

Undergraduate Student Perceptions of Team Based Learning (TBL) in the Homeland Security Classroom

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ABSTRACT

A variety of Scholarship of Teaching and Learning (SoTL) research has identified Team-Based Learning (TBL) as a powerful and versatile teaching strategy enabling instructors to take small-group learning to a higher level of effectiveness. TBL employs a series of active teaching and learning techniques to transform groups of individuals into high-performance learning teams. While research exists in a variety of disciplines, a dearth of information exists regarding its applicability and effectiveness in homeland security. The following study investigates student perceptions of TBL in two homeland security courses over the period of three years. The authors provide background on the methodology as well as smart practices for those considering its adoption.

INTRODUCTION

“...one lesson we have to take to heart is the importance of teamwork. If we are to really be a Department of Homeland Security and not a collection of individual components, we have to come together as a team and take full advantage of the tremendous assets, resources and capabilities at our disposal.”

Chertoff, M., Former Secretary of the U.S. Department of Homeland Security,
December 20, 2005

There are several attributes/skills that must be present in a successful homeland security leader including, but not limited to: critical and creative thinking, written and oral communications, interpersonal, leadership and planning, problem solving and teamwork. Faculty must work diligently to incorporate information and activities into their courses that will build and enhance these skills in their students. In an effort to further these skills, homeland security faculty at Eastern Kentucky University (EKU) began the use of team-based learning (TBL) in two specific courses to determine its effectiveness in delivering course content but also promulgating the skills mentioned above.

Research and practice concluding that team-based learning (TBL) is an effective means of incorporating the use of interactive small groups to stimulate and enhance learning has led to an increased use of the pedagogical method in the higher education classroom (Parmelee, 2010; Thompson, Schneider, Haidet, Perkowski, & Richards, 2007; Haidet, Kubitz, & McCormack, 2014). Institutions within the fields of health sciences such as; medicine, nursing and pharmacology have

evaluated the TBL approach. Programs in undergraduate education in engineering, law, psychology, information management, mathematics, statistics, and communication, as well as graduate education from social work, education, and public health business have examined TBLs effectiveness, or perceived effectiveness (Haidet et al., 2014); however, the academic community within the field of homeland security has shown less engagement.

The overall purpose of this research was to evaluate and disseminate student perceptions of the effectiveness of Team Based Learning in two homeland security courses over a period of three years. It is hoped that other homeland security faculty can use these findings and recommendations to strengthen their courses, students, and respective programs.

Team-Based Learning (TBL). Team-based learning (TBL) is an educational model that goes beyond simply covering content by focusing on providing students the opportunity to implement course concepts to solve problems (Michaelsen & Sweet, 2008). TBL was developed by Dr. Larry Michaelsen in the late 1970's after he recognized that his large class size would require an adaptation in teaching style. He realized the need to change from his previous Socratic lecture approach to another method to more effectively engage students necessitating the search for a technique that would motivate students to better prepare for class. Michaelsen found that students were actively discussing material within their teams which he would have discussed during lectures. His approach to enhance student preparedness included the assessment of students individually and then in teams. Michaelsen followed testing with classroom activities focused on teams working together on a significant problem. Other student teams in the class worked on the same problem and all of the teams were required to make a specific choice and develop a simultaneous report (Sibley & Ostafichuk, 2014).

General Overview of TBL. Michaelsen and Sweet (2008) describe the focus of learning in TBL as exceeding instructional content by providing students both conceptual and procedural knowledge and by focusing on an assurance that students are provided the opportunity to practice the use of course concepts to solve problems. This results in the majority of class being used for team assignments focused on the use of course content to address the types of problems they are likely to face in the future.

TBL courses focus on major instructional units (MIUs) that students are required to learn about prior to the beginning of each respective block of study. Students are purposely organized into permanent groups that work together throughout the term to better learn and utilize concepts. Prior to the first class of the MIU, EKU faculty utilizing TBL require students to read the assigned materials and develop a course preparation guide which is a tool to help students organize the information read into elements of critical thinking. During the first class session for each MIU, students are given an individual short assessment, which begins the readiness assurance process (RAP). The assessment is focused on the fundamental and powerful concepts presented in the readings. Students are then given the same assessment, which they complete as a team and receive immediate feedback on each question. Teams are then provided the opportunity to write an evidence-based appeal on any of the questions missed. The readiness assurance process is then followed by corrective instruction via a short lecture, focused on addressing any misconceptions that may have been uncovered in the RAP. The majority of the remaining MIU (week two) is spent on teamwork activities/assignments that require the students to apply the new concepts to solve problems (Michaelsen & Sweet, 2008).

