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Keyu Jiang

Mark Bannister

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# USING A CUTTING THE CAKE PEER ASSESSMENT METHOD IN A LEADERSHIP IN INFORMATION NETWORKING AND TELECOMMUNICATIONS COURSE

Keyu Jiang and Mark Bannister

*To satisfy the increasing demands of various group-based dynamic studies, we have developed a variant classroom assessment technique that synthesizes different grading systems, such as a criterion-referenced system, norm-referenced system, peer grading and their modification. This paper describes the Cut-the-Cake Grading Method through the introduction of our implementation and its comparison with other assessment methods.*

## INTRODUCTION

Today more and more faculty members are aware that: "learning is not a spectator sport. Students do not learn much just by sitting in class listening to teachers, memorizing prepackaged assignments, and spitting out answers. They must talk about what they are learning, write about it, relate it to past experiences, and apply it to their daily lives. They must make what they learn part of themselves" (Chickering and Gamson, 1987). Therefore, the most commonly used form of assessment in higher education, paper-and-pencil objective tests, fails to keep pace with the development of active learning, especially with higher level of risk involved, such as role playing, small-group presentations, and projects. Some of the basic assessment methods, such as performance assessments, oral questions, and portfolios are introduced to assess a student's performance and provide feedback based upon their work in a student-oriented practice learning class within a rapidly changing environment. A successful grading system should be a clear and fair grading system which both encourages students to achieve the course objective maximally and reduces the workload of faculty minimally. Hereby, we adopted a Cut-the-Cake Peer Assessment Method which successfully synthesizes different grading systems, such as criterion-referenced system, norm-referenced system, peer grading and their modification.

## PREMISE AND SCHEME

The object of the course is to let the students experience and demonstrate tacit and explicit knowledge of a subject by participating in group-based learning, thus the Cut-the Cake

Peer Assessment Method is suitable for active group learning, especially a capstone or other major team project. According to Benjamin Bloom's level of learning, we emphasize in our classes the middle level of "application" and "analysis" to the upper order levels of "synthesis" and "evaluation," rather than lower order levels of "knowledge" and "comprehension" (Bloom, 1956). For example, INT 430 Leadership in Information Networking is designed for interpenetrating both tacit and explicit knowledge of leadership, and teaching students to learn not only what leadership is, but how to be a leader. Our target is to make unconscious or conscious but non-verbal knowledge "explicit" so that we can review, correct and grade critical inarticulate knowledge of leadership. Assigned reading, class discussions, and one-on-one interviews of successful business or media leaders provide a knowledge base for students. Case studies and development of a business plan with a team are designed to develop application, analysis and synthesis. To achieve that, we need a grading system covering quality/quantity of individual leadership performance, team performance, and the reflection of that dynamic relationship. The Cut-the-Cake Grading Method is applied to small group learning and group competition in the classroom. The number of students in the class has been approximately 30 with this number divided into five teams with the goal that the difference in members in each team would not be more than one person.

The main Cut-the-Cake Grading Procedure and instructions are listed in the following table:

**Table 1: Grading Procedure and Instructions**

| Stage | Grading procedure | Measure | Output |
|---|---|---|---|
| Plan Assessment | Cut-the-Cake Grading Criteria creation | Team/Cross-team/Class debate or meeting | Master list of grading criteria |
| Do Evaluation | Inside team Cut-the-Cake Grading | Inside Team meeting | Inside team member score |
| | Cross team Cut-the-Cake Grading | Cross-team debate and presentation | Team score |
| Check evaluation | Individual Check to final Cut-the-Cake Score | Quiz and exit exam | Final score |
| | Anchor Cut-the-Cake Score | Instructor's necessary Balance | |

Following this procedure our intent has been to ensure use of a well-devised scoring scheme to cover every stage of dynamic learning. Each stage and its features are introduced below.

## MODIFY CRITERION-REFERENCED SYSTEMS FOR CUT-THE-CAKE GRADING CRITERIA STIPULATION

A criterion-referenced test is one that provides for translation of the test score into a statement about the behavior to be expected of a person with that score, or that person's relationship to a specified subject matter (Dochy, Segers, and Sluijsmans, 1999). Our Criterion-referenced tests measure students by listing class objectives and assigning grades based on the extent to which the students achieved them. The objective is simply to demonstrate whether or not the students have learned the course material and the depth of their understanding.

### Possible Modifications

At the beginning of class, the instructor is responsible for introducing the grading categories rubric, which will ensure that the following peer grading meets the objective. Students are required to come up with several questions within the grading criteria standard for each task and consentaneous grading subtitles and styles through group discussion. They then rate their answer to that question on a scale from one to five to ensure Cut-the-Cake grading validity and reliability.

### The Advantage of Modification

The advantage for student participation in the early stage of the Cut-the-Cake Peer Assessment Method is that criteria stipulation will allow students to have a sense of mastery as to how they perform in this class and also allow the instructor to analyze the students' current knowledge and skills for the purpose of identifying a suitable change of program and checking evaluations in a later stage.

For each individual performance within a team, grading subtitles and style should be approved by team members during an internal meeting. For team competition task performance, grading subtitles and style should be agreed upon during a cross-team meeting attended by individual team members elected by members within each team. Students will grade each team individually according to the consensus objective standard without comparing the other teams. This facilitates equal grading among the teams.

By participating in stipulation creation of the grading rubric, students are more apt to perform better because they know how to earn the optimal score. Some students will grasp a chance to show their leadership during the grading

criteria stipulation debates or meetings. Many former students reflected on this during their exit interview stating they had a sense of mastery as to how they would perform in this class.

As the procedure is 100% student driven, this frees the instructor to put more effort in observation of each individual's performance, such as the content of his or her presentations, his or her public speaking and teamwork skills. Students are asked to not only understand the Cut-the-Cake rule and reach criterion-referenced agreement, but also to nominate an individual in the team to be the star member carrying additional leadership responsibilities. Being a star member earns extra credit points at the end of the semester.

## THE CHARACTERISTIC OF TEAM CUT-THE-CAKE GRADING

### Evolution Peer Assessment Method for Inside Team Cut-the-Cake Grading

The use of peer assessment, in which students rate each of their fellow group members according to their perceived contribution, has been widely used as a means of establishing an individual's contribution (Dochy, Segers, & Sluijsmans, 1999). It has generally been found that peer assessment by students produces very similar results to assessment by lecturers (Orpen, 1982) and has the added benefit of promoting a sense of responsibility and involvement in the work (Weaver & Cotrell, 1986). To avoid various potential biases within the students' ratings, we developed the Cut-the-Cake Peer Assessment Method.

The Cut-the-Cake Peer Assessment Method can be simply summarized in this way: those who make the most contribution will get the best reward. The following example illustrates the method. Each student within the group has 100 points to divide between all team members according to their performance. Students are to divide the points based on the agreed upon criteria. Let us say that there are four students in a group which makes 400 points available to the entire team. Student A, worked extremely hard and led the group throughout the project, the students peers decide that he or she should be awarded 110 points for providing a contribution of extra leadership to the group. Students B and C, contributed what was required of their positions, and would be awarded 100 points each for sharing equal workload. Student D did not put in as much effort as the rest of the group would be awarded 90 points after the task was completed. This differs from the traditional academic group or team grading method of assigning the same grade to all team members.

**Inside Cut-the-Cake Example**
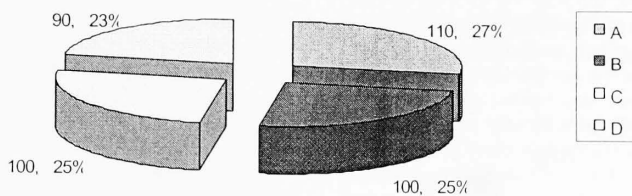


Students are required to carefully consider both the evidence and criteria upon which they are making their judgments. Instead of an anonymous grading method, the Cut-the-Cake Peer Assessment system uses a transparent system in which students rate each other according to the objective criterion-referenced system devised by the students. The Cut-the-Cake Peer Assessment focuses on more than just a procedure for grading students; it forms part of the learning experience in itself. The peer grade would not only consist of a figure but also includes comments for review on a Strengths, Weaknesses, Opportunities, Threats (SWOT) analysis, so that each member has chance to review and improve him or herself and to enable the team to win in the next stage. Although in this stage students are competing with each other, they are more likely to actively help each other learn because their ultimate task is to win the biggest cake in the class.

### Introduce Norm-Referenced Systems for Cross Team Cut-the-Cake Grading

A norm-referenced test (NRT) is a type of test, assessment, or evaluation in which the tested individual is compared to a sample of his or her peers (referred to as a "normative sample") ( Huitt, 1996). In norm-referenced systems students are evaluated in relationship to one another.

In order to get a final grade on each proposal, we should judge the performance of the four teams based on an assumed 90, 80, 70, 60 scale, which might be further adjusted in the event that two scores were too close to tell, for example Team A scored 90 points and Team B scored 87. The number one ranked team would take the full 90 points. Once the team score is assigned, we would multiply the Cut-the-Cake scores by the team score and then divided by 100. This means that if a student wants to achieve 100%, he or she must score more than 110% on their Cut-the-Cake scores and the student's team would have to receive the best comparative score between the groups. The following graph illustrates the formula.
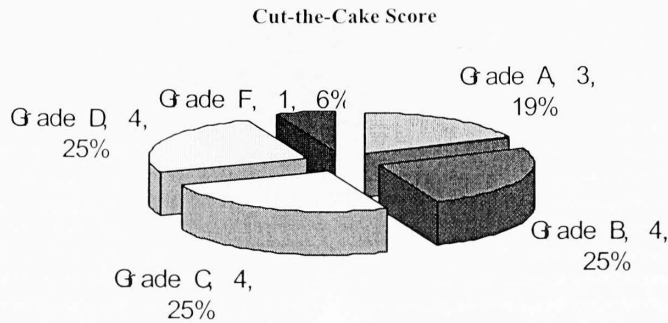
$$Formula = \frac{Team\ Score\ \times\ Inside\ Cut\text{-}the\text{-}Cake\ score}{100}$$

Use of the Cut-the-Cake Peer Assessment rewards effective individual and team performance and produces an equitable grade distribution. More importantly, this is real world scenario learning. It allows students to experience the fundamental idea in leadership that no "dream team" can achieve 100%, but an outstanding member of a team can score higher than 100% by receiving a bigger piece of the cake by working in or leading an outstanding team. In the end, the students' score did not always match up to the efforts devoted.

**Table 2: Example**

| Team | | W | | | | X | | | |
|---|---|---|---|---|---|---|---|---|---|
| Student | | A1 | A2 | A3 | A4 | B1 | B2 | B3 | B4 |
| Cut-the-Cake Score | Inside | 110 | 100 | 100 | 90 | 110 | 100 | 100 | 90 |
| | Team | 90 | 90 | 90 | 90 | 80 | 80 | 80 | 80 |
| | Individual | 99 | 90 | 90 | 81 | 88 | 80 | 80 | 72 |
| Team | | Y | | | | Z | | | |
| Student | | C1 | C2 | C3 | C4 | D1 | D2 | D3 | D4 |
| Cut-the-Cake Score | Inside | 110 | 100 | 100 | 90 | 110 | 100 | 100 | 90 |
| | Team | 70 | 70 | 70 | 70 | 60 | 60 | 60 | 60 |
| | Individual | 77 | 70 | 70 | 63 | 66 | 60 | 60 | 54 |

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The following graphic illustrates the resulting project grade distribution:

**Cut-the-Cake Score**



## CHECK METHODS FOR CUT-THE-CAKE GRADING TO ENSURE VALIDITY AND RELIABILITY

In this system the instructor usually determines the percentage of students assigned each letter grade, although it may be determined (or at least influenced) by departmental policy. Supplemental assessment methods have been adopted to make tacit knowledge explicit through direct or indirect communication between students and instructor. The instructor will correct unfair treatment under the shelter of the democratic Cut-the-Cake method, while respecting the student's characteristics and self-determination, and worked to assure the consistency of an assessment through balance score options, which include but are not limited to quizzes, the final exam, and extra rewards listed below.

### Quizzes – Ask Students to Submit Possible Exam Questions

Asking students to submit possible exam questions which are shared with the full class provides a good opportunity for other students to better understand the subject matter. Sharing an array of student developed questions also helps students to review, correct and to criticize. In our experience this allows the instructor to get a good sense of the types of questions students expect to be on the test. The submitted questions provide the instructor with feedback on his or her effectiveness in covering course objectives and whether students are focusing on key concepts. From a practical standpoint, the instructor has the option to adapt or revise some of the questions submitted, or file them away for possible future use. Experience with this process shows that many students tend to submit questions that focus on memorizing minutia instead of bigger picture issues, complex topics, or important concepts. Students tend to offer questions with clearly identified answers as opposed to questions that require synthesis and analysis. This requires that an instructor must carefully select questions

and to provide feedback as to why questions range in quality or were selected for the exam.

### Final Exam – Allow Students to Comment on Test Questions

The final exam used in INT 430 Leadership in INT is in a creative form of face-to-face interviews, which places emphasis on an individual's personal accomplishments, providing students with a fair chance to show what they have learned throughout the course. These open questions are deeply rooted from the course, however students are expected not only to give the right answer to the question, but also present their unique opinions demonstrating application and synthesis. A specific goal of this set of interview questions is to seek innovative solutions to problems. Obviously, a person who never gives an original view can not be regarded as potential innovator, which is a valued characteristic for a successful leader. Moreover, this interview process intended to let students benefit from developing a comfort level with interviewing, in anticipation that they will participate in high stakes interviews with a future employers soon.

### Other Balance Score – Ask for Feedback About the Exam

The purpose of the balance score is to ensure that each individual is equally graded without discrimination and to eliminate the nonconformities. The balance score is a subjective observation of activities from grading rules creation participation to the final exam, or an objective performance such as being elected as star member of the team. Points are also awarded for leading activities on and off campus with the goal of encouraging students to practice leadership outside the classroom. Students are allowed balance score points of 1% for each activity or contribution, up to 20% of the total grade.

Every student is required to submit an exit essay to show his or her attitude toward this course, such as I liked this course, or I hated this course, or if I had taught this

course; and present their related conclusion, such as: What methods did you like or dislike? Would you change the grading? Did the class structure work? Why or why not? Do you feel you are better prepared for the Capstone course in Information Networking? Explain your thoughts on what it takes to be a leader? When should you initiate an organizational change? This review procedure gives students a final chance to defend themselves and leave some valued suggestion for future course instruction improvement.

## Anchoring by Instructor

After teaching multi-section courses several times using the same or an equivalent grading system, the distribution of test scores accumulated can serve as the anchor. Comparing the outcome of a present class with this cumulative distribution, the instructor would judge the ability level of the group and better appropriate allocation of grades. Anchoring can be used to reveal whether and how the class groups differ in achievement and the comparability of grades in different historical periods to prevent grade deviation, especially grade inflation.

### Table 3: Anchoring

| Anchor | Content-Referenced |
|--------|--------------------|
| ++ | Achieved much above the level of the curriculum expectation |
| + | Achieved above the level of the curriculum expