in Singapore.

Team-based Learning, Team Composition, and Team Success: What Really Matters?

Molly Espey

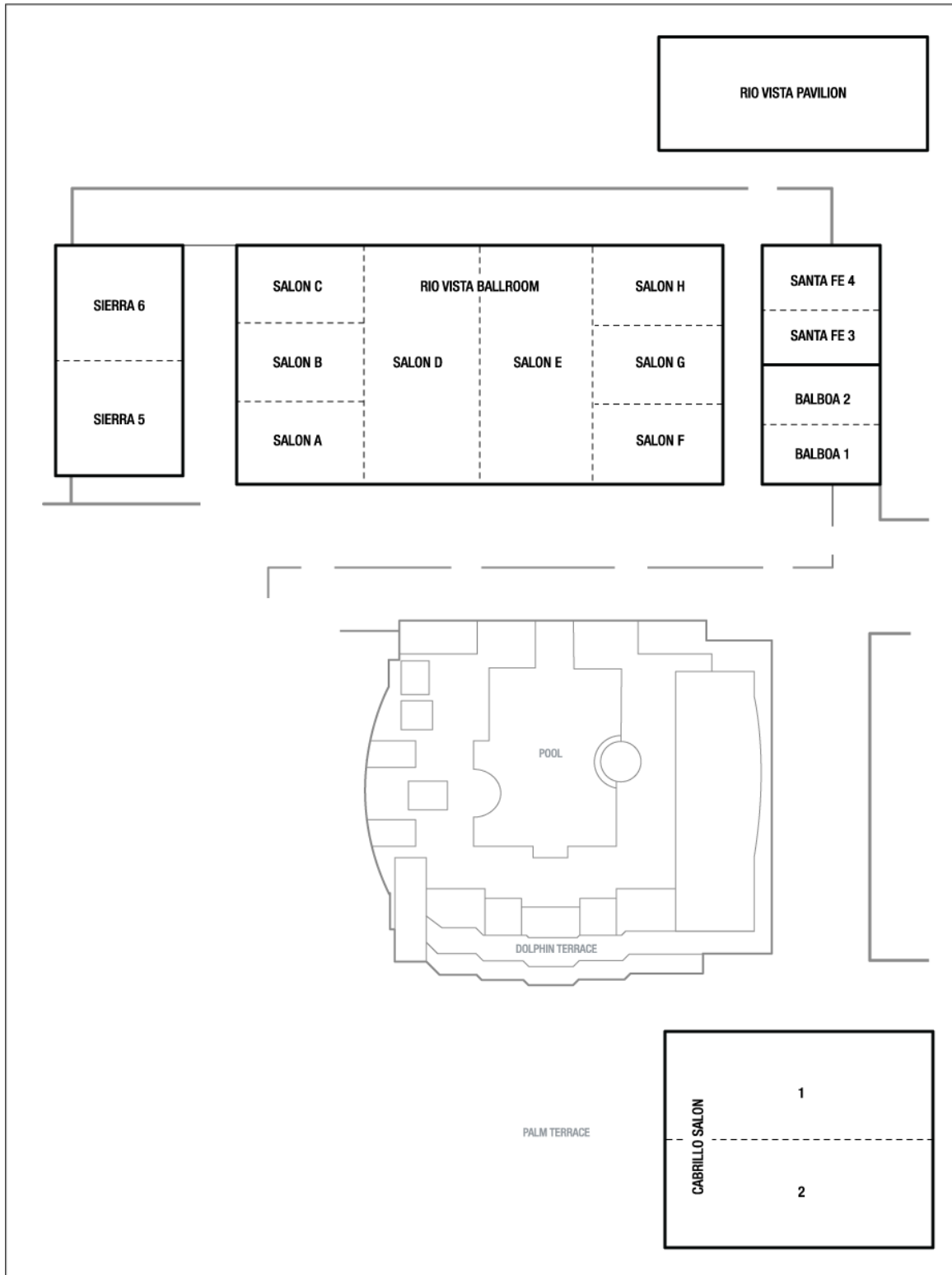
BACKGROUND: Awareness of characteristics of team composition that contribute to team success can help faculty members more carefully design teams to enhance outcomes and learning.

DESCRIPTION: Team cohesiveness and team performances of 89 teams in a total of nine sections of an introductory microeconomic theory course taught between 2006 and 2011 were analyzed to determine what observable characteristics of teams appear to influence team success. Fourteen teams will be added to the database at the end of this semester. Team cohesiveness, measured as the variance in peer evaluations within each team, is modeled as a function of surface-level and deep-level variables. Team success on both RATs and team application exercises is modeled similarly but team cohesiveness is also included as an explanatory variable. Surface-level variables available for each student include gender, class level, major, and whether the student is from in-state or out-of-state. Deep-level variables include grade point average, used to measure students' level of effort and/or value of education, and team cohesiveness. Control variables include team size and class size.

EVALUATION: Preliminary results suggest that team success is not significantly influenced by team size, class size, the mix of in-state and out-of-state students, the mix of class levels, or the average team GPA. The GPA of the top individual on the team, team cohesiveness, and the percent of females on the team are all significantly and positively correlated with team success.

CONCLUSIONS: Knowing which team components matter and which don't, in terms of team success, can help instructors focus energy and attention on the appropriate variables in designing teams and working to maximize team performance. While complementary skills are likely to contribute significantly to team effectiveness, success appears to be most significantly enhanced by team cohesiveness, thus faculty should be attuned to divisions or conflicts on teams and attempt to alleviate such problems to the extent possible.

Hotel Map



	Thursday	Friday	Saturday	
7:00			Registration Open	
7:15		Registration Open		
7:30				
7:45				
8:00		Opening Remarks		
8:15	Registration Open	Plenary 1	Poster Viewing	
8:30				
8:45				
9:00	Becoming a Consultant- Trainer in TBL	TBL 101	Workshop Session 1	
9:15				Workshop Session 3
9:30				
9:45				
10:00				
10:15				
10:30				
10:45				
11:00				
11:15				
11:30				
11:45		Lunch	Lunch & Business Meeting	
12:00				
12:15	Lunch			
12:30				
12:45				
1:00				
1:15			Oral Presentations 1	
1:30		Workshop Session 2		
1:45				
2:00				
2:15				
2:30	Specific Choice			
2:45			Plenary 2	
3:00				
3:15				
3:30		Oral Presentations 1		
3:45				
4:00				
4:15				
4:30				
4:45				
5:00				
5:15				
5:30		Poster Viewing & Reception		
5:45				
6:00				
6:15				
6:30				

Schedule at a Glance