4S: The Four Essential Principles of Team-Based Learning. TBL requires a shift in primary learning objectives and substantial adjustments in the role and function of both faculty and students. The faculty member focuses on designing and managing the instructional process and the students are responsible for the initial acquisition of information and knowledge and then working with other students in a team effort to effectively use the content (Michaelsen & Sweet, 2008). Michaelsen identified four principles necessary for success in team based learning: (1) groups must be properly formed and managed, (2) students must be made accountable, (3) team assignments must promote both learning and team development, and (4) students must receive frequent and immediate feedback. Over the past 30 years, educators in professional schools and college campuses have increasingly employed TBL with successful results (Thompson et al., 2007).

1) Teams properly formed and managed. Faculty must form teams that are capable of effectively completing the required tasks. Research indicates that teams formed by students are least effective while diverse teams selected by faculty are most effective (Smart & Csapo, 2003). These teams should be diverse, consisting of four to seven members, and avoid the pairing of close friends or individuals with other relationships. Teams should remain intact throughout the entire course, providing adequate time for members to transform into effective working teams. In selecting teams, instructors should also ensure that students do not have uniform backgrounds or the same strengths or weaknesses in an effort to distribute skills, experience, and strengths uniformly throughout the teams. This can be accomplished by surveying students on the first day and identifying prior relevant experience, previous courses or other similarities (Espey & Walker, 2012).

2) Students must be held accountable. In traditional classes students are only accountable to faculty; however in TBL students must be accountable for their individual preparation, for participation in-group assignments, and for interacting with other members of the team in a productive manner. Individual preparedness occurs prior to the beginning of each unit of study when students complete course readings in preparation for the readiness assurance process previously highlighted.

Ensuring team members are accountable for their contribution to the team requires faculty to implement a system to create the opportunity for students to evaluate the contribution of their teammates. Peer assessments are an effective means with areas of evaluation to include, but not limited to: individual preparation for teamwork, attendance in class, involvement in team meetings and team discussions, and individual contributions provided in a collaborative and supportive manner. In short, peer assessments are effective evaluation tools because only the team members are truly aware of student participation levels (Michaelsen, 2002).

3) Team assignments promote learning and team development. The development of effective team assignments is essential for a successful TBL course. Common problems establishing teamwork can be overcome with appropriately developed assignments that require interaction and collaboration. Assignments requiring the development of lengthy documents or presentations will generally result in groups dividing up the work among team members instead of working together to achieve the best resolution and end product. The utilization of intricate assignments and the resulting division of work by team members into separate components inhibits intra-group interaction and collaboration between groups. By providing assignments that require a complex decision making process but a presentation of work in a simple form, success can be achieved (Michaelsen, 2002).

4) Students receive frequent and immediate feedback. Teams must receive frequent and timely feedback to develop and perform effectively. This can be achieved through feedback on readiness assessment tests that foster learning and the self-evaluation of individual and team efforts. Furthermore, since the team assessment scores are made public, members become motivated to protect their image among other groups and with immediate feedback groups recognize when they fall short and should have capitalized on another team member's feedback. This process can increase the standing of team members who may be less assertive and demonstrate the importance of including everyone in the decision making process. The process enables students to work together to attain the basic knowledge needed for success (Watson, Michaelsen, & Sharp, 1991).

Conditions for Success. Regardless of the teaching strategy employed, an essential component of student learning is the extent to which students prepare for class and their willingness to engage in open, give and take discussions. The development of trust and comfort needed to challenge each other's views can only be achieved through a series of positive interactions. Tuckman (1965) categorizes the stages of group development as forming, storming, norming and performing. In 1977 Tuckman added an additional stage – adjourning – after acknowledging work by Braaten (1975), which identified the existence of another stage reached after the conclusion of the group-work. In an effort to ensure that teams are given ample time for the group development process to occur, it is essential that team membership is maintained throughout the duration of the course.

Rising Popularity and Research. With the increasing interest in TBL, questions have surfaced in the academic community regarding the method's use, approach, and effectiveness. When reviewing TBL courses and research, it is critical to verify that these programs and learning approaches are structured and implemented in a true TBL format. Haidet et al. (2014) reviewed 130 publications purported as being focused on TBL. It was discovered that 18 of the articles were actually not discussing TBL and further examination noted that out of the 112 remaining publications, 28 discussed small group and team learning activities but did not incorporate the core elements of team-based learning. Of the 84 remaining publications 63 (75%) were examining fully implemented TBL approaches that used Michaelsen's Team-Based Learning method and 21 (25%) were partial implementations of TBL (Haidet et al., 2014; para. 10.).

Haidet et al. (2014) also found that the majority of studies reviewed described improvements in learning by all students using TBL; however, TBL was particularly beneficial to students who were academically at the low end of the class. The research also found consistent improvements in team performance including the areas of internal communications and awareness, participation and attendance rates, and increases in student perceived self-efficacy and higher levels of student interest. Two of the studies examined student's long-term ability to use knowledge gained in TBL courses, finding that students were able to successfully apply knowledge previously gained in TBL course in the workplace. Some studies discovered decreases in student satisfaction and that some instructors and students struggle with the TBL method, finding it less enjoyable, less effective, and less efficient than lecture based methods. It was further noted that teachers experienced an initial increase in workload and a relatively steep learning curve while gaining experience with TBL methodology. Both positive and negative impressions of pedagogical effectiveness and attitudes toward teamwork were noted during the study.

METHODS

In 2015, homeland security program faculty at Eastern Kentucky University's College of Justice and Safety began collecting survey data from students participating in two upper level HLS courses structured in a TBL format. The courses included HLS 391 Risk Analysis and HLS 401 Intelligence Process. The risk analysis course focused on the history and process of risk assessment and management as it relates to the protection of critical assets and infrastructure in both the public and private sectors. The intelligence process course concentrated on key questions facing the U.S. intelligence community and its role in homeland security, national defense, and international affairs, with a focus on policy, oversight and intelligence support. The course also addressed the collection, analysis, sharing and dissemination of information within and between local, state, and federal government agencies as well as the private sector.

Homeland Security TBL Course Format. Each of the 16-week, in-person courses met for one hour and 15 minutes, two times a week. Given these parameters, each of the eight instructional areas were allotted two weeks, which is as previously noted called a major instructional unit (MIU). At the beginning of the semester, the instructor collected student background information, which was used to select well-rounded, diverse teams. Teams were comprised of five to seven students and were grouped around a table during class. These teams remained intact throughout the semester and were provided time during class to work together and additionally required to work outside of class. The courses, consisting of 30 to 35 students, would utilize a schedule for each MIU, see Table 1.

Table 1. Course Schedule

<i>Week One, Class One:</i>	<i>Week One, Class Two:</i>	<i>Week Two, Class Three:</i>	<i>Week Two, Class Four:</i>
Readiness Assurance Process: IRAT/TRAT	Corrective instruction based on the results of the assessment	Team Planning / Problem Solving Period	Team Presentations / Discussions with Class

Peer assessments were conducted at mid-term and right before the final week of the course. The only deviations to the schedule were made due to inclement weather cancellations; when these occurred classes were combined to achieve course objectives.

Process, Instrumentation and Sample. The process in the study focused on collecting and examining the perceptions of students regarding the effectiveness of TBL methodology in the two courses. These courses were typically taken by homeland security students during their junior or senior year in the program. The survey (derived from Vasan, DeFouw & Compton, 2009; see Appendix A) utilized a five-point Likert-type questionnaire for 22 responses. These five-point questions (numbers 1-21 & 26) were rated on a scale of 1-5 (1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree). It also included one question (number 22) that asked for the student's anticipated grade in the course. The survey additionally included three short-answer/open ended questions (numbers 23-25) eliciting a total of six responses.

These questionnaires were distributed and collected from all students during the last week of classes for course offerings during the 2015, 2016, and spring 2017 on-campus course schedules. This resulted in 100% participation from 194 students for the survey over the three-year period examined; however, three of the Likert questions were not addressed by all of the students. While the survey is not representative for all homeland security students and only those surveyed, it does provide insights into the perceptions of a set of students that could be applied to other courses/methods.

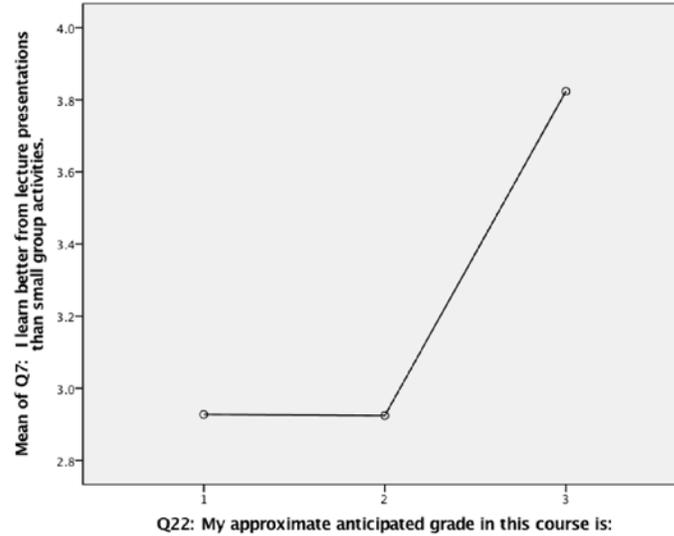
DATA ANALYSIS

Quantitative data analysis was conducted using the Statistical Package for the IBM Social Sciences (SPSS) Version 24 to examine means for each of the 22 Likert-type questions and by respective courses and respective semesters. Both courses examined were only offered once each year for a total of three classes being examined for each of the two courses. All open responses were transcribed and recorded by a graduate assistant. Both courses were instructed by the same faculty member for the period investigated. Results were examined at the course level, year, and by total surveys completed. Questionnaires were distributed and collected during class and no student identifiers were collected or recorded such as: names, student identification numbers, age, race, nationality, or gender. Questionnaire results were electronically recorded and retained in a password protected computer for analyses.

RESULTS

Survey analyses indicated favorable perceptions regarding the effectiveness of the TBL methodology in the homeland security courses examined. As previously noted, the Likert-type questions were rated on a scale of 1-5 with scores ranging from one which indicated the student strongly disagreed with the statement, to five which meant they strongly agreed with the statement and three being a neutral response. Survey results to key questions included the following: “TBL helped me increase my understanding of the course material” (N=193, M=3.83). Solving problems in a group is an effective way to learn (N=194, M=4.08). Preparing the TBL team presentations improved my understanding of the concepts (N=194, M=4.09). The ability to collaborate with my peers is necessary if I am to be successful as a student (N=194, M=4.34). The TBL format was helpful in developing my information synthesizing skills (N=194, M=4.00). There was mutual respect for other teammates’ viewpoints during TBL (N=194, M=4.16). I learned more in this TBL course section than if it was taught in the non-TBL lecture format (N=187, M=3.91). Additionally students were asked what they anticipated their final grade would be in the class. Responses were recorded as A=1, B=2, C=3, D=4, and F=5. Ninety-six or 50% believed they would receive an A, 79 or 41% estimated they would receive a B, and 17 or 9% a C. None of the students anticipated their grade to be a D or F (see Appendix B). The total of the three-years anticipated grade responses were used in a one-way repeated measures ANOVA, with Posthoc Beferroni corrections to control for anticipated grade measures. Responses to question seven (N=194, M=3.02) “I learn better from lecture presentations than small group activities” which was provided by the group estimating their grade to be a C (N=17, M=3.82), the lowest grade estimated by students, was the only set of responses with statistical significance (P=.009) when compared to students estimating their grade to be an A (N=96, M=2.93) or a B (N=79, M=2.92), see Table 2.

Table 2. Responses to Question 7 by Anticipated Grade in Course



Note. Anticipated grade A=1, B=2, C=3

Student response to question 1=strongly disagree, 2=disagree, 3=neutral, 4=agree, and 5=strongly agree.

DISCUSSION

Active learning has been an academic “buzzword” within higher education for decades with faculty being encouraged to seek innovative alternatives to traditional lectures. Despite literature on active learning that outlines smart practices with effectiveness data, the inclination and practice of delivering passive instruction as the sole classroom strategy remains prevalent in higher education (Baggett, 2016). In an effort to encourage deeper learning and professional development, faculty are encouraged to apply alternative strategies (such as TBL) that may strengthen homeland security related instruction and learning.

As outlined in this article, TBL is a form of active learning that utilizes the main components of constructivist learning in which the faculty is a guide to facilitate learning in an environment where learners should encounter inconsistencies between preconceptions and new experiences to provide a basis for development of new understandings (Hrynychak & Batty, 2012). While the research presented is not generalizable to all undergraduate students, or even all undergraduate homeland security students, it does provide insights to faculty members considering an alternative to traditional lecture based instruction. Further, it provides a method in which critical and creative thinking (two essential skills for homeland security practitioners) can be applied in the higher education classroom with research indicating that TBL increases learning in subjects with higher complexity (Peterson, 2012).

Further, TBL can also further develop student collaboration skills and enhance social development (Johnson, Johnson & Smith, 2007). In the current social media era, the ability to demonstrate social/emotional intelligence and oral communication skills is a challenge for some

students. The ability to not only guide students in learning and applying a content area while cultivating a life skill such as teamwork is of tremendous value.

In closing, faculty has a variety of pedagogical approaches available with the end goal of ensuring student learning occurs and preparation for future careers in the discipline. While the practice of traditional lecture still has a place in a university classroom, faculty are encouraged to experiment with different approaches (such as TBL) to determine the ones that are most effective for each of their various courses. It should be noted that all active learning are not applicable across the board. The course topic, duration and other characteristics make some strategies more effective than others. When faculty discovers the strategies that are most effective for their courses, they will undoubtedly witness student deeper learning, comprehension, analysis and application (Baggett, 2016).

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APPENDIX A

Team-Based Learning (TBL) Survey
(derived from Vasan, N.S., DeFouw, D.O. & Compton, S., 2009)

COURSE: _____ HLS 391 or _____ HLS 401

Please answer the following questions using the following scale (circle one number for each question):

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

- | | |
|--|-----------|
| 1. TBL helped me increase my understanding of the course material. | 1 2 3 4 5 |
| 2. I have completed 100% of the required reading. | 1 2 3 4 5 |
| 3. The TBL format helped me to focus on core information. | 1 2 3 4 5 |
| 4. Individual readiness assurance tests (iRAT) were useful learning activities. | 1 2 3 4 5 |
| 5. I generally felt prepared for the iRAT. | 1 2 3 4 5 |
| 6. Discussions of the TBL learning issues were useful learning activities. | 1 2 3 4 5 |
| 7. I learn better from lecture presentations than small group activities. | 1 2 3 4 5 |
| 8. Solving problems in a group is an effective way to learn. | 1 2 3 4 5 |
| 9. I learned additional information during the team readiness assurance tests (tRAT). | 1 2 3 4 5 |
| 10. The TBL instructional day improved my understanding of the concepts. | 1 2 3 4 5 |
| 11. I have a positive attitude about working with my peers. | 1 2 3 4 5 |
| 12. I found the TBL planning days very productive. | 1 2 3 4 5 |
| 13. Preparing the TBL team presentations improved my understanding of the concepts. | 1 2 3 4 5 |
| 14. The ability to collaborate with my peers is necessary if I am to be successful as a student. | 1 2 3 4 5 |
| 15. Solving problems in a group is an effective way to practice what I have learned. | 1 2 3 4 5 |
| 16. My team worked well together. | 1 2 3 4 5 |

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17. I contributed meaningfully to the TBL discussions. 1 2 3 4 5
18. Most students were attentive during TBL sessions. 1 2 3 4 5
19. I paid attention most of the time during the TBL sessions. 1 2 3 4 5
20. The TBL format was helpful in developing my information synthesizing skills. 1 2 3 4 5
21. There was mutual respect for other teammates' viewpoints during TBL. 1 2 3 4 5
22. My approximate anticipated grade in this course is: A B C D F
23. Please comment on the following areas based on your experience in this TBL course format versus other non-TBL upper division (300-400 level) courses you have taken:
- Did you engage more with the course materials (readings, handouts, presentations, projects) in this TBL course or in non-TBL courses? Please explain your answer.
 - On average, how many hours per week did you work on:
 - * This TBL course _____
 - * Non-TBL courses _____
 - Did this TBL course improve your ability to work in a team? Please explain your answer.
24. What do you evaluate are the strengths of the TBL format?
25. What do you evaluate are the weaknesses of the TBL format?
26. On the following scale, please evaluate the statement "***I learned more in this TBL course section than if it was taught in the non-TBL lecture format.***" (Circle one number.)

1	2	3	4	5
Strongly Disagree	Disagree	Neutral	Agree	Strongly Agree

APPENDIX B*Table 3. TBL Survey Results*

The five-point questions below were rated on a scale of 1-5
(1 = strongly disagree, 2 = disagree, 3 = neutral, 4 = agree, and 5 = strongly agree)

#	Question	2015 Mean	N	S.D.	2016 Mean	N	S.D.	2017 Mean	N	S.D.	Total Mean	N	S.D.
1	TBL helped me increase my understanding of the course material.	3.84	79	.95	3.59	64	1.04	4.14	50	.83	3.83	193	.97
2	I have completed 100% of the required reading.	3.11	80	1.18	3.03	64	1.25	3.10	50	1.13	3.08	194	1.18
3	The TBL format helped me to focus on core information.	3.82	79	.96	3.67	64	.94	4.08	49	.84	3.84	192	.93
4	Individual readiness assurance tests (iRAT) were useful learning activities.	3.81	80	1.06	3.48	64	1.20	3.94	50	.74	3.74	194	1.05
5	I generally felt prepared for the iRAT.	3.23	80	.98	3.06	64	1.11	3.56	50	.84	3.28	194	1.01
6	Discussions of the TBL learning issues were useful learning activities.	3.76	80	.82	3.75	64	1.01	3.96	50	.88	3.81	194	.90
7	I learn better from lecture presentations than small group activities.	3.05	80	1.19	3.19	64	1.17	2.74	50	1.08	3.02	194	1.16
8	Solving problems in a group is an effective way to learn.	4.11	80	.93	3.92	64	.97	4.24	50	.87	4.08	194	.93
9	I learned additional information during the team readiness assurance tests (tRAT).	3.98	80	1.01	3.55	64	1.13	4.18	50	.75	3.89	194	1.02
10	The TBL instructional day improved my understanding of the concepts.	4.0	80	.99	3.67	64	1.07	4.06	50	.82	3.91	194	.99

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11	I have a positive attitude about working with my peers.	3.93	80	1.13	4.09	64	.83	4.12	50	.96	4.03	194	1.03
12	I found the TBL planning days very productive.	4.05	80	1.13	4.06	64	.96	4.20	50	.93	3.99	194	1.03
13	Preparing the TBL team presentations improved my understanding of the concepts.	4.05	80	.87	3.98	64	.97	4.30	50	.84	4.09	194	.90
14	The ability to collaborate with my peers is necessary if I am to be successful as a student.	4.33	80	.73	4.17	64	.92	4.56	50	.73	4.34	194	.81
15	Solving problems in a group is an effective way to practice what I have learned.	4.26	80	.84	4.09	64	1.02	4.28	50	.93	4.21	194	.92
16	My team worked well together.	4.03	80	1.08	4.03	64	1.23	4.06	50	.94	4.04	194	1.09
17	I contributed meaningfully to the TBL discussions.	4.21	80	.72	4.02	64	.75	4.34	50	.59	4.18	194	.71
18	Most students were attentive during TBL sessions.	3.63	80	.85	3.41	64	1.19	3.90	50	.95	3.62	194	1.01
19	I paid attention most of the time during the TBL sessions.	4.15	79	.66	4.05	64	1.05	4.34	50	.66	4.17	193	.81
20	The TBL format was helpful in developing my information synthesizing skills.	4.04	80	.74	3.77	64	1.02	4.24	50	.77	4.00	194	.86
21	There was mutual respect for other teammates' viewpoints during TBL.	4.14	80	.78	4.11	64	1.04	4.28	50	.78	4.16	194	.87
22	I learned more in this TBL course section than if it was taught in the non-TBL lecture format.	3.80	74	1.07	3.75	63	1.08	4.28	50	.93	3.91	187	1.06
23	My anticipated grade in this course is: (A=1) (B=2) (C=3) (D=4) (F=5)	1.59	79	.63	1.61	64	.76	1.55	49	.58	1.59	192	.65