Hilton St. Petersburg Bayfront Hotel
St. Petersburg, Florida

March 1-3, 2012

11th Annual TBLC Meeting
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Meeting Program

Thursday, March 1, 2012
Pre-Conference Workshops
(separate registration required)

8:30—5:00 Registration Desk Open

8:30—9:00 Light Breakfast

9:00—4:00 Becoming a Consultant-Trainer in Team-Based Learning
Williams/Demens
Designing and Facilitating Workshops in TBL 101
Ed McKee, Central Michigan University
Rick Sabina, Oakland University

Functional Mentoring
Paul Koles, Wright State University
Sandy Cook, Duke-National University of Singapore

9:00—12:00 TBL 101
St. Pete 1
Ruth Levine & Michael Sweet

12:00—1:00 Lunch

1:00—4:00 The Specific Choice: Making Your TBLC Module Successful
St. Pete 1
Dean Parmelee

6:00 Dine-Around
Meeting Program

Friday, March 2, 2012

7:00—4:00  Registration Desk Open
7:00—8:00  Light Breakfast
8:00—8:15  Introduction & Welcome
           Wayne McCormack, 2012 Program Chair
           Michael Sweet, TBLC President
8:15—9:00  Plenary Session 1
           A Collective Intelligence Factor in the Performance
           of Human Groups
           Christopher F. Chabris
9:00—10:20 Oral Presentations 1
            Innovations in Team-Based Learning
            Moderator: Dwight Wolf
            Presenters: Douglas Carrie
                       Patricia Weinstein
                       Sandy Cook
                       Brian Dzwonek
10:30—12:30 Workshop 1
            F: Writing “Good” Multiple Choice Questions
            F: Beyond Basics: Becoming an Expert in TBLC
            Classroom Facilitation
            I: When Time is Short, Think TBL
            R: Turning Teaching into Educational Scholarship
Meeting Program

Friday, March 2, 2012

12:40—1:40 Lunch—Table Topics
Grand Bay

12:40—1:40 Take a Consultant to Lunch
Tangerine South (separate registration required)

1:50—3:50 Workshop 2
St. Pete 1 F: Designing Effective Peer Evaluations
St. Pete 2 F: Leaving a Trail of Breadcrumbs: How to Write
Date-Rich Team Activities for Novice Learners to
Reinforce Factual Content
Harbourview I: Overcoming Challenges in TBL: The Regis
Approach
Skyway/Pier: R: Getting a TBL-Based Research Program Up and
Running

4:00—6:00 Poster Reception—Wine & Hors D’oeuvres
Lobby
Meeting Program

Saturday, March 3, 2012

7:00—2:00   Registration Desk Open

7:00—8:00   Light Breakfast

8:00—10:00   Workshop 3
              St. Pete 1   F: Collaborative Development of Rich Cases for Team-Based Learning
              Skyway/Pier   F: Great Workshop! Now What?
              Harbourview   I: Taking Peer Evaluation to the Next Level Using Mentor-Assisted Debriefing (MAD)
              St. Pete 2   R: Introduction to Measuring Educational Outcomes

10:00—10:50   Speed-Networking Sessions

11:00—12:20   Oral Presentations 2
               Grand Bay   New Research in Team-Based Learning
               Moderator: Karla Kubitz
               Speakers: Karl Smart
                          Esam Agamy
                          Tracy Knowles
                          Michelle Farland

12:30—2:00   Lunch-Business Meeting

2:00—3:00   Plenary Session 2
            Grand Bay   Stretching the Boundaries of TBL: Whoa, Don’t Do That!
                        Larry Michaelsen

3:00   Adjourn
Speed Networking Session

This session is designed to help TBLC members connect with others interested in sharing best practices and/or collaborating on research projects about TBL. Please come prepared to give your 1-minute “elevator speech” about your application of TBL and ideas for research on the effectiveness of TBL. Be sure to bring an extra stack of business cards to exchange. You will meet with a different partner every ~4 minutes, meeting a total of 12-15 other people. During each round you will share your 1-minute speeches, spend a couple of minutes exploring areas of common interest, and exchange business cards so you can arrange to contact each other at a later time to follow up on a common interest.
Oral Presentations Session 1
Innovations in Team-Based Learning
Moderator: Dwight Wolf

Using Team-Based Learning to Support Individual Assignments and Gather Peer Review Feedback in Large First Year Classes
Douglas Carrie

Creating a Sense of Team and Promoting Collaboration Online: Beyond the Discussion Group
Patricia Weinstein

Global Initiatives in Team-Based Learning
Sandy Cook

A Continuous Quality Improvement Model for Team-Based Learning in Medical Education
Brian Dzwonek

ORAL PRESENTATION ABSTRACTS

Using Team-Based Learning to Support Individual Assignments and Gather Peer Review Feedback in Large First Year Classes

Dr. Douglas Carrie, Director of First Year Studies, The University of Auckland Business School, Auckland, New Zealand PhD (London Business School), MBA (Thunderbird), BCom (University of British Columbia)
BACKGROUND: The University of Auckland Business School has introduced a Team Based Learning (TBL) delivery model for two core first year courses that are taken by all of our undergraduate students. BUSINESS 101 and 102 are designed to be integrated courses that bridge all business disciplines. There is a strong vision for these courses to not only deliver academic content, but to also play key roles in transitioning first year students to their University study, and in developing the skills that they will need to succeed in their studies and in their future business careers, e.g. business communication, teamwork, critical thinking, and information literacy. This is a large-scale TBL delivery with some 2,000 students moving through this two-course sequence each academic year.

DESCRIPTION: Students have two individual assignments to prepare in each course, meaning they work through a set of four assignments over the course of the year. These include two essays in BUSINESS 101 followed by two business reports in BUSINESS 102. One challenge we faced was how to embed quite traditional individual assignments into these courses, as required by the Business School, while taking advantage of our TBL delivery model. Our solution was two-fold. Firstly, we ensured that appropriate application exercises were sprinkled throughout the courses to support these assignments, e.g. application exercises revolves around academic honesty, information literacy, essay writing, report writing and giving/receiving feedback. Secondly, for each assignment, we repeated a set sequence of double blind peer review and marking processes, including an innovative in-class team based peer review process. This involves (1) students individually peer reviewing sets of assignments of other students; (2) students evaluating the quality of the individual peer review feedback they have received from other students; (3) students self-reviewing their own assignments; (4) TBL teams group peer reviewing assignments and moderating the feedback from the individual peer review process; and (5) staff markers consolidating all of the previous feedback, adding value through further comments, and determining final marks.

EVALUATION: Students can learn from both giving and receiving feedback.
Our Faculty TBL Facilitators have reported intense engagement in the assignment related application exercises, and especially in the team peer review processes. Through our assurance of learning processes, we are seeing evidence of improved academic writing skills and improved first year assignment outcomes.

**CONCLUSION:** Through the TBL processes that surround assignments in BUSINESS 101 and 102, staff and students are effectively co-creating value in the form of improved assignment support systems, and also in the form of far more comprehensive assignment feedback than one would normally see with traditional assignment marking processes in such large scale class deliveries.

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**Creating a Sense of Team and Promoting Collaboration Online:**
**Beyond the Discussion Group**

Patricia Weinstein

**BACKGROUND:** Educators have reported positive student feedback when implementing TBL in asynchronous online courses using tools such as discussion groups, virtual chats and bulletin boards within course management systems. Collaboration, an essential team skill, is as important to the research process as the final product. Thus, team-based learning (TBL) with its emphasis on collaboration was chosen as the instructional strategy for an online undergraduate nursing research course.

**DESCRIPTION:** In designing an online nursing research course, alternative tools beyond discussion boards found in online course management systems were sought to increase a sense of team and foster collaboration while preserving the 4 S’s of team assignments. Free online educator tools provided by Google were utilized and set up with access outside of the course management system.
RESULTS/EVALUATION: The 4 S’s of team assignments were accomplished using Google Docs. Students who completed the course were surveyed and asked if team activities were better, the same or worse than team activities they had experienced in other courses. Ninety percent responded that the activities were better or the same. When asked if they preferred collaborating in Google Docs compared to discussion boards, 70% preferred Google Docs. Students expressed in open-ended comments on the survey that Google Docs worked well for collaborating on team activities. The instructor reported that using Google docs increased preparation time for the course compared to preparation for courses using only tools provided within the course management system, but workload decreased with succeeding semesters once the infrastructure was in place. Grade distribution was similar to that achieved by students enrolled in the same course offered face-to-face and online without TBL.

CONCLUSIONS: Setting up an online TBL course for the first time utilizing unique online tools that promote a sense of team and promote collaboration requires increased preparation time compared to courses using only tools provided within the course management system. However, student satisfaction and perception of improved collaboration justified the initial increased workload.

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Global Initiatives in Team-Based Learning

Sandy Cook, Ph.D., Colleen O’Connor Grochowski, Ph.D.

BACKGROUND: Duke University and Duke-NUS are actively engaged in global initiatives to improve medical education in many resource-limited areas of the world. Interest in TBL as a primary pedagogy has been evidenced by the number of delegations who have come to both schools to observe TBL in action and learn about its basic principles.
As a result, several invitations to provide workshops and extensive faculty development come from various countries around the world (Taiwan, Cambodia, Philippines, Tanzania). The purpose of this presentation is to describe two initiatives and some of the lessons learned.

**DESCRIPTION:** In 2010, Duke Global Health Institute was awarded a Medical Education Partnership Initiative (MEPI) grant designed to strengthen the medical education in Tanzania (http://www.fic.nih.gov/Grants/Search/Pages/MEPI-OGAC-Tanzania.aspx). One of the objectives is to train teaching faculty in the development and implementation of TBL in the medical school curriculum. In the Spring of 2011, Duke-NUS began collaborating with University Research Company (URC), an organization developed in 1965 with the mission “to provide innovative, evidence-based solutions to health and social challenges worldwide.” (http://www.urc-chs.com) Their request was to train faculty to use TBL to facilitate the delivery of nurse-midwifery and continuing medical education training programs they have developed.

**RESULTS/EVALUATION:** We have developed strategies for introducing TBL and providing training on the various components, including workshops on the Introduction to TBL, Writing Objectives & MCQs, Basic Facilitation Skills, and Teambuilding. Introductory experience include either watching TBL with our medical students or participating in a TBL session on a topic of local interest. These were well received and have inspired both groups to change the method of course delivery. We found that culture and language issues impact the ease with which some of the principles are understood and the effectiveness of certain activities.

**CONCLUSIONS:** The use of TBL is growing internationally through concerted global efforts from the Duke family. The TBL learning strategy seems to transcend cultural boundaries and is viewed as a powerful and needed approach to enhancing medical education in the countries we have visited so far. However, concepts and activities may not always work as planned when English is a second language.
A Continuous Quality Improvement Model for Team Based Learning in Medical Education

Brian Dzwonek, EdD Deputy Director Medical Education Research and Evaluation Duke-NUS Graduate Medical School Singapore

Team Based Learning (TeamLEAD) is the primary curricular model used in the MD and PhD program at Duke-NUS Graduate Medical School Singapore. A critical factor in the success of this methodology is the quality of the materials that are produced for each learning session. In an attempt to formalize an ongoing review process and continuous quality improvement model for TeamLEAD we have created the Team Lead Work in Progress (TWIP), a dynamic multi-step team centered approach to curricular review. The Team Lead Work in Progress (TWIP) is a formal, structured review process that occurs prior to the deployment of course material for Team-LEAD sessions. The structure supports prior review of course materials, timelines, calendars, objectives and multiple choice questions. The TWIP is part of a broad and comprehensive review of course materials that are divided into three general categories: activities that occur before, during, and after TeamLEAD. The TWIP is attended by course directors, facilitators, faculty and education staff. The session will cover the elements of the TWIP, a framework and model for faculty development, an overview of the roles and responsibilities of each of the team members, and the impact of this process on student outcomes and course data.

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Workshop Session 1

FUNDAMNETALS TRACK

Writing “Good” Multiple Choice Questions
  Karla Kubitz

Beyond Basics: Becoming an expert in TBL Classroom Facilitation
  Rebecca Moote

INNOVATIONS TRACK

When Time is Short, Think TBL
  Trudi Jacobsen

RESEARCH TRACK

Turning Teaching into Educational Scholarship
  Wayne McCormack
WORKSHOP ABSTRACTS

Writing “Good” Multiple Choice Questions

Karla Kubitz

BACKGROUND: In order to successfully adopt the team-based learning teaching strategy, teachers must learn to write 'good' multiple choice questions. This is because good multiple choice questions are essential during the Readiness Assurance Process and they are also critical as a strategy for developing effective team application exercises. In addition, because they must match learning goals/ objectives, teachers must learn to write good multiple choice questions that ‘match’ the different levels of Bloom’s Taxonomy of Cognitive Levels.

OBJECTIVES: By the end of the workshop, the attendees will: 1) Be able to explain what a 'good' multiple choice question is. 2) Be able to distinguish a 'good' from a 'bad' multiple choice question. 3) Be able to match multiple choice questions to the different levels of Bloom’s Taxonomy of Cognitive Levels 4) Be able to write good multiple choice questions for their team-based learning classroom.

FORMAT/ METHODS: The Workshop will be conducted using a ‘team-based learning’ format. Attendees will be provided with a 'pre-workshop' reading assignment on writing effective multiple choice questions and the Workshop will begin with an individual and a team Readiness Assurance Test (RAT). The team RAT will be taken using the IFAT form and will be followed by a mini-lecture addressing confusing aspects of the reading assignment. The Workshop will continue with one or more team application exercises concerning writing effective multiple choice questions. In these, attendees will be challenged to apply their knowledge of how to write good multiple choice questions and receive immediate feedback on their success in doing so.
LEARNER ASSESSMENT: Workshop attendees will:

- Distinguish a ‘good’ from a ‘bad’ multiple choice question.
- Match a multiple choice question to its level of Bloom’s Taxonomy.
- Write one good multiple choice question for their team-based learning classroom.

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Beyond Basics: Becoming an Expert in TBLC Classroom Facilitation

David Clark PharmD, Peter Clapp Ph.D., Miki Goldwire PharmD, Rebecca Moote PharmD, Michael Nelson Ph.D., Regis University School of Pharmacy

BACKGROUND: Providing student teams with quality learning materials is only the beginning of the TBL experience. One challenge new TBL faculty face is facilitating a classroom discussion that reinforces the significance of application exercises and assesses mastery of learning objectives. This workshop will provide useful facilitation tools and strategies to faculty new to TBL as well as those who have used TBL extensively. It will also serve to provide examples of application exercises that participants can use in mentoring other faculty 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 three years.

OBJECTIVES:

1. Identify the best way to facilitate classroom discussion when all teams have answered an application question correctly.

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

**FORMAT/METHODS:** The workshop will be conducted using TBL format. Following an introduction, 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 question concerns in the classroom
- Facilitating inter-team and intra-team discussions
- Incorporating all teams/students into classroom discussion. Groups will discuss a single application question, come to a consensus, and select an answer. Groups will simultaneously reveal their choices and the facilitator will engage the groups in debate, enabling them to discuss advantages and disadvantages. Groups will be given additional applications and undergo a similar sequence of intra-group problem-solving followed by inter-group debate. At the end, facilitators will discuss their experiences with TBL facilitation and will provide a summary of the facilitation tools used during the workshop.

**LEARNER ASSESSMENT:** Group discussion will identify if participants have identified strategies to improve TBL facilitation.
When Time is Short, Think TBL

Trudi Jacobson, University at Albany, State University of New York, Judy Carey Nevin, Otterbein University

BACKGROUND: Team-Based Learning methods are in use in a number of disciplines across campus, but few institutions seem to be using TBL in condensed-format classes. The presenters have both had experience using TBL for one-shot guest presentations in full-semester classes; in 3-week for-credit classes; and in half-semester classes. Through hands-on TBL-based activities, participants will see that TBL methods can be used in condensed courses—with some modifications.

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

1. Enumerate components of TBL that need to be adjusted for a time frame shorter than a typical semester. Identify adjustments that are inappropriate for the goals of TBL.
2. Appreciate that benefits related to TBL are possible even in very condensed teaching situations.
3. List key advantages of using TBL rather than alternate teaching methods even when time is short.

FORMAT/METHODS: The facilitators plan to use elements of TBL throughout the workshop. The session will begin with brief introductions to the presenters’ experience in condensed teaching situations. The participants will then be divided into teams, using their responses to a very short survey administered when they enter the room about their experience teaching condensed courses. In the first application exercise, teams will determine what elements of TBL (which will be listed on a handout for those newer to the method) would have to be adapted for a condensed course format.
Teams would record these elements for display for the ensuing simultaneous disclosure and gallery walk. After reviewing other teams’ responses, individuals will be asked to identify one important idea that did not appear on his/her team’s list. Discussion of the issues will follow. In the second application exercise, teams will discuss a case study of a condensed course’s use of TBL. They will answer several questions about the scenario, and will then be asked to review their responses given an alteration to the scenario. The facilitators will then share their experiences and the lessons they have learned teaching in a variety of shorter time frames. While questions will be encouraged throughout the workshop, there will be time set aside at the end for additional questions and/or continuing discussion.

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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.

**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:** The workshop will be conducted using a “team based learning” format. Following a 20-minute introductory discussion, workshop attendees will be divided into teams. They will then be given a readiness assurance test to reinforce the definition of educational scholarship and Glassick’s criteria for assessing scholarship. The group application activity will consist 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

*Designing Effective Peer Evaluations*
Ruth Levine

*Leaving a Trail of Breadcrumbs: How to Write Date-Rich Team Activities for Novice Learners to Reinforce Factual Content*
Stephanie Stockwell

INNOVATIONS TRACK

*Overcoming Challenges in TBL: The Regis Approach*
Lauren Burt

RESEARCH TRACK

*Getting a TBL-Based Research Program Up and Running*
Kelly Ottman and N. Kevin Krane
WORKSHOP ABSTRACTS

Designing Effective Peer Evaluations

Ruth E. Levine, University of Texas Medical Branch, Galveston; Paul Koles, Boonshoft School of Medicine, Wright State University

Peer evaluation is an important component of Team-Based Learning, yet it can be very challenging to implement. Based on our struggles implementing peer evaluation, we will share a variety of methods that we have used, giving workshop participants the opportunity to grapple with issues inherent in peer evaluation. After completing the workshop, participants will be able to:

• List an advantage and disadvantage of each of 4 methods of peer evaluation
• Define the concept of “gaming” the system
• Appreciate the importance of preparation when introducing the concept of peer evaluation into a learner’s environment
• Analyze how learner culture affects the use of peer evaluation

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Leaving a Trail of Breadcrumbs: How to Write Data-Rich Team Activities for Novice Learners to Reinforce Factual Content

Stephanie B. Stockwell, James Madison University

BACKGROUND: Writing team activities tailored to course content is an obstacle when transitioning from lecture to TBL methods. In particular, instructors of novice learners in the natural sciences must generate activities to reinforce highly factual course content that does not readily lend itself to discussion.
As an alternative to case studies, workshop attendees will be guided through the process of writing highly structured data-rich team activity designed to reinforce factual content. Teams are led through a role-playing scenario with a learner-relevant theme. Along the way, students employ facts to decipher datum presented as graphical or anecdotal evidence. Information gleaned forms the trail of breadcrumbs that lead students to a solution.

**OBJECTIVES:** The learner will:

1. Outline the creative and formative steps of writing data-rich team activities
2. Describe multiple examples for the use of data presentation
3. Anticipate potential obstacles in the implementation of data-rich activities

**PRODUCTS/MATERIALS:**

Each participant will receive:

1. Sample methods of data representation
2. A full-length data-rich activity written by the workshop facilitator
3. Contact information for the presenter

**LEARNER ASSESSMENT:** Learners will outline a data-rich activity for their class. Discussion of anticipated obstacles will measure comprehension of the writing and implementation processes.

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**Overcoming Challenges in TBL: The Regis Approach**

Dan Berlau, PhD; Leticia Buffet, PharmD; Michele Hanselin, PharmD; Jeffrey Lalama, PharmD; Leah Sheridan, PhD; Brandon Sucher, PharmD
BACKGROUND: Team-based learning (TBL) has been the primary method of instruction in the Regis University School of Pharmacy since 2009. In this session we present challenges in implementing TBL and highlight enhancements that we have made to improve delivery of the curriculum.

SPECIFIC OBJECTIVES: By the end of this workshop, the learner will identify tools and technologies that enhance classroom efficiency and academic integrity, align peer evaluation with institution specific educational outcomes, and implement integration to enhance achievement of curriculum outcomes and prevent TBL fatigue.

FORMAT/METHODS: The workshop will be conducted using a TBL format. Following a brief introduction, workshop attendees will be divided into teams and given 3-4 application exercises in which they will determine the best solution to each of the following TBL implementation challenges:

1. Optimizing classroom efficiency while promoting academic integrity
2. Ensuring achievement of learning objectives
3. Maximizing peer evaluation utility
4. Integrating TBL to prevent fatigue. Following each application exercise, facilitators will discuss the experience of Regis University School of Pharmacy in making specific programmatic changes made to mitigate these challenges. Audience participants will have the opportunity to ask questions throughout the workshop.

PRODUCTS/MATERIALS: Each participant will receive a handout summarizing the adjustments that Regis University has made to overcome challenges in implementing TBL.

LEARNER ASSESSMENT: Learners will evaluate strategies to overcome challenges in implementing TBL through facilitated application exercises.
Getting a TBL-Based Research Program Up and Running

Kelly Ottman and N. Kevin Krane

BACKGROUND: This workshop is designed for those who would like to turn TBL activities into research by applying principles of scholarship and learning.

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

1. Define the scholarship of teaching and learning (SoTL) and compare it to teaching
2. List incentives for engagement in SoTL work
3. Describe methods whereby TBL activities can be applied to scholarship
4. Understand and apply relevant taxonomy to TBL and SoTL
5. Network with other colleagues who utilize TBL and are interested in SoTL work

FORMAT/METHODS: This workshop will address the background of SoTL and will explore research taxonomies related to TBL. Participants will actively engage in a TBL approach as they explore ways to begin their SoTL journey. Networking will occur to promote synergies among participants.

PRODUCTS/MATERIALS: Materials and references will be provided.

LEARNER ASSESSMENT: Learners will be evaluated on their ability to apply SoTL taxonomy to research through the TBL process.
Workshop Session 3

FUNDAMENTALS TRACK

Collaborative Development of Rich Cases for Team-Based Learning
Lindsay Davidson

Great Workshop! Now What?
Jim Sibley

INNOVATIONS TRACK

Taking Peer Evaluation to the Next Level Using Mentor-Assisted Debriefing (MAD)
Christopher Burns

RESEARCH TRACK

Introduction to Measuring Educational Outcomes
Paul Haidet
WORKSHOP ABSTRACTS

Collaborative Development of Rich Cases for Team-Based Learning

Lindsay Davidson, MD, Queen’s University, Kingston ON; Sheila Pinchin, M.Ed., Queen’s University, Kingston ON

BACKGROUND: Complex and authentic – or “Rich” – cases are an integral component of Team Based Learning, particularly in the health-related professions. We have developed an approach to aid in the development of complex cases suitable for use as application exercises in TBL. This workshop will focus on how to develop cases to meet specific learning objectives for classroom or online teaching. Using templates created from collaborative learning and case-based learning literature, participants will build a case in steps. A collaborative approach will be used during the workshop, allowing participants to learn from each other as they build and share their work.

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

1. List the elements of an authentic case
2. Develop a narrative sketch of a complex, fictional patient,
3. Identify artifacts suitable for use in the case,
4. Propose instructional questions that would complement the case they have developed.

FORMAT: Small group collaborative learning: Participants will work together in teams of 5-6 to develop, share and respond to cases using the framework provided.
PRODUCTS/MATERIAL: Participants will receive:

1. “8 steps to case-development” handout
2. Links to sample cases
3. Access to an online community where they can share their cases and continue the discussion following the workshop.

LEARNER ASSESSMENT: Learners will review each other’s cases and provide feedback during the process.

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Great workshop! Now What?

Jim Sibley, Centre for Instructional Support, The University of British Columbia, TBA James Madison University

BACKGROUND: The consultants left the building - faculty have gone back to their teaching...how do we help convert the enthusiasm and interest generated in a TBL workshop into the sustained work necessary to generate real curricular change?

OBJECTIVES: After examining the possibilities - we will co-construct a Faculty Learning Community (FLC) plan to turn the interest generated in a TBL workshop to real classroom practice.

FORMAT/METHODS We will examine the use of Faculty Learning Communities (FLC) thorough a variety of narratives - both from a participating faculty member perspective and a facilitator perspective. We will profile a FLC from James Madison University and discuss a FLC at a distance (video conferencing) experience with the University of Wisconsin at Stevens Point.
Using the lens of Milton Cox's Faculty Learning Communities, we will then consider some issues around the selection of faculty to participate in communities, the length of times communities should be together, the institutional supports that can help ensure success, the process of developing shared outcome goals, and identify the necessary facilitators supports.

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**Taking peer evaluation to the next level using mentor-assisted debriefing (MAD)**

Christopher M. Burns Ph.D., Melanie A McCollum Ph.D., Veronica E. Michaelsen M.D., Barnett R Nathan M.D., Mary Kate Worden Ph.D.

**BACKGROUND:** Peer evaluation has the potential to be the most valuable aspect of TBL. To gain the full benefit of this rare opportunity to learn how peers perceive their behavior and knowledge, students must value giving and receiving feedback and be willing and able to provide quality feedback to one another. A mentor-assisted peer evaluation debriefing process designed to accomplish these goals will be explored.

**OBJECTIVES:**

- Explain the need to provide guidance on peer feedback
- Describe effective guidance on peer feedback
- Analyze peer feedback formulating effective recommendations for improvement
- Evaluate mentor-assisted debriefing
- Consider additional ways to improve peer evaluation at other institutions
FORMAT/METHODS: Brief introduction. (10 min) TBL and small group discussion will be used to teach the UVA approach to adding value to peer evaluation through MAD. Participant teams will role-play a post-TBL MAD session using presenter-provided example feedback. Team members will share their example feedback and teams will critique the usefulness of the feedback for recipient improvement and devise effective guidance for the best and worst examples. Outcomes will be discussed with the whole group. (30 min) Application exercises will challenge participant understanding of MAD and assess its effectiveness for increasing student buy-in and proficiency in peer evaluation. Simultaneous reporting and facilitated discussion typically used in TBL sessions will promote rich debate among teams. (30 min) To conclude the session, participants will be invited to share experiences from their home institutions and brainstorm further improvements of peer evaluation. (20 min)

LEARNER ASSESSMENT: Participants will demonstrate understanding of MAD and ability to identify strengths and weaknesses. Discussions will reveal whether participants are able to extrapolate ways to adapt elements to the unique culture and educational goals of their own institutions.
Oral Presentations Session 2

New Research In Team-Based Learning
Moderator: Karla Kubitz

The Impact of Team-Based Learning on Learning Preferences
Karl Smart

Team-Based Learning Improves Course Outcomes and Student Performance Compared to Lecture Methods
Esam Agamy

Using Team-Based Learning Strategies to Increase Student Success in Majors’ Science Courses
Tracy Knowles

Comparing Team-Based and Mixed Active Learning Methods in an Ambulatory Care Elective Course
Michelle Farland

ORAL PRESENTATION ABSTRACTS

The Impact of Team-Based Learning on Learning Preferences
Karl L. Smart, Ph.D.; Anil Kumar, Ph.D.; and Poonam Kumar, Ed.D.

BACKGROUND: Continued emphasis on accountability in education has brought closer scrutiny to student learning and what happens in the classroom. Previous research has demonstrated team-based learning’s positive impact on student performance. But little research has explored how team-based learning affects student learning preferences.
**DESCRIPTION:** Team-based learning (TBL) was implemented in five business communication courses in the College of Business Administration at a medium-sized Midwestern university. Students' learning styles were assessed using the Grasha-Riechmann Student Learning Style Scales (GRSLSS) in an attempt to determine the impact of TBL on student learning preferences. The GRSLSS measures preferences according to six different styles: Independent, Collaborative, Dependent, Participant, Competitive, and Avoidant.

**RESULTS/EVALUATION:** In the five courses, 159 students participated in the study. Students’ learning styles were assessed at the beginning of each semester using the GRSLSS. Learning preferences were again assessed at the end of the semester using the same learning styles assessment after team-based learning was used in the courses. A T-test analysis comparing the pre-test and post-test data indicated that there was a significant increase in the Participant and Collaborative learning styles preferences with the use of TBL (significant at p< .001 level).

**CONCLUSIONS:** The effective implementation of TBL in business communication courses can strengthen students’ preference for a Collaborative learning style, reflecting the need to prepare students to collaborate and function in teams in the workplace.

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**Team-Based Learning Improves Course Outcomes and Student Performance Compared to Lecture Methods**

Esam Agamy

**BACKGROUND:** Students join the University directly after obtaining their high school leaving certificate. In the two colleges (Medicine and Dentistry), the program is six years - a foundation year followed by five years of medical and dental studies.
The main aim of the foundation year is to reinforce their knowledge before joining PBL curriculum. Most students do not have the language and communication skills required to be successfully engaged in the PBL approach implemented in the Medical and Dentistry curricula.

DESCRIPTION: The subject-based Human Biology course was delivered using the TBL approach for three years since 2007. The aim of this study is to describe experience in using TBL in a non-traditional course, report students’ reaction to TBL, its feasibility, effectiveness and efficiency. Analysis included multivariate linear regression on scores from TBL activities, individual exams and team contribution scores (peer review, IRAT performance, faculty observation, and team contribution) to determine the impact on final grade. Student performance on individual exams and final grades were compared between TBL and lecture.

EVALUATION: 463 students included in the study achieved higher mean scores on examination questions that assessed their knowledge of human biology-based content learned using the TBL approach compared with questions assessing human biology-based content learned via lecture methods. Students’ feedback on course evaluation survey and written reflection indicated more learner participation and enjoyment. Every student completed a peer evaluation form for his/her teammate feedback of students and instructors of first and second years in Medical and Dentistry colleges clearly indicate that students were better prepared for the PBL approach.

CONCLUSIONS: Students responded best to TBL, in terms of width and depth of knowledge, knowledge retention, engagement, and transferable skills. Students’ higher performance suggests that TBL enhances mastery of course content.
Using Team-based Learning Strategies to Increase Student Success in Majors’ Science Courses

Tracy Knowles, MSES, Chad Mueller, MS, Tammy Liles, MS, and Deborah Davis, Ph.D. Bluegrass Community and Technical College Derek R. Lane, Ph.D. University of Kentucky

BACKGROUND: Majors’ science courses at BCTC are known to be stumbling blocks for students who wish to pursue academic studies in science-related fields. These courses have traditionally had higher than average attrition rates (average for all Biology and Chemistry majors courses approximately 30%), and are core requirements that a student must master in order to progress to the next level of courses in a STEM major. TBL redesigned courses were taught beginning in 2010 to try to increase student success in the majors’ science courses.

DESCRIPTION: Eleven faculty members were trained in course redesign and TBL. Six chemistry and biology majors’ courses underwent initial redesign and were taught at least once by trained full time faculty (CHE 170, CHE 175, CHE 180, CHE 185, BIO 150, BIO 152). In total twenty-seven sections were taught over the last two semesters and twenty sections are being taught in fall 2011. Assessment of progress tools were developed and implemented for CHE 170 and 180. Ten embedded questions were developed and tested in the final exams of CHE 170 and 180 sections in Fall 2010. These questions were included in the final exams for sections of CHE 170 in the Spring 2011. Unsatisfactory achievement data was also collected for both semesters measuring student completion indicators such as withdrawal, D and failure rates. An assessment survey was developed and conducted in the Spring 2011 semester for all students registered in a TBL class. Almost 200 student responses were collected and evaluated. An online survey was designed to assess TBL and included measures of student attitudes about learning, motivation, value of teams and team-based learning, student learning efficacy, and instructor behaviors (e.g., caring, classroom management, immediacy).
RESULTS/EVALUATION: Psychometric properties for the student (n=198) TBL measures were calculated and most scales operated at acceptable to excellent levels. Higher scores for experienced teachers were reported for student motivation, TBL attitudes, group experiences, and perceived learning. An overall improvement of 12% was revealed when comparing the unsatisfactory student achievement rates for traditional sections of BIO 150 offered during the 2008-2009 academic year (44%) to the student unsatisfactory achievement rates for students enrolled in the re-designed fall 2010 BIO 150 course (32%). A marked improvement was also revealed for the re-designed CHE 180 course where unsatisfactory student achievement rates improved 16% from 45% to 29%.

CONCLUSION: Negative student outcomes related to withdrawal, failure, and unsatisfactory achievement revealed significant improvement when compared to student outcomes in selected chemistry and biology courses offered before the TBL curriculum was implemented.

Comparing Team-Based and Mixed Active Learning Methods in an Ambulatory Care Elective Course

Michelle Z. Farland, PharmD; Andrea S. Franks, PharmD; Alexander B. Guirguis, PharmD; Christa M. George, PharmD; Amanda Howard-Thompson, PharmD; Robert E. Heidel, MS The University of Tennessee Health Science Center College of Pharmacy

BACKGROUND: A variety of active learning methods can be used to achieve accreditation competencies. However, there is little research available to compare the effectiveness and satisfaction of different active learning methods. We assessed students’ performance and perceptions of team-based learning (TBL) and mixed active learning (MAL) methods in 2 college of pharmacy elective courses. We also assessed faculty perceptions of TBL.
DESCRIPTION: The ambulatory care elective course was taught simultaneously on 2 campuses using different learning methods. One course used MAL methods, the other used TBL. Students’ course grades were compared between the 2 learning methods using independent sample t tests. Cumulative GPA prior to enrollment in the course was adjusted for using a hierarchical multiple regression model. Students’ perceptions were assessed with 2 anonymous course evaluation instruments (4 point scale). Faculty members who used the TBL method were surveyed.

RESULTS: The course was offered to 64 students (TBL 37; MAL 27). There was a significant difference in mean quality points earned (p<0.001; TBL 3.7; MAL 3.3). No difference was found when comparing cumulative student GPAs prior to course entry, p = 0.83. The student response rate for course evaluations was 80%. Course evaluations for both courses were favorable. There was a significant difference in student opinion on the usefulness of required readings (p = 0.03; mean ± SD; TBL 3.8 ± 0.4; MAL 3.6 ± 0.5) and overall course coordination (p = 0.022; TBL 3.9 ±0.3; MAL 3.7 ± 0.5). All faculty members who used the TBL method reported considering using TBL in another course. Seven of the eight (88%) faculty thought TBL required less time overall (preparation, implementation, follow-up/grading) compared to previous small-group active learning experiences.

CONCLUSIONS: Students were satisfied with both teaching methods; however, student grades were significantly higher in the TBL course. Faculty members newly introduced to TBL recognized it as an effective teaching strategy for small-group active learning.
100 Fundamentals Track

100-101: TBL implementation in undergraduate medical education: genetic risk as an example application

William F. Brescia, PhD., Vicki M. Park, PhD., Satoru K. Nishimoto, PhD., Russell W. Chesney, MD., Jewel C. Ward, MD., PhD., Eniko K. Pivnick, MD.

BACKGROUND: In 2009, the University of Tennessee College of Medicine (COM) undertook planning for a major revision of its undergraduate medical curriculum. Goals of the revision were better integration throughout the curriculum and a shift toward more active and self-directed learning. Preparation was facilitated through interactions with the TBL Collaborative.

DESCRIPTION: A TBL exercise on genetic risk, delivered to M1 students had the following learning objectives: use of family histories to construct pedigrees and to estimate risk of genetic disease and, also, consideration of genetic counseling issues. Excerpts from the exercise will be used to illustrate best practices of the TBL approach.

RESULTS/EVALUATION: Throughout the first semester, feedback was solicited from students for the purpose of formative evaluation. A survey was delivered to students to evaluate their first semester’s experience with TBL.

CONCLUSIONS: TBL provides an efficient means of increasing active, self-directed learning. TBL accomplishes many goals of small group education. The approach is easily scalable, thus permitting gradual implementation.
within an established curriculum. It is an effective tool for integration across concurrent courses providing a framework for applying diverse content to a single case. TBL promotes early development of critical thinking skills and teamwork that are essential aspects of clinical education.

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100-102: Use of 6-Step Problem Solving Methodology and Team Based Learning to Teach Engineering Fundamentals

Catherine Brewer

BACKGROUND: Iowa State University’s Center for Excellence in Learning and Teaching (CELT) offers a Preparing Future Faculty (PFF) program for graduate students and post-docs considering careers in academia. It was in the PFF courses that I learned about team based learning (TBL) and how it can bring more active learning and concept application to the undergraduate classroom. In converting a traditional chemical engineering fundamentals lecture course to a TBL course, I found that there were few examples of suitable application exercises available. Textbook problems required a single calculated answer rather than a choice and examples from other TBL engineering courses were typically for senior-level design courses in which students had sufficient background information from prerequisite courses to tackle complex design problems. I sought to develop application exercises that met TBL guidelines and were simple enough for students to solve in a reasonable amount of time with limited background knowledge.

DESCRIPTION: The 15-week, junior-level course covered heat and mass transfer (the second of three transport phenomena courses taken by all
chemical engineering majors). Application exercises were developed based on a 6-step problem solving methodology presented in an engineering trouble-shooting textbook. The goal of the methodology was to teach engineers how to become expert, systematic problem solvers. I combined this methodology with variations on textbook problems such that students solved series of similar calculations to decide between scenarios that also considered cost, safety and feasibility.

RESULTS: Based on end-of-semester student evaluations, the majority of students preferred the TBL style application exercises in class compared to individual calculations outside of class. I observed that students were more engaged with problems when they had to make a choice with real-life implications rather than simply calculate a correct value. Two challenges to be overcome in revisions of these application exercises are timing such that the problems can be finished in a reasonable number of class periods and better incorporation of the problem-solving estimation, graphing/drawing, and exploration steps into the TBL reporting process.

CONCLUSIONS: TBL can be successfully applied to engineering fundamentals courses by creating application exercises based on variations of textbook calculations and a problem-solving methodology.

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100-103: Designing and Implementing Team-Based Learning Exercises in a Medical Biochemistry Course
Edward E. McKee, Ph. D. Indiana University School of Medicine – South Bend, 1234 Notre Dame Avenue, South Bend, IN 46617 Present Address: College of Medicine, Central Michigan University, 208 Rowe Hall, Mt. Pleasant, MI 48859
BACKGROUND: Team-Based Learning [1] is a well-characterized and highly interactive pedagogy that has been used for some time in a variety of disciplines. However, its use in medical education and in Medical Biochemistry is more recent [2]. The popularity of Team-Based learning appears to be growing as medical education strives to become more interactive. I “discovered” TBL in my own search for a more interactive teaching strategy that could be delivered by a single faculty member. I have made extensive use of TBL for the past 5 years in my course in Medical Biochemistry and Molecular Biology.

DESCRIPTION: The poster will describe how TBL has been used in my course to integrate and apply content in Medical Biochemistry and Molecular Biology. The added value of TBL in a competency based curriculum is also described. TBL provides a basis for students to practice, refine, and assess their peers on a variety of competencies required for team interaction, including: communication, life-long learning, self awareness, ethical and moral reasoning, problem solving, and professionalism.

RESULTS/EVALUATION: Data will show that the students highly valued the TBL sessions agreeing that they were enjoyable, productive, and motivating. Students agreed that the sessions stimulated higher order thinking and problem solving. Our class size is relatively small (16-24 students) and variable from year to year. Exams, pre- and post-TBL were also modified, thus it was not possible to make meaningful comparisons in outcomes as measured by exams. Performance in Biochemistry in the USMLE Step I exam was not significantly different.

CONCLUSIONS: The sessions were highly valued by the students and provided a highly interactive environment for learning content and perfecting competencies associated with team skills.
100-104: Factors for Successful Implementation of Team-Based Learning at a Multi-Site Medical School

Abbas Hyderi, MD, MPH; Amy Y. Lin, MD; Roger W. Geiss, MD; Janet M. Riddle, MD; Vijaya Somaraju, MD; Larisa Nonn, PhD; Carol Kamin, MS, EdD; Linda Chang, PharmD, MPH

BACKGROUND: The University of Illinois College of Medicine (UICOM) is a multi-site medical school with campuses in Chicago, Peoria, Rockford, and Urbana. To address LCME mandated curricular changes to increase active learning in the preclinical curriculum, UICOM decided to implement Team-Based Learning (TBL).

DESCRIPTION: A four-campus TBL work group was formed to provide support and encouragement to move forward with implementation. Members of the work group included interested course directors and faculty, deans, and medical educators. Members of the group were surveyed about when they became interested in using TBL, experiences that convinced them to try it and that reinforced their interest in TBL, and their experiences using TBL in their teaching or courses. Those who had not yet implemented TBL were asked about experiences that would make them more likely to try TBL in the future, and those that they would need in order to try TBL in their own practice.

RESULTS: Our implementation of TBL is successfully proceeding due to an intercampus work group of change agents, many of whom had positive experiences with TBL at a variety of professional society meetings. Observation of "real" TBL sessions, either on a site visit to a school experienced with TBL or at UICOM, heightened interest and confidence in implementing TBL. Having peer support was also essential for
implementation. Above all, we were motivated by student engagement with course content and peers during TBL sessions. Time to develop TBL modules and faculty development were identified as ongoing needs.

CONCLUSIONS: The four-campus TBL work group has been crucial for successful implementation of TBL at UICOM. Progressive experiences of TBL - at professional society meetings and through observation of sessions - as well as peer support have been key factors contributing to our initial success. Having dedicated time to develop TBL modules is a challenge that our change agents identify.

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100-105: Implementation of Team-Based Learning at a Multi-Site Medical School

Amy Y. Lin, MD; Catherine Best-Popescu, PhD; Stephanie Ceman, PhD; Mark Gelula, PhD; Abbas Hyderi, MD, MPH; Janet Riddle, MD; Carien Williams, JD

BACKGROUND: The University of Illinois College of Medicine (UICOM) is a multi-site medical school with campuses in Chicago, Peoria, Rockford, and Urbana. LCME mandated curricular changes required the college to increase the proportion of active learning in the preclinical curriculum. Because of the limited number of faculty and large class size, small group teaching is not practical. Team-based learning (TBL) provides the benefits of small groups with the efficiency of one instructor in the large group setting. UICOM decided to implement TBL as part of our curricular reform.
METHODS: To address the required curricular changes, a task force was formed, composed of deans, course and clerkship directors, faculty, and students from each campus. The task force met regularly via teleconference to discuss various issues related to curricular reform, including active learning instructional methods, such as TBL. To learn more about TBL, a small group of deans and interested course and clerkship directors representing three of the four campuses went on a site visit to Wright State University, a medical school with over ten years of experience with TBL. The group at Wright State shared TBL materials and their expertise in using and implementing TBL. To educate the faculty who would potentially be using TBL, a webinar series was established, the first of which addressed TBL, and an ad hoc team formed by the Department of Medical Education in Chicago went to each campus for faculty development. For early adopters of TBL at UICOM, a four-campus TBL work group was formed. In Fall 2011, three courses, two at Urbana and one in Chicago, piloted TBL.

RESULTS: TBL was successfully implemented in the Genetics and Physiology courses at Urbana, and the Pathology course at Chicago. Students liked the experience and felt their learning was enhanced by being prepared and having the opportunity to discuss concepts both amongst themselves and with content experts. Structurally, the lecture hall caused challenges for students to hear each other during team discussion. Faculty indicated they liked the TBLs because students seemed more prepared and engaged compared with traditional lectures.

CONCLUSIONS: The challenges of implementing TBL are amplified in a multi-campus medical school. Ongoing dean support, faculty development, and formation of a working group composed of one or two champions at each campus can help move the process forward and ease implementation.
100-106: Team-Based Learning in Medical Nutrition Therapy: No more “Death by PowerPoint”, just Case-based Learning

Alice K. Lindeman, Ph.D., R.D.

BACKGROUND: Medical Nutrition Therapy (MNT) is essential to comprehensive and integrated health care. All members of the health care team study and apply it either directly or indirectly. MNT is generally a capstone course for undergraduate students in dietetics and those who choose nutrition science for post graduate medical study. Due to the volume of material as well as diverging interests of students, the course is usually delivered as lecture/exam/paper. Offering MNT as team- and case-based can allow students to better realize their distinct professional role in MNT. To date there have been no published reports on TBL nutrition courses directed exclusively to future health care professionals.

DESCRIPTION: MNT was modified from all-lecture individual work to no-lecture and 75% team-based work. For eight subjects (nutrition assessment, diabetes, obesity, CVD/HTN, renal, gastro-intestinal, accessory organs, and critical/respiratory care) students analyzed and created case studies. Course structure included readings (with PowerPoint/podcast assistance) and abstracts; iRAT and tRAT; and, group work involving chat rooms, classroom discussions, and group case studies. Final competency was shown through developing complicated case studies and research posters. Fifty-eight students were involved in the intervention.

RESULTS/EVALUATION: Course and peer evaluations will be gathered at mid- and end of the semester. Final course evaluation, exam scores (converted to z-scores) Course evaluations as well as student work including exam grades, written abstracts, and cumulative activity will be com-
pared to those from students enrolled in the class in 2008 (a year in which same instructor taught the class). Statistical significance will be established at $p < .05$.

**CONCLUSION:** As a result of this study, it will be determined if students with a common interest in nutrition but with divergent goals for professional careers benefit from a case-based and team-based method of delivery. Evaluating course performance (test scores) between lecture-based and team-based “instruction” will show if students respond favorably to the challenge of learning and applying skills as part of a team.

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100-107: Transforming Nursing Education...Responding to the Call Through Team Based LearningTM

Kathleen Mawhinney RN MN, Dianne O’Neil RN BN MEd, Dr. Linda Yetman RN ACNP(Dip) PhD, Cathy O’Brien Larivee RN BN Msc(A)

**BACKGROUND:** Patricia Benner and colleagues have put forth a call to action for all nurse educators to critically examine their teaching practices and to consider new innovative teaching strategies that promote student engagement and deeper, more meaningful learning (Benner, Sutphen, Leonard & Day, 2010). She and colleagues assert that “change in nursing education must come now” (Benner et al., p. 7). To that affect, several Faculty members at the University of New Brunswick, Saint John, Department of Nursing & Health Sciences have responded to Benner’s call and are transforming the way nursing education happens in their classrooms. Integrating Team Based Learning (TBL)TM into several nursing courses, served as the catalyst for this instructional change. The use of TBL
promotes student accountability, engagement, teamwork and application of knowledge; essentially outcomes that are underpinnings of our nursing program.

DESCRIPTION: Introducing TBLTM as a teaching methodology occurred during the Fall Term, 2011. Courses where TBLTM was integrated were chosen based on Faculty interest, and included classroom courses from first and third year of the four year Nursing Program. These courses were: Professional Relationships, Communications in Health Care, and Acute Health Challenges.

RESULTS: Faculty, integrating TBLTM, found that class attendance was more consistent than in the same courses from previous years and that students were more prepared for interaction and discussion having had to complete the reading assignments prior to class. In addition, preliminary anecdotal feedback indicates that while most students consider TBLTM a valuable teaching tool that promotes their engagement, and life-long learning, some are firm in their evaluation that TBLTM means being ‘self-taught’.

CONCLUSIONS: Nurse educators have a responsibility to enhance learning through meaningful teaching practices. Initial discussions amongst faculty and feedback from students about using TBL TM as a teaching strategy that promotes deeper, meaningful learning is primarily positive. The core elements of TBLTM are congruent with expected outcomes of students in the Nursing Program. Continued exploration and assessment of TBLTM as an effective teaching methodology in our Nursing Program will be ongoing.
100-108: Using Team Based Learning to Teach Peer Evaluation and Writing Peer Feedback Techniques to Medical Students

Edward E. McKee (1) and Stacey A. Jackson, Indiana University School of Medicine – South Bend, 1234 Notre Dame Avenue, South Bend, IN 46617 (1)
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BACKGROUND: Assessment tools that test for basic knowledge and skills have been well-described. However, assessment tools that provide information on other desirable competencies have not been as well developed [1]. Team-Based Learning (TBL) [2] is used extensively in the Medical Biochemistry course at IUSM-South Bend. During TBL, students are given continual opportunities to refine their skills in seven of the nine IUSM competencies: communication, science in guiding diagnosis, life-long learning, self awareness, ethical and moral reasoning, problem solving, and professionalism. It is important in this process that students receive quality feedback to determine how well they are meeting the expectations of the competencies. Peer evaluation and written feedback from one’s team mates can be a powerful tool to provide this information. However, first year medical students are not always equipped with the skills to give appropriate feedback.

DESCRIPTION: The poster will present our development of a Team Based Learning module given during orientation at Indiana University School of Medicine-South Bend (IUSM-SB) that introduces students to TBL, to the value of peer assessment within TBL, and to writing quality peer feedback. The peer evaluation tool will be described and includes a quantitative section that lists 16 behaviors presented in a Likert style format that relate to the IUSM student competencies. The tool has a
section for required written feedback. As part of the training students complete the evaluation tool as a formative and then summative exercise in which their feedback comments are graded and critiqued by instructors. Our rubric for grading and critiquing comments will be described.

RESULTS/EVALUATION: Data will show that the students enjoyed the session; understood the importance of peer evaluation and writing peer feedback; and, felt more confident in providing feedback. Using this tool, teammates were not all scored the same.

Marked improvement in writing feedback comments were noted in the summative assessment compared to the formative assessment. We did not note any negative perceptions by the students regarding the peer evaluation process.

CONCLUSIONS: Our experience suggests that this approach to training students in peer evaluation and writing quality feedback is the first step in providing foundational training to master core competencies in effective communication, self-awareness and professionalism.

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100-109: Strategic Planning for Successful Administration of team Based assignments in A Human Nutrition Class with High Enrollment

Shahla Ray, Ph.D.

BACKGROUND: Traditional lecture-dominant methods often do not promote student motivation and intellectual engagement. Therefore, recently there has been an increased focus on using team based learning
(TBL) methods to manage and teach large enrollment courses. One of the ways to practice active learning, especially in large classrooms, is to follow Bloom’s Taxonomy (a well-recognized model of TBL). There is a growing body of literature supporting the effectiveness of TBL.

However the process of translating these theories into practice in large classrooms remains a challenge for many teachers. Meeting exit competencies using TBL methods requires careful planning and timing during course design and preparation.

**DESCRIPTION:** A team based poster presentation project was planned and assigned toward the end of semester after most of the class material was completed and most of the course objectives were met. For this assignment, students were responsible to perform scientific literature search in order to compile the most recent research on nutrition related topics while using the terminology related to research methods. Students’ final work was presented during the class meeting time. For this assignment, they were also responsible to learn about all of their peers’ posters during that time. This enhanced the student’s engagement in team learning while practicing public presentation. Students were also assigned to design and create a brochure entitled, “Healthy Eating during college years”. This activity involved designing a brochure that could promote healthy eating practices on campus while encouraging the student’s engagement in mastery of the course objectives. To ensure the efficiency of team work, group rules were established, and necessary supplementary forms and instructions were provided.

**RESULTS AND CONCLUSION:** Students were able to practice the highest level of learning, creating by using the knowledge gained on the nutrition topic. Meanwhile other four Bloom’s learning levels (remembering, understanding, applying, analysis, evaluating) were applied.
100-110: Student Perceptions on the Value of Timing Readiness Assurance Tests

Charlotte Ricchetti, Pharm.D., BCPS, CDE, Jason M. Brunner Ph.D., Matthew Fete Ph.D., Stephen Luckey, Ph.D., Michael Nelson, Ph.D.

BACKGROUND: At Regis University School of Pharmacy, students completing their first semester of an integrated TBL curriculum indicated that there was too much time between the start of an iRAT and the application exercises. Faculty recognized that the idle time meant less time for application of the material. During the fall semester, iRATs were not timed. However, during the spring semester, faculty utilized two different strategies to time iRATs. For the first eight weeks of spring semester, pharmacy students were informed of the total time allotted to complete the iRAT (defined time limit). During the second eight weeks, the same students were informed that five minutes remained once fifty percent of the class had completed the iRAT (variable time limit).

DESCRIPTION: A survey assessed students’ perceptions of no timing and the two timing strategies used during the spring semester.

RESULTS/EVALUATION: Seventy-four students (97%) completed the survey. Students felt there was an adequate amount of time to finish iRATs in all three courses. Both timing strategies used during the spring semester, caused an increase in anxiety, but there was more anxiety reported in the class with a defined time limit (51%) versus the course with a variable time limit (27%). Students felt both timing strategies used during the spring semester increased their confidence in their ability to complete timed exams, facilitated more time to focus on applications, and decreased “down-time” between iRAT and tRAT. Most importantly, students did not feel timing the iRATs negatively affected their ability to
perform well on the iRAT. Overall, students preferred the variable time limit for iRATs.

CONCLUSIONS: Our survey determined that the timing of iRATs decreases “down-time”, helps students increase their confidence in their ability to perform well on timed exams (e.g. board exams) and provides more time to focus on applications. While students reported an increase in anxiety caused by the timing of iRATs, they reported they preferred the timed iRATs over the iRATs that were not timed. Because the variable timing strategy had perceived benefits over the defined timing strategy, the majority of the faculty at Regis University School of Pharmacy has adopted the variable timing strategy.

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100-111: Team-Based Learning Across the Medical Curriculum: The UNC-Chapel Hill Experience

1Gwen Sancar Ph.D., 2Kurt Gilliland Ph.D., 3Alice Chuang Ivester M.D., 4Amy Denham, M.D., and 5Cristin Colford, M.D. 1Department of Biochemistry and Biophysics, 2Department of Cell Biology and Anatomy, 3Department of Obstetrics and Gynecology, 4Department

BACKGROUND: Small group activities are increasingly viewed as potential vehicles for developing and reinforcing problem-solving skills, professionalism, and effective teamwork. To this end, TBL was adopted in selected courses at UNC-Chapel Hill School of Medicine in the 2011-12 academic year. Here we report our experience with TBL across the curriculum.
DESCRIPTION: TBL was utilized in four courses in the preclinical curriculum and in two clinical clerkships. Prior to each session, students were provided with a list of lectures to review and/or 10-60 pages of reading. iRATs were administered over 10-30 min depending upon the complexity and number of questions. Group application exercises stressed data interpretation and often required use of on-line medical literature. Answers to some questions were purposefully ambiguous, requiring students to discuss and debate. Peer evaluations were completed at the end of the session. For large classes we used on-line testing and peer evaluation systems.

RESULTS: Student engagement increased substantially during TBL exercises compared to previous small group activities. Students arrived prepared and on time. More students participated in discussions and these discussions were notably richer than in previous group activities. End-of-course evaluations indicated that most students felt that TBL was more useful and enjoyable than lecture format in helping students learn the material and develop clinical reasoning skills. Some students, first year students particularly, were hesitant to award poor numerical evaluations to team members, however written suggestions for improvement were often offered.

CONCLUSIONS: TBL is useful in teaching students to work effectively in teams, in reinforcing basic elements of professionalism, and in developing problem-solving skills. Students respond well to this opportunity for active learning while simultaneously developing skills useful for independent study and lifelong learning.

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100-112: A Facilitation Framework for TBL Application Activities

James Sibley - University of British Columbia Loretta Whitehorne - Registered Nurses Professional Development Centre, Halifax, NS Larry Michaelsen - University of Central Missouri

BACKGROUND: Many TBL practitioners are forced to learn classroom facilitation skills at the same time as they are piloting the new TBL strategy in their classroom. Many never get specific guidance on facilitation skills development and must rely on their own intuition and common sense to try to understand what is working, what is not working, and how their facilitations might be improved. By self-observation and self-reflection many TBL practitioners become very skilled facilitators, but we hope to provide some guidance for new and experienced facilitators.

DESCRIPTION: We will present a framework of facilitation interventions. The framework will bring together the work of Angela Cunningham and James Erskine. The selection and elaboration of components of the final framework will be informed by a series of telephone interviews of TBL practitioners.

The interviews are scheduled for January 2012. The interviews will focus on learning what skills the practitioners have developed, how they developed them, what they learned the hard way and what advice they might give to someone trying to improve their facilitation skills.

RESULTS: A clearly articulated facilitation framework with supporting commentary from interview transcripts.

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100-113: Inside Jokes and Idioms: Idiosyncratic Language and Cohesion in Team-based Learning

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

BACKGROUND: Students for across the eight colleges of Rochester Institute of Technology may enroll in a communication course that is entirely team-based learning in its design. A central part of this course is the study of problem-solving, creativity, and cohesion building in a team-based environment. Various class exercises and activities assist teams in creating a sense identity in order to help them increase cohesion and productivity. At the end of the term a post-test design to measure the correlation between team cohesion and the use of idioms was performed.

DESCRIPTION: High team cohesion is an ideal dynamic to help promote effective and productive working groups. The symbolic convergence theory states that groups develop their own personalities and manifest their identities through language and other symbols know only to those within the group. These idioms (inside jokes, idiosyncratic words, novel gestures, visual symbols, and nicknames) allow teams to differentiate themselves from others and create boundaries that both insulate them from others and allow individuals to create strong connection with their teams. It is hypothesized that this connection leads to a greater sense of cohesion felt by team members. A total of 99 students enrolled in five section of this course over a one-year period. At the end of each term, each team of students generated a list of idioms used by their teams. Individually, each student completed a 12-item Small Group Cohesion Scale; additionally the instrument included items to measure the use of idioms with the group context: 1. inside jokes; 2. use of nicknames; 3.
specific language known only to group members, and; 4. use of nonverbal mannerisms. Analyses were run to discover if there were correlations between team-based cohesion and idiom use.

RESULTS: The results of this research support the hypothesis that team-based cohesion and the frequency of idiom use are positively correlated. Of the four types of idioms measured in this research, it is the “inside joke” that shows the strongest correlation with group cohesion.

CONCLUSION: Team identity is an important factor in determining success in a team-based learning environment. Promoting the development of idioms can help teams to create identities, which, in turn, can help promote team success. Various activities to promote idiom development will also be presented at this poster session.

Innovations Track

200-101: TBL Online: Asynchronous RAP

Matt Barclay

BACKGROUND: Many universities offer online courses. Some experts predict that the university of the future will increasingly turn to online instruction. Recently, several members of the TBLC community have inquired about using TBL in online settings. Two of the advantages of taking online courses are the conveniences of doing so at any time and in any place. TBL has been widely implemented in face-to-face settings where real-time discussion and immediate feedback are paramount. Team-Based Learning for online courses featuring synchronous interaction has begun to be explored. Yet, many students take online courses for the convenience of
working anytime, not just any place. An instructional challenge then is whether TBL can be replicated closely enough in an asynchronous fashion to still deliver the benefits of TBL found in face-to-face and synchronous online settings.

**DESCRIPTION:** At Franklin University of Columbus, Ohio, courses are offered in face-to-face and online formats. Moreover, courses at Franklin are designed for equivalence to ensure that for all sections of a course, whether online or face-to-face, each student is presented with and required to achieve the same learning outcomes. The challenge of designing TBL asynchronously is particularly pertinent to instructional designers at Franklin who are desirous to employ the instructional strategy of TBL and make the face-to-face and online courses as similar as possible.

**EVALUATION:** The purpose of this poster presentation is to share a design with the TBLC community that features an asynchronous Readiness Assurance Process (RAP). The design will show a combination of common collaborative tools and ubiquitous software in template form coupled with a specific instructional sequence. It is hoped that the design will be beneficial to others and initiate a significant exchange of ideas that will enhance the value of the design.

**CONCLUSIONS:** To be drawn at the conference.
200-102: Engaging Team-Based Learning (TBL) Activities in the Anatomical Sciences

Mary T. Bee PhD, James Montante PhD, William Forbes DDS, Judith Venuti PhD, Rick Sabina PhD

BACKGROUND: Educating students in the field of anatomy has been a challenge for decades. Bringing a “dead” science to “life” has been problematic for even the greatest of educators. We have examined several different group activities and approaches to teaching anatomy that incorporated a variety of teaching styles and formats designed to keep the learning process engaging, stimulating, and self-motivating.

DESCRIPTION: Developing novel approaches for the group activity portion of the TBL is essential for student engagement. Group activities that I have successfully implemented include: (1) the incorporation of clinically relevant video clips, which students assess and discuss as a group, (2) construction of gastrointestinal organs out of modeling clay, (3) using fabric muscles made of felt to attach to a skeleton which helped reinforce their understanding of muscle attachments, and (4) using yarn to depict the passageway of nerves in the brachial plexus and spinal cord tracts.

RESULTS: The level of student satisfaction increased 24% and the majority of students felt that these activities enhanced their learning with an average of 6.82 out of 7 on the Likert scale. Moreover, grades increased 12% compared to another section of the same class where these techniques were not employed.

CONCLUSION: Engaging teams of students is of great importance for understanding difficult concepts and retention of knowledge in
anatomical sciences. The activities presented here provide opportunities for unique student interactions that enhance student learning during TBLs.

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200-103: Use of Modified Team-Based Learning As A Sole Method of Instruction in A Core Clinical Clerkship

Maria L. Cannarozzi M.D.; Sergio Salazar M.D.

BACKGROUND: Effective delivery of core didactic material within the clinical clerkship setting is challenging for faculty. Students are primarily involved with patient care and may not perceive didactic preparation as important. From the clerkship director perspective, student mastery of core content is essential to ensure understanding of key medical principles and readiness for end-of-clerkship testing as well as to maintain institutional accreditation standards. When designing a clinical clerkship didactic curriculum for the inaugural year of our clerkship in internal and family medicine, we chose to utilize only active learning methods. Our charter class of medical students is small (n=39), thus our clerkship groups are comprised of 8-10 students per rotation period. Our challenge was to incorporate active learning which would encourage individual preparation, student-to-student teaching and large group discussion, although our large group is small in size.

DESCRIPTION: We developed TBL learning materials including readiness assessments as well as interactive application exercises (in the form of multi-step cases). The materials are currently delivered in half day sessions each week. As per TBL guidelines, students are assigned pre-readings and assessed with IRAT/GRATs (two groups of 4-5 students
each). Application exercises are conducted in a large group (all 8-10 students) with each of the two teams taking turns leading case discussion.

RESULTS: The process is ongoing (in its inaugural year), but students appear pleased with the method. Learning is collaborative and dynamic. Through application exercises, students share their personal clinical experiences. Additionally, using this method, we have been able to identify collective ‘gaps’ in student knowledge from the first two years of medical education at our institution.

CONCLUSION: Our modified TBL method appears to be an effective way to deliver core didactic content in the medical clerkship setting. Student satisfaction, sharing of clinical experiences and faculty identification of knowledge deficiencies in a new medical curriculum appear to be positive outcomes of this educational model. (Ongoing conclusions, including NBME shelf examination scores, student satisfaction data will be available at time of TBL conference in March 2012)

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200-104: Introduction of Team-Based Learning into a Gross Anatomy course as a single review session

Marianne L. Conway M.D.; Allan R. Sinning Ph.D.

BACKGROUND: In recent years Team Based Learning (TBL) as an instructional strategy has taken on an increasingly important role in medical education. Studies support the potential benefits of TBL: increased student engagement, improvement in communication skills, better examination scores when compared with passive learning strategies,
improved skills in application of course concepts and clinical problem solving to name just a few. We first introduced TBL as a single review session at the end of each of our four teaching blocks in the Fall Semester of academic year 2010/2011. Our aim was to emphasize clinical relevance of learning gross anatomy and help students practice and improve their ability to apply knowledge and basic concepts during the process of clinical problem solving along with promoting the appreciation of working in teams.

DESCRIPTION: All essential elements of TBL as described by Michaelsen have been utilized. Each team consisted of 8 students representing two dissection groups of four students each. All of the four sessions started with the individual readiness assurance test (iRAT) consisting of 10 multiple choice questions that focused mainly on basic concepts and knowledge followed by a team readiness assurance test (tRAT). The third, largest part of each session was taken up by team discussion and problem solving based on two to four clinical scenarios with related questions. In the first year of introducing TBL into our course the questions were presented to teams in a multiple choice format. Based on our experiences with the process in the first year, it was felt that student engagement and discussion between teams at the conclusion of the session could be further facilitated by changing the question format. In the second year we introduced a modified format: we asked the teams to make a specific choice when solving the clinical problems but did not provide any options to choose from as we did the previous year.

RESULTS: We found that this new, modified format was not only effective in engaging students in a more active approach to explore the various possibilities in order to solve the problems within their own team, but also provided for a much livelier discussion between the teams. More members of the teams engaged in the discussion between the groups in
the last part of the session than the previous year, demonstrating better reasoning skills as they explained their team’s decision making process and defended their choices or refuted other teams’ answers requiring less interaction from the faculty in terms of providing lengthy feedback.

CONCLUSION: In view of the more favorable outcome observed in the second year of the TBL implementation process into our course along with positive verbal comments from both students and faculty we intend to use and further evaluate this new format in the coming academic year.

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200-105: Retention and Improved Understanding as a Result of Modifications to the TBL process

Janil Puthucheary MRCPCH, Goh Sok Hong MSc, Doyle Graham MD, PhD, Sandy Cook PhD

BACKGROUND: Duke-NUS Graduate Medical School modified the TBL process in the first year basic science courses, such that in the Readiness Assurance Process (RAP), teams can choose up to 2 per 25 GRAT items to do open book, followed by a student driven discussion. We previously reported how this increased retention by repeating 13 immunology items. This study sampled 116 questions from first year basic science courses to explore generalizability of pilot data.

DESCRIPTION: The item inclusion criteria were they were well written and reflected core content. Items were repeated in last 2 weeks of the first year to all 56 first year medical students. We compared students' individual pre/post scores on the basis of the team GRAT choice (open/closed book) and team performance (correct/wrong) at pre.
RESULTS: Table 1 illustrates pre/post results according to team choice and performance. In addition, we analyzed the data by course. Overall, scores from the first course decreased (-1%, p=NS) and all others increased significantly at p<.05 (+4 to +10%). Yet, scores from all courses had a similar pattern of as Table 1 based on team behavior and performance.

CONCLUSIONS: Our data demonstrate that, on average, traditional TBL (reflected by “closed book” data) leads to increased scores when repeated. Improvement in retention occurs best when teams engage in discussion (all open book and closed book/wrong items). To minimize forgetting, we need to explore ways to stimulate discussion even when initially correct.

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200-106: Combining TBL and a cooking demo to teach lipid metabolism, nutrition and cardiovascular disease

Chayan Chakraborti, MD FACP1, Timothy S Harlan, MD1 and David S. Franklin, PhD2,3. 1Department of Clinical Medicine, 2Department of Biochemistry and Molecular Biology, 3Corresponding and Presenting Author, Tulane University Health Science

BACKGROUND: Tulane University recently formed collaboration with Johnson & Wales University to use evidence-based learning of both culinary and medical nutrition. An outcome of this collaboration combines the TBL format with a cooking demonstration to teach concepts of lipid metabolism and nutrition. The TBL provides active learning of basic metabolic biochemistry concepts and how they apply to prevention and/or treatments of Cardiovascular Disease (CVD). The cooking demonstration serves to reinforce these basic science principles with applied nutrition.
DESCRIPTION: The TBL focuses on biochemical concepts of lipid metabolism and nutrition in context to the development and treatment of CHD. Such concepts include (1) Differentiating different types and classifications of fatty acid in our diet, (2) The process of digestion and absorption of fatty acid and triglycerides, as well as the medical ramification of lipid malabsorption, (3) Distinguishing between the major lipoprotein complexes, and (4) Approaches to Therapeutic Lifestyle Changes (both diet and exercise) that aid in reducing the risk of CHD. The TBL is followed by a cooking demonstration, involving a discussion of common dietary lipids, their makeup, and how they are applied in various recipes. Two chefs from Johnson and Wales will cook simple recipes, from which students can learn how these ingredients are used. A healthy lunch and useful recipes are provided during the demonstration.

RESULTS/EVALUATION: The results from the TBL, examination scores, and general student impressions of the active-learning session and demonstration will be discussed.

CONCLUSIONS: These exercises tie basic science and nutrition fundamentals to a clinical picture in the context of a patient’s day to day diet. By helping students understand nutrition and cooking of common foods, they better understand the challenges their patients face to maintain a healthy lifestyle. Our long term goal is to reinforce biochemistry, metabolism and nutrition through active learning and demonstrations, bringing the students knowledge full circle.

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200-107: Integrating Team Based Learning and On-line Platforms in the English Composition Classroom

Warren G. Green, Ph.D.

BACKGROUND: The traditional composition classroom often centers on a stand-and-deliver teaching mode. Lecture and PowerPoint presentations lead to students demonstrating understanding through coordinated writing exercises. The successful completion of these writing assignments depend on the students’ ability to integrate and apply the information presented in the classroom and through independent readings, largely in an environment of isolation. In order to minimize confusion, the composition students are often provided with pre-ordained topics, themes, and rubrics developed by the instructors and meant to keep the students “on course.” The normal class session focuses on the instructor providing specific information while the students do virtually all of their work outside of class. Within this model it is clear that the students are often responding to prompts rather than taking responsibility for their own learning; they are focused on what they perceive to be the instructor’s intentions rather than focusing on their own exploration of writing strategies. As topics are chosen from pre-existing lists, the students have minimal intellectual input from the outset.

Topics that may or may not have any relevance to the individual student are explored within the context of provided themes, once again with minimal student input. Finally, the student uses the rubric as a checklist of the required parts rather than a tool for an exploration of a whole.

Having taken part in our English department’s exploration of an on-line composition platform, and after my exposure to an intensive Team Based Learning workshop, I sought to develop a syllabus that flipped the traditional classroom model from a teacher-centered to a student-
centered learning environment that integrated team based Learning with the on-line composition platform.

**DESCRIPTION:** Our department requires the use of the online composition platform, but leaves the level of use to the individual instructor. In one sixteen week semester, two freshman composition courses were redesigned to integrate Team Based Learning and the on-line composition platform in order to focus the individual class session on student centered learning. Reading assignments were followed by Readiness Assurance Tests (a total of 10 tests over the semester). Topics for essays were developed within the context of writing strategies and coordinated readings using a series of individual “tickets” which were then discussed within teams. Teams then shared their findings with the group before final paper topics were chosen, once again by the individuals. The series of “tickets” moved from “Initial Topic Tickets” (IT3) through “Narrowing the Topic Tickets” (NT3) to the refined and revised “Focused Topic Tickets” (FT3). In each case the “ticket” assignment had a corresponding writing assignment available within the specific Essay Unit accessed at the online composition platform. Additional assignments broke the writing process into clear pre-writing organizational exercises, each with a corresponding individual “ticket” that was submitted on-line and there available for peer review. The peer review process of each assignment was the focus of the daily class session. A midterm survey was administered to the two composition classes (a total of 39 students) as a self-assessment of how well they were meeting the course goals as outlined in the syllabus.

In addition, the students were asked for their opinions on the best and worst aspects of the team based approach and on the best and worst aspects of the online composition platform. A final survey with similar assessment goals was administered at the end of the course.
RESULTS/EVALUATION: The vast majority of the students completing the surveys reported that the teamed based approach to composition made them feel more in control of their own learning. Despite the quite large number of individual assignments, the fact that they were working together in the classroom allowed for immediate and varied input about their work. In addition, classroom discussion was driven by students’ questions about specific aspects of their current work rather than being dominated by questions about instructor expectations. While there is not yet any quantitative statistical grounding, it is clear that dropout rates were down significantly and that grades, in general, while no higher seemed more objectively solid.

CONCLUSIONS: As a result of the positive feedback from students and the obvious improvement in individual comprehension of topic, I intend to continue develop and integrate means by which to integrate team based learning and the online composition platform into my freshman composition classrooms.

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200-108: HOMER: A Novel And Extended Use Of An Online Learning Community In Team Based Learning

Tracey Hillier MD FRCPC; Anna E. Oswald, BMSc, MD, MMEd, FRCPC; Robert Hayward MD, MPH, FRCPC

BACKGROUND: Team Based Learning (TBL) presents opportunities for e-learning innovation. We describe integration of TBL with an online learning community (HOMER, homer.med.ualberta.ca) at the University of Alberta.
DESCRIPTION: TBL was introduced to 200 medical and dental students in the Musculoskeletal block of a systems-based curriculum. A pre-TBL attitudes survey was administered online together with a scenario-based feedback exercise. Weekly TBL-evaluation surveys were reviewed with student representatives. Post-TBL surveys re-assessed attitudes and revised feedback exercises. Knowledge resources were released online, while monitoring usage. During TBL sessions, IRATs, GRATs and Application Exercises were administered in small-group computer laboratories, where a TBL “script” provided instructions, gave immediate group feedback, monitored group activities, gathered data and facilitated chats with instructors and groups. Peer assessments (Koles method) allowed learners to review how they were assessed by others and how their own assessments were rated by instructors.

RESULTS/EVALUATION: E-learning facilitated instantaneous analysis of the IRAT and GRAT scores, with side-by-side histograms, and within-session feedback helped facilitators tailor discussion to group needs. They could monitor group progress real-time, a "chat" function reduced barriers to participation and TBL feedback surveys encouraged process optimization.

CONCLUSIONS: Diverse e-learning tools facilitated our TBL journey. Consistent data collection facilitated rapid iterative process improvement. Instantaneous learner feedback facilitated impactful discussion shared performance measures afforded compelling evidence of the value of the team learning experience. Finally Homer allowed the facilitators to be more sensitive to group progress and could tune discussions accordingly.
200-109: Using Team Based Learning (TBL) for Faculty Development – A Model that Works

Elizabeth Krajic Kachur, Ph.D.

BACKGROUND: The Team Based Learning Collaborative is famous for organizing workshops and conferences using the very methods they promote. And, indeed, there is no better way to explore the opportunities and challenges of any educational technique than to experience it oneself. Different from degree-offering programs, the contract between faculty and faculty developer typically does not include preparation requirements. These are important considerations for the readiness assessment. While it is acceptable, maybe even desirable, to demonstrate some lack of knowledge upfront, one has to be careful not to discourage learners, who thus might feel turned off from TBL and one’s faculty development program.

DESCRIPTION: Over the past year three half-day faculty development workshops on Current Trends and Future Directions in Medical Education were organized by a guest lecturer for Vienna Medical School (Austria). One of five trends presented was TBL. The other topics were: Core Competencies, Curriculum Integration, Computer-based Learning and Clinical Skills Labs. Before coming to the session participants are asked to review an issue of the journals Medical Education and Medical Teacher and analyze the content. In the first half hour of the workshop additional information is presented to prime learners for the Readiness Assurance Test (RAT), a 5-item multiple choice test using Immediate Feedback Assessment Technique (IF-AT) forms. The application of the RAT followed the typical format of self-test before team-test plus a subsequent discussion of the answers.
In the first application exercise participants had to equate the ACGME Core Competency Model with the European Tuning Project Level 1 Learning Outcomes using flip charts and Post-its. In the second application exercise participants had to select one of the 5 key topics and predict what would be “in” and what would be “out” ten years from now. Results were put on flipcharts which were subsequently presented to the large group. Groups were assigned by having participants first line up by level of experience in medical education and then count out the number of groups that the class was divided into.

RESULTS/EVALUATION: Institutional program evaluation forms indicated that participants were highly pleased with the program, although very few had prior experience with TBL. The “demands on participants” were viewed as “just right” by the large majority (i.e., 4 on a 7-point scale). No one felt that they were “too high” (6 or 7) or “too low” (1 or 2). Overall satisfaction ratings typically were between 5 and 6 on a 6-point scale, with 6 standing for “very good.”

CONCLUSIONS: TBL can be utilized as a viable method for faculty development even if participants are not attending a TBL workshop per se. While one has to pay attention to the limited preparations one can expect from faculty-level participants, it is possible to utilize all other elements of TBL, from RATs to application exercises.

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200-110: Exploration then integration: Implementing TBL following SDL exercises

Mänette Monroe M.D. MEd; Andrea Berry MPA, Abdo Asmar, M.D.
BACKGROUND: Self-directed learning (SDL) exercises promote student engagement in the process of identifying, managing and monitoring learning of course content. Such learning can lead to an extensive, deep understanding of concepts and topics presented in the exercise. The challenge with Team-based learning requires students to integrate knowledge to solve a significant problem. In such exercises, students must quickly bring to bear the important concepts presented in the Readiness Assurance Process to solve the case(s).

DESCRIPTION: The University of Central Florida College of Medicine GI and Renal Module has implemented a series of SDL exercises early in the week followed by TBL experiences later in the week to encourage students to explore and build the scaffolding (SDL) required to integrate knowledge (TBL) around various disorders and diagnoses. In the SDL exercise, students were given resources to explore various topics and were asked to create MCQs based on the most salient aspects. By presenting SDL exercises as a means to explore various aspects of a topic, then presenting a significant problem using TBL, we simulate and encourage clinical reasoning to better prepare students for third year clerkships.

RESULTS/EVALUATION: Students participating in the 2011 GI and Renal module (60 students) will be surveyed to determine the perceived effectiveness of the combined SDL and TBL method. The authors will also compare outcome data from MCQ items related to the concepts presented in the cases for the 2010 module (traditional teaching) versus the 2011 (SDL/TBL) module. Class characteristics (academic performance) will be considered in the analysis.

CONCLUSIONS: PBL followed by TBL will encourage students to become engaged in developing a deep understanding of a problem, then to inte-
grate such knowledge to solve a significant case. This model intends to simulate the learning process students use to develop clinical thinking. Perception and outcome data will be analyzed to support the model described.

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200-111: Exploration then integration: Implementing TBL following PBL exercises
Mänette Monroe MD MEd, Andrea Berry MPA; Abdo Asmar, MD

BACKGROUND: Problem-based learning encourages student engagement in constructing knowledge by presenting challenging, open-ended, broad problems. In such exercises, students are responsible for identifying their goals, determining appropriate resources, implementing learning strategies and evaluating outcomes. Such learning leads to an extensive, deep understanding of the various issues and concepts presented in the initial case. The challenge with Team-based learning requires students to integrate knowledge to solve a significant problem. In such exercises, students must quickly bring to bear the important concepts presented in the Readiness Assurance Process to solve the case(s).

DESCRIPTION: The University of Central Florida College of Medicine GI and Renal Module will implement a series of PBL exercises early in the week followed by TBL experiences later in the week to encourage students to explore and build the scaffolding (PBL) required to integrate knowledge (TBL) around various disorders and diagnoses.

By presenting PBL as a means to explore various aspects of a problem, then presenting a significant problem using TBL, we can simulate and encourage clinical reasoning to better prepare students for third year clerkships.
RESULTS/EVALUATION: Students participating in the 2011 GI and Renal module (60 students) will be surveyed to determine the perceived effectiveness of the combined PBL and TBL method. The authors will also compare outcome data from MCQ items related to the concepts presented in the cases for the 2010 module (traditional teaching) versus the 2011 (PBL/TBL) module. Class characteristics (academic performance) will be considered in the analysis.

CONCLUSIONS: PBL followed by TBL will encourage students to become engaged in developing a deep understanding of a problem, then to integrate such knowledge to solve a significant case. This model intends to simulate the learning process students use to develop clinical thinking. Perception and outcome data will be analyzed to support the model described.

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200-112: Mitigating Some Factors that Reduce Groups’ Performance in Team-Based Learning through Facilitation
Sylvester Yaw Oppong, MB ChB, MBA. PhD.; Benjamin Abaidoo, BSc

BACKGROUND: In recent times, Team-Based Learning (TBL) has emerged as perhaps the most effective mode of teaching particularly in the health sciences. The effectiveness of TBL however depends on certain factors relating to both students and faculty/facilitators. If not properly organized and facilitated, students’ performance in TBL may be adversely affected by factors that have the potential to distract students from the focus of their assignment and lead to waste time-wasting. We sought to find out possible distracting factors and also determined whether effective facilitation and monitoring of the TBL process through effective facilitation could ameliorate the situation and improve group performance.
DESCRIPTION: Potential distracting factors were identified using observational studies. A pre-clinical class of 48 students was divided into 7 teams. In the first instance, a TBL session (TBL-1) in ‘the pathogenesis of sickle cell disease’ was held with a rather passive non-faculty facilitator in attendance. Two students from another class were recruited and trained to observe distracting events (without facilitating) and record them. A week later another TBL exercise (TBL-2) was organized on ‘nutrient malabsorption’ using the same teams. Two faculty members trained in facilitation were present to effectively facilitate the process, in addition to the 2 student observers. Observed distracting events were scored as: 0 – no event; 1 – mild to moderate event, and 2 – significant event. The scores for each group were summed up to obtain Distraction Scores (DS) for both TBL-1 and TBL-2. Student performance in G-RAT and Application questions were matched with the group Distraction Scores for TBL-1 and TBL-2. Distraction Scores of TBL-1 and TBL-2 were also compared.

RESULTS: Significant distracting events/factors identified were Absent-mindedness/poor participation, vociferous and domineering team members, story-telling members, discussion of irrelevance, side private conversations. Aggregate Distracting Scores was significantly higher in TBL-1 compared to TBL-2. There were marked differences in Distraction Scores among the groups in TBL-1 but those differences were not significant in TBL-2. Groups with the highest Distraction Scores performed poorly in group assignments. In TBL-2 these groups reduced their Distraction Scores and simultaneously improved their group performance.

CONCLUSION: Some events or factors, which can be avoided by effective facilitation, significantly reduce group performance at TBL. Regular workshops are therefore being organized in the University of Ghana Medical School to equip faculty with the skills of effective facilitation of TBL.
**200-113: Novel method to encourage peer teaching amongst students**

Indiran Pather, D.Pharm. and Chandra Sekhar Kolli, Ph.D.

**BACKGROUND:** Higher education has become extremely individualistic and highly competitive while TBL tries to foster cooperation between students for the benefit of the individual and the team. Cooperation often does not come spontaneously. This presentation describes an attempt to promote collaboration and peer teaching within a TBL setting.

**DESCRIPTION:** A major shortcoming of the Team Readiness Assurance Test (TRAT) and Application Exercise is that the best students in the team often choose the correct answers without much discussion. The Cumulative Team Writing Test was developed in an effort to strongly encourage cooperation and peer teaching within teams. The test consists of 5 or 6 questions that require a written answer by one student selected randomly from the team. The identity of the student who will provide the answer is not revealed during the 10-minute discussion of the question within each group. At the end of this period, the instructor announces which student will answer the question on behalf of each team (e.g. student no. 2 from the team list). The selected students are isolated from the team while they write their answers. No materials may be taken to the writing area. They have 10 minutes to write out their answers. After a 5 minute break, the rest of the team begins to read the next question. The students answering the earlier question will contribute to the consensus answer of the next question when they return to their teams.

**RESULTS/EVALUATION:** Instructors noticed great enthusiasm for the exercise and real teaching occurring in the teams. Students felt that the exercise was stressful but very good. Many said that they enjoyed the exercise; that it taught them a lot. They had a real opportunity to expose
themselves to varied approaches to answer a question. The individual student is forced to prepare since the team will test his knowledge during the preparation period and he is also responsible for a portion of the team grade when he answers a question. Team members try to ensure that every person can present a logical answer since they do not know who will be called (a student may be called up a second time) and the team’s grade is affected by that individual’s answer. A technique they said they use for the weaker student was to have multiple team members explain it in each member’s unique way.

**CONCLUSIONS:** This is an innovative and powerful way to encourage students to teach each other.

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**200-114: Utilization of a Modified Team-Based Learning Format in the Pediatric Residency Core Curriculum**

Tyler Reimschisel and Sarah Green

**BACKGROUND:** TBL and other new educational formats have been largely confined to undergraduate medical education.

A major factor for this is that the new formats require a large, single block of time (typically 2-3 hours) for a given educational session, but residents in a busy training program rarely have more than one hour at a time to devote to formal education. The lecture lends itself nicely to a confined block of time, and residency programs continue to provide the ACGME-required core curriculum in a traditional lecture format during a noontime conference.
Though the utilization of PowerPoint slides in a lecture is a very efficient form of information transmission, it is an extremely poor method for learning. This project studied whether a modified team-based learning (mTBL) approach would improve feasibility and improve the educational value of selected topics in a pediatric residency core curriculum.

**DESCRIPTION:** During the week before the mTBL session residents accessed the assigned readings and completed the iRAT online using Blackboard. At the beginning of the noon conference, residents in their continuity clinic teams completed the gRAT before the physician led a large group discussion. Groups then completed the Application phase before the physician led a large group discussion. Continuity clinic teams were placed into two groups, and each group completed either a mTBL or lecture on a given topic. Each group completed 3 mTBL sessions and 3 lectures during the first 6 months of the study, then all teams participated in mTBL for the next 6 months. Except in one case, the physician who provided mTBL to one group also provided the lecture on the same topic to the other group of residents in another month. In the first half of the study, 2-3 MCQ were completed by the residents 1- and 3-months after the session to assess knowledge retention.

**RESULTS/EVALUATION:** Approximately 1/3 of available residents completed the iRAT. Attendance and satisfaction were high and comparable for mTBL and lecture. Participation waned during the first 6 months, then improved when the new academic year began. Knowledge retention was indistinguishable between mTBL and lectures. Limitations include small sample sizes, comparisons between different groups of residents each month, and lack of standardization for difficulty and validity in the follow up questions.
CONCLUSIONS: mTBL is a feasible, effective format to use in a residency. Participation improves over time.

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200-115: Incorporating Team-Based Learning into a New Medical School Curriculum
Michael J. Rindler, PhD, Erin C. Hazard, MSEd, Marina Marin, MCS, Melvin G. Rosenfeld, PhD, Steven B. Abramson, MD, Adina L. Kalet, MD, MPH, Victoria M. Harnik, PhD New York University School of Medicine, New York, NY 10016

BACKGROUND: Over the past 2 years, a new modernized Curriculum for the 21st Century was introduced at NYU School of Medicine. The 18-month pre-clerkship component begins with a Core Foundations of Medicine module and progresses through organ system modules that emphasize integration of clinical and basic sciences. To encourage critical thinking and make use of our most dynamic faculty, TBL (which we call Team-Based Medical Decision-making or TBMD) has been incorporated throughout our pre-clerkship curriculum.

DESCRIPTION: We have implemented 10 1.5 h exercises to date. Readiness Assurance Process (RAP) quizzes are limited to 5-10 questions. Application exercises vary from 2-4 per session and are generally case-based. Student preparation includes reading articles from the literature. TBMD teams remain together across modules and are also used in the histological and anatomical teaching laboratories. We have instituted a peer assessment program. Students evaluate the members of their TBMD teams 3 times using an 11-item instrument that includes questions about critical thinking and communication skills.
After reviewing their aggregated peer feedback, students are required to write self-reflection essays.

**RESULTS:** Student reactions to the TBMD exercises have been mixed. There was grudging acceptance of TBMD when it was introduced in the Fall of 2010, despite generally favorable reviews of the exercises themselves. So far, the class entering in 2011 has shown more enthusiasm for TBMD.

**CONCLUSION:** TBL can be successfully incorporated into a multidimensional, integrated medical school curriculum. It is a vehicle for integrating complex basic and clinical science material and for teaching teamwork and communication skills, essential competencies for 21st century physicians.

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**200-116: Interprofessional Team-Based Learning in a Primary Care Teaching Clinic**

Brigitte Sicat, Pharm.D.; Bruce Rybarczyk, PhD; Bennett Lee, MD; Benjamin Lord, MS; Samantha Hudson, MD

**BACKGROUND:** Internal medicine residents, pharmacy residents, and psychology doctoral trainees routinely co-manage patients in our primary care clinic located in an academic medical center. However, the care provided is multidisciplinary versus interdisciplinary. Last year, the authors developed three Interprofessional Education (IPE) Team-Based Learning (TBL) modules whereby learners could learn with, from, and about each other.
DESCRIPTION: Three 2-hour IPE TBL modules were expressly designed to promote a belief in the importance and effectiveness of interdisciplinary team work as well as content knowledge and the application of that knowledge in the following areas: (1) Introduction to the Professions/Motivational Interviewing, (2) Depression, and (3) Non-Cancer Pain. The modules (learning objectives, readiness assessment tests, cases, and case discussion points) were developed collaboratively by an interdisciplinary faculty team. The modules (learning objectives, readiness assessment tests, cases, and case discussion points) were developed collaboratively by an interdisciplinary faculty team. During each 2-hour learning session, learners were placed in teams of 7-9 members with each discipline represented on the teams while the interdisciplinary faculty team served as facilitators. Surveys were administered to participants after each TBL module to evaluate their perceptions of achievement of learning objectives and of learning gains from participating in the module.

The Attitudes Toward Health Care Teams Scale was administered to evaluate their attitudes toward health care teams at baseline and after the second and third TBL modules.

RESULTS/EVALUATION: Each module had 70 attendees and an average of 51 participants completed the survey each session (63% medical residents, 17% clinical psychology doctoral trainees, 15% pharmacy residents, and 4% chaplains; 35% male, 65% female). In an anonymous survey of the trainees in attendance, there was a uniform report of “moderate gain” to “good gain” (2 and 3 on a 5-point scale ranging from “0=no gain” to “4=great gain”) on the learning objectives. Disciplines were generally similar in their ratings. The TBL components were also rated in terms of how much help they provided in meeting the learning objectives. On a 0-4 scale (0 = no help, 1 = a little help, 2 = moderate help, 3 = much help, and 4 = great help)
the results were as follows: individual readiness assurance test = 2.4, team readiness assurance test = 2.7, case-based discussion within the team = 3.3, and case-based discussion with the full group = 3.2. Additionally, the Attitudes Toward Health Care Teams Scale showed that there was significant positive change toward viewing teams as more efficient after participating in the first two TBL modules. This change was evident in all three main participant groups (medical residents, pharmacy residents, and psychology doctoral trainees)

CONCLUSIONS: The IPE TBL sessions appear to be an effective format for teaching interdisciplinary communication as well as a belief in the importance and effectiveness of interdisciplinary team work. Additionally, it appears to serve as an effective tool for applying current clinical knowledge in areas where interdisciplinary work is essential, including adherence with medical regimens, depression, and chronic pain.

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200-117: Modification of Medical Physiology Curriculum Using Team Based Learning (TBL)

Bruce R Stevens PhD, Patricia L Abbitt MD, Chris Baylis PhD, Kirk P Conrad MD, Judy M Delp PhD, Christopher E Forsmark MD, Mohan Raizada PhD, Peter P Sayeski PhD, Deborah A Scheuer PhD, Colin Sumners PhD, I David Weiner MD, Michael R Bruce MS, Charles E Wood, PhD, University of Florida College of Medicine, Dept. of Physiology & Functional Genomics

BACKGROUND: This retrospective cohort study examined Team Based Learning (TBL) effects on learner outcomes when introduced as a tool for medical student physiology instruction. Physiology at our institution has
been historically organized into 5 modular organ systems, with core competency assessment, formative feedback, and summative feedback based solely on traditional multiple choice question tests (MCQ) following each module, plus NBME Shelf exam at the end. Formative feedback historically follows each MCQ. Five TBL sessions were added to our historically eclectic learner activities that include nonscored learner-directed small group quiz conferences/discussions (LQCD).

DESCRIPTION: Organ module MCQ performance means were compared from years 2008 – 2011. Only the 2011 group experienced TBL, which was conducted prior to MCQ. Each TBL package was comprised of assigned preparatory targeted content to study, individual readiness assurance tests (IRAT), group readiness assurance tests (GRAT), and group activity exercises (GAE). IRAT and GRAT incentivized points toward the overall course score, while GAE was not scored. All years included LQCD which was completed before MCQs. Learner total yearly group (class) sizes ranged from N=126 to 134. Pass/fail replaced letter grades beginning in 2011, precluding certain comparisons to the prior 3 years.

RESULTS: Comparing means of all yearly traditional MCQ vs. TBL IRAT, an effect size = 0.23, together with ANOVA (p<0.05), indicated that MCQ performance was moderately influenced by learners being either in a different yearly class or by experiencing TBL. Post-hoc analysis (p<0.001) indicated that for year 2011 the MCQ was significantly greater than IRAT, while GRAT was significantly greater than either MCQ or IRAT. Further post-hoc analysis indicated that year 2011 MCQ was significantly less (p<0.05) than any other MCQ in the 3 prior years. NBME Shelf z-score (internal rescaled score) for 2011 was not significantly different from any Shelf z-score in the prior 3 years. Learner feedback comments generally favored the usefulness of TBL, comparable to LQCD.
CONCLUSION: Medical physiology learners’ individual traditional MCQ test performances were greater than individual IRAT performances following the TBL package experience. We will retain TBL in the curriculum.

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200-117: Using TBL to Reach Pedagogical Goals in a First-Year Composition Course

Angus Woodward

BACKGROUND: Our Lady of the Lake College is a private, Catholic college in Baton Rouge offering associate, baccalaureate, and master’s degrees in health professions, natural sciences, and liberal studies. Of OLOLC’s approximately 1800 students, roughly 85% are women and all are commuters. Writing 1311, the second-semester first-year writing course at OLOLC, emphasizes reading and information literacy. In Spring 2011, I began using TBL in multiple sections of WRIT 1311.

DESCRIPTION: Since the Fall 2008 semester, I have surveyed my students regarding four pedagogical concerns: use of readings, emphasis on ideas, grading, and group activities. In the Fall 2009 semester, I added a fifth concern, engagement. The number of survey respondents has varied from 16 to 43, with an average of 27.

RESULTS/EVALUATION: Comparing results from Spring 2011 (when I began using TBL) to results from previous semesters, significantly more students have agreed or agreed strongly that the use of readings and the emphasis on ideas contributed to their development of writing skills, that they
understood the bases for their grades, that working in groups was productive, and that the course was engaging.

**CONCLUSIONS:** Instituting team-based learning is a way for instructors reach important pedagogical goals.

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200-118: Team-Based Learning in an Undergraduate Anatomy and Physiology Course

Sarah Leupen

**BACKGROUND:** Team-Based Learning (TBL) is a relatively common form of instruction in the health professions. However, most published studies and descriptions of TBL in the health professions involve graduate and professional schools or relatively homogenous undergraduate populations (e.g., pre-nursing students). Also, to this author’s knowledge there is no published description of the use of TBL in a standard two-semester Anatomy and Physiology course for undergraduates.

**DESCRIPTION:** Team-Based Learning was used as the exclusive form of instruction for a two-semester Anatomy and Physiology course of about 100 students. The students were a heterogeneous group of pre-health undergraduates (approximately evenly divided among pre-pharmacy, pre-nursing, pre-medical, pre-physical therapy, and other students). Teams were formed on the first day in order to produce groups heterogeneous by intended profession. For each of the two semesters, course material was divided into seven units. Each unit began with an individual and team readiness assessment test, followed by several class peri-
ods in which teams worked through increasingly complex application exercises on the unit topic, including simultaneous-choice questions with white-board responses, categorizing and labeling worksheets, cases, and interactive games. Each unit ended with an individual test or individual-then-team quiz, and the courses ended with an individual and a team final, both comprehensive.

**RESULTS/EVALUATION:** In both mid-course and end-of-course evaluations, students expressed satisfaction with the method, enjoyment of the course, and increased use of the textbook and class attendance compared to other courses. They were very successful in achieving course goals, and the DFW rate was less than 3%, far less than the corresponding lecture-based section of the course.

**CONCLUSION:** TBL is a natural fit for a two-semester undergraduate Anatomy & Physiology course, with its many clinical applications, wide variety of cases available, and the importance of teamwork in the health professions. TBL can be successfully applied to such a course with high student achievement and both student and instructor satisfaction.

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**Research Track**

**300-101: Concept Mapping as a method for assessing cross-cultural differences between TBL classes - Some preliminary results**

Peter Balan University of South Australia, Australia; Mark Harrison (Randolph College, Virginia)
BACKGROUND: This research explored the use of concept mapping as a method to investigate and assess cross-cultural similarities in- and differences between students from different cultures. Concept mapping is a mixed-method approach that combines qualitative and quantitative techniques; it produces a graphical depiction of the underlying structure of the data set. The subject of this research was cross-cultural differences in the motivations of undergraduate students enrolling in TBL classes in Marketing; we compared a set of students in the US to a set of students in Australia. Our aim is that this research will lead to improved understanding of variations in student motivations, and hence to improved design of TBL learning modules.

DESCRIPTION: A survey instrument was given to a class of students in Australia and to a class in the United States. Each student was asked to each nominate one or two reasons why he or she had enrolled in that particular course. The US data set included 35 items from 22 students, and the Australian data set comprised 125 comments from 65 students. The data for each class - anonymous and unprompted qualitative comments - were analyzed using concept mapping, which produced a graphical cluster map for each class. This provided rich output that allowed analysis of clusters at different levels of detail.

RESULTS: Comparison of the two cluster maps revealed striking similarities between the two classes. The key clusters of student motivations for both classes were “learn more”, “interested in the course”, and “to fulfill program requirements”. These results indicate similar motivations between the two sets of students, which suggests that TBL modules designed for one class may also be effective for the other.
CONCLUSIONS: Concept mapping is shown to be a feasible, practical and useful method for assessing the similarities as well as the differences between the motivations of two groups of students. This method accommodated the different sizes of data sets, and can be used to investigate further aspects of student involvement with their courses. Practical applications and research questions are identified.

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300-102: TBL in a Biomedical Sciences M.S. Program: Student & Faculty Perceptions of Learning & Group Work

Jay Campisi, Marie-dominique Franco, Joan L. Betz, Michael J. Ghedotti, Kristi Penheiter, John Sakulich, Catherine Kleier

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 and learning, Team Based Learning (TBL) was incorporated into 4 of the 5 required courses within the Fall semester curriculum. None of our students had previous experience with TBL.

DESCRIPTION: We integrated content in Biochemistry, Genetics, Physiology and a Research/Literature seminar course so that overlapping content areas were covered at the same time in the 4 separate courses. We incorporated TBL into our predominately lecture-based classes on 4 separate occasions (n=22 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. Three courses (Biochemistry, Genetics, Physiology) conducted separate iRAT/tRAT and then a joint AE was completed covering material from all 4 courses. We examined student perceptions of group work & TBL at the beginning/end of the semester.

RESULTS: Student perceptions of group work changed over time. Pre-semester 52% of students stated their previous group work experiences were positive, and 55% of students stated that problems often arise when doing group work. Post-semester, 59% of the students stated positive associations with group work and only 41% stated problems often arise when doing group work. Pre-semester results indicated 59% of students believed they achieved better outcomes working alone. However, post-semester only 36% of students believed they achieved better outcomes working alone. Finally, 77% of students stated that TBL improved their learning by a moderate to great amount, 14% stated that TBL improved their learning a little, while only 9% stated that TBL did not improve their learning. Faculty observations were consistent with student survey results and also noted increasing student awareness of the connections among biochemistry, genetics, and physiology.

CONCLUSIONS: Instructors found joint TBL activities to be an effective way to engage students in an integrative and meaningful way across 4 discrete courses. Student perception of group work became more positive following TBL, and most students considered TBL to be an effective way to learn.

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300-103: Team-Based Learning Improves Long-Term Retention in a Pre-Clinical Pediatrics Course

Amanda R. Emke, MD

BACKGROUND: The effect on long-term retention following the addition of Team-Based Learning (TBL) to a curriculum has not been widely reported. We compared the effect of a lecture-plus-TBL pre-clinical pediatric curriculum on knowledge retention to a lecture only curriculum.

DESCRIPTION: Historical controls completed the second-year pre-clinical pediatric course (16 hours of lectures) in the 2007-2008 academic year. The course changed in 2008-2009 (7 hours of lectures and 10 hours TBL). Students in both groups completed multiple-choice knowledge-based exams before and after the pre-clinical pediatrics course and again before and after the third-year pediatric clerkship. Changes in knowledge (percent correct) were compared between groups using repeated measures analysis of variance, controlling for number of weeks between the pre-clinical course exams and beginning of the pediatrics clerkship.

RESULTS: Baseline knowledge did not differ significantly between control (n=29) and TBL (n=40) groups (47% vs. 49%, respectively). Knowledge improved after the pre-clinical course for both groups, but increased significantly more in the TBL group (58% vs. 79%; effect size 1.19). While knowledge declined in both groups between the end of the course and beginning of clerkship, the TBL group continued to demonstrate improved retention (50% vs. 56%; effect size 0.32). Knowledge increased in both groups to similar levels (76% vs. 76%) after the clerkship.

CONCLUSIONS: The addition of TBL to a pre-clinical pediatrics curriculum was associated with greater gains and retention in pediatrics knowledge compared with a lecture-only curriculum.
300-104: Student Perceptions of Team-Based Learning in a Visual Optics Course

John Mark Jackson, OD, MS, Southern College of Optometry, Memphis, TN

BACKGROUND: Our optometry program’s first use of Team-Based Learning was in a first-year course in optics. The purpose of this study was to assess student perceptions about their experience.

DESCRIPTION: In the Fall 2011 semester, all 130 first-year students took Optics of The Eye I. It was the second year the instructor (JMJ) used the TBL format for the course. To assess how the student’s perceived the experience, the students took the "Team-Based Learning Student Assessment Instrument" (TBL-SAII) developed by Heidi Mennenga, PhD. This is a 33-question instrument divided into three subscales: Accountability, Preference for Lecture or Team-Based Learning, and Student Satisfaction. The questions use a 5-point Likert scale (1=strongly disagree, 5=strongly agree).

RESULTS/EVALUATION: 120 out of 130 students (92%) responded to the survey. The overall results were positive with regards to their perceptions of TBL. The mean responses for each subscale are as follows: Accountability 4.18 +/- 0.27; Preference 3.69 +/- 0.43; Satisfaction 4.03 +/- 0.31. Each subscale shows a favorable response to TBL, with Preference showing the least positive effect. Within each subscale there were between 1-3 items that scored significantly differently than the mean.

CONCLUSIONS: The overall perception of TBL was positive for this group of students. The results were especially favorable in the Accountability subscale, with students indicating TBL provided motivation to prepare for class
and perform well on team assignments. The responses were somewhat more neutral-to-positive on the Preference subscale, and this section had the largest number of items that differed from the mean. TBL appears to have left an overall positive impression on the students and motivated them to prepare and perform well.

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300-105: Does Participation in Team-Based Learning Affect Medical Students' Longer-Term Learning?

Paul Koles, MD; Adrian Corbett, PhD; Khalid Elased, PhD; Adrienne Stolfi, MSPH; Nicole Borges, PhD; Dean Parmelee, MD; Boonshoft School of Medicine, Wright State University

BACKGROUND: Several studies have evaluated learning outcomes of students who participate in team-based learning (TBL) in health professions curricula, focusing primarily on short-term effects on academic performance in single disciplines (anatomy, pathology, pharmacology, psychiatry). 1-4 Evidence of longer-term learning outcomes associated with TBL in integrated curricula is needed.

DESCRIPTION: The performance of 22 second-year medical students (11 males, 11 females) on two examinations was evaluated. The pre-test consisted of 100 questions in 9 domains: physiology, pathology, and pharmacology of cardiovascular (n=34), respiratory (n=34) and renal (n=32) systems. Students took the pre-test before a 10-week block of integrated courses in these 3 systems. Seven interdisciplinary TBL modules were included in this block. A post-test, consisting of the same 100 questions, was administered 8 weeks after the end of the 10-week block. Pre-test vs. post-test performance was compared for subsets of 50 ques-
tions related to TBL module content (TR) vs. 50 questions unrelated to TBL module content (TU).

RESULTS: There was no significant difference in pre-test mean scores for TR vs. TU questions (32.9% vs. 34.7%, p=0.319). Comparison of post-test vs. pre-test mean scores showed significant improvement for both TR and TU questions (TR: 32.9% vs. 59.9%, p<0.001; TU: 34.7% vs. 52.1%, p<0.001). Improvement between pre-test and post-test mean scores for TR questions was significantly greater than for TU questions (TR: +27.0% vs. TU: +17.4%; p<0.001).

CONCLUSIONS:
1. Pre-test difficulty of TR vs. TU questions was similar (no inherent differences in item difficulty).
2. Students’ improvement in performance on both TR and TU questions at 8 weeks after the cardiovascular-respiratory-renal course block suggests both gain and retention of knowledge.
3. The larger improvement in post-test scores for TR vs. TU questions suggests a learning benefit associated with TBL that persists at least 8 weeks after courses in which TBL was used.

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300-106: Medical Student Performance After Incorporation of Team-Based Learning Into a Mechanisms of Disease Course

N. Kevin Krane, MD, Craig Clarkson, PhD, Ross Klingsberg, MD, Jennifer Gibson, PhD, Byron Crawford, MD
BACKGROUND: In 2008, Tulane University School of Medicine (Tulane) began to incorporate TBL into its “Mechanisms of Disease” (MOD) course. MoD is an integrated 2nd year pathology and pathophysiology course, that is taught in systems-based units that include pharmacology, microbiology, and clinical diagnosis. To determine if students learned more effectively after TBL was added to the MoD Course, student performance was evaluated after the implementation of TBL.

DESCRIPTION: Within each system unit, results from examination questions taken from content delivered by TBL were compared with results from questions arising from content delivered by lecture. Results of overall student performance were also compared on the internally created systems-based unit examinations both before and after implementation of TBL.

RESULTS/EVALUATION: Initial data showed that the mean examination performance improved after the implementation of TBL. Improvement on student performance in individual examination questions was variable, depending on the systems block. More complete analysis will incorporate results from the 2011-12 academic year.

CONCLUSIONS: Initial data comparing student performance is consistent with Koles, et al., (Acad Med 85:1739, 2010), in which Tulane students demonstrated improvement in performance on multiple-choice examinations in content areas where TBL has replaced lecture. (More complete conclusions will be drawn following the incorporation of data from students who will finish examinations in February 2012.)
300-107: Team-Based Learning (TBL) Engages Biomedical Science Graduate Students and Postdocs in RCR Training

Wayne T. McCormack, Ph.D. & Cynthia W. Garvan, Ph.D.

BACKGROUND: Engaging learners in responsible conduct of research (RCR) training is difficult with passive learning methods such as lectures and web-based courses. Team-based learning (TBL), an active, small group learning method focusing on problem-solving and integrating information, has not been widely explored for improving biomedical science graduate education or postdoctoral training. TBL engages learners by holding them accountable for coming to class prepared via a readiness assurance process, and group application exercises involving problem-solving within and between teams.

DESCRIPTION: To investigate its potential impact on RCR training, TBL was implemented in an RCR course for biomedical science graduate students and postdoctoral fellows, and assessed by retrospective comparison of course evaluations.

RESULTS/EVALUATION: Overall course ratings and textbook ratings ("ORI Introduction to the Responsible Conduct of Research", Steneck) improved slightly after implementation of TBL. Before TBL the involvement of many faculty members led to different group experiences, although class discussions were recognized as being more valuable for learning than lectures. After TBL implementation most students preferred TBL over other small group teaching methods, and students spent more time preparing for class. A majority of respondents agreed that TBL resulted in more interaction and improved learning.
CONCLUSIONS: Based on student feedback, TBL successfully engages learners and improves overall satisfaction with RCR training. The impact of TBL on ethical decision-making is under investigation. Based on our experiences using TBL in RCR and other courses, the implementation of TBL in graduate education will improve application and problem-solving skills, generate enthusiasm in the classroom, and promote collaboration and teamwork among graduate students.

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300-108: Student Attitudes’ Toward and Experiences in Teams during Their First Year of Medical School

Adam S. Deardorff, MS; Sandy Cook, PhD; Annie Daniel, PhD; Nicole J. Borges, PhD; Dean Parmelee, MD; Kevin Krane, MD

BACKGROUND: Compelling arguments have been made for integrating team training into formal undergraduate medical education. However, establishing the relevant outcome measures and appropriate methods to evaluate the efficacy of such programs remains a challenge. One solution is to rely on longitudinal student self report data. Team-Based Learning (TBL) is a strategy currently employed to promote both active learning and the development of teamwork skills in medical schools across the globe. This study explores student attitudes toward TBL and student experiences in teams during TBL instruction and how they change over the course of the first year of medical school.

DESCRIPTION: With Institutional Review Board approval, 2009-2010 and 2010-2011 first year classes at three medical schools using TBL as an instructional modality completed an Attitudes Survey (n = 388) and Team Performance Scale (n = 275) within the first few months of beginning medical school (when their TBL teams were formed) and at the end of their first year. Overall response rate was 70%.
RESULTS: Scores from each measure for the three medical schools were averaged resulting in composite scores for each administration of the survey. A Wilcoxon Rank Sum test (p < .002) Bonferroni correction) was conducted to determine if student attitudes toward TBL and their experiences in teams changed significantly from the beginning of their first year of medical school compared to the end of the year.

One item on the Team Performance Scale (“All team members consistently paid attention during group discussions”) reached significance (p < .001). No other significant differences on either scale were found. When analyzing each schools data separately, there were no additional significant differences regarding Team Performance. For attitudes, however, one school exhibited numerous significant pre/post test changes.

CONCLUSION: Overall findings indicate few changes in first year medical student attitudes toward TBL or experiences in teams. A limitation is the quality and amount of TBL in the first year at the three medical schools varied.

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300-109: Utilizing Team Based Learning Methodology to Transform a Psychiatry Clerkship Curriculum

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BACKGROUND: Prior to 2008, third year medical students rotating through Psychiatry at the University of South Alabama scored below average on the National Board of Medical Examiners (NBME) shelf exam and overall satisfaction with the clerkship was low among students. Additionally, less than one percent of students from the University of South Alabama chose psychiatry as a specialty upon graduation.

DESCRIPTION: Starting in the 2010/11 academic year, fifty-percent of the clerkship didactic time was converted into team-based learning exercises. Due to the success of this program, this initiative has been expanded and team based learning is now the primary educational methodology among third year students.

RESULTS/EVALUATION: From 2006-09, prior to converting to an active-learning format, the average NBME psychiatry shelf examination score for University of South Alabama students was 73.3, approximately the 40th percentile national. In the two years following the conversion to an active learning format including team-base learning the average scores have improved to 80.1, 68th percentile nationally. Overall rating of the course (on a five point scale) improved from 3.19 in the 2008/09 academic year to 4.50 in 2009/10 and then 4.55 in 2010/11. The number of medical students choosing psychiatry as a specialty during the five years prior to the changes in curriculum was 3. This number improved dramatically to 3 in 2010, 5 in 2011, and 5 in 2012.

CONCLUSIONS: The conversion of the educational curriculum in psychiatry at the University of South Alabama from a primarily lecture based format to an active learning methodology utilizing team-based learning has partly contributed to a significant improvement in the performance on the NBME shelf examination, overall improvement in satisfaction towards the clerkship, and an increase in the number of medical students choosing psychiatry as a career.
300-110: Beyond The Theory: Bringing the Chronic Care Model to Life for Baccalaureate Nursing Students

Teresa Barry Hultquist, PhD, APRN-CNS

BACKGROUND: Undergraduate nursing students are exposed to many theories during their coursework, but many find it difficult to apply theoretical concepts in their patient care. CDC estimates indicate almost 1 out of every 2 US adults has at least 1 chronic condition. Health care reform is targeting improved provider-patient management of chronic illness to maximize health. Wagner’s Chronic Care Model (CCM) contains 6 components that influence the ability to deliver effective chronic illness care, if students and providers can apply the components to their patient care.

DESCRIPTION: This content was used with 2 classes of undergraduate nursing students in a chronic care course. One class had 67 traditional students at one site, and the second class had 28 accelerated students (nursing as a second degree) in 3 sites across 500 miles via IP video. Readiness assurance of the CCM components was tested individually, in groups, and appeals and discussion was done. Students then applied the CCM theory to case studies (e.g. people with diabetes, asthma, cancer).

RESULTS/EVALUATION: The traditional student class had previous experience with the process, but indicated they didn’t really like working in groups. They did not appeal and moved out of their groups during break and had to be regrouped. Class groups applied the theory to case studies at a basic level with limited creativity. Accelerated students fully engaged in all components including an appeal and quickly moved from theory to application. Students engaged in an in-depth discussion within and between sites with creative ideas for implementation of all CCM components.
CONCLUSIONS: Although both classes applied the theory to case studies, the student groups differed on their participation and engagement in their learning.

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300-111: Principles of Economics Courses: TBL & Gender

Jasminka Ninkovic, Ph.D. Oxford College of Emory University, History and Social Science Division

BACKGROUND: It has been shown in the literature that in the classical class setting a performance gap exists between students of a different gender: female students perform, in general, lower than male students in principles of economics classes controlling for all other individual differences. There is also evidence in the literature that females perceive and perform better in teams than male members. This research will deal with the question: Does team based learning lower the gap between female and male achievement on tests in principles of economics classes?

DESCRIPTION: In the past I have taught multiple sections of Principles of Economics classes. My research has shown that while controlling for the individual students’ characteristics, statistically significant differences existed in test performance for female and male students (between 0.17 and 0.24 on the grading scale 0-4). I started using TBL last year and introduced it a gradual way starting last (2010) fall. This fall I am using “full-fledged” TBL in my Principles of Microeconomics classes and will be able to compare test achievement of these classes with the classes prior to fall 2010.
EVALUATION/HYPOTHESIS: I would expect that on the basis of the previous findings, use of TBL will narrow the gap between male and female performance in Principles of Economics classes. In my data I will be able to control for such differences as ability, parents’ education, class size, ethnic background, and gender. I expect to get results that confirm a previous hypothesis by using multiple regression analysis with dummy variables and t-tests to test for statistical significance of the coefficients. I will have complete data to perform the analysis at the end of fall semester 2011.

CONCLUSIONS: Will be available by January when I have complete data from fall courses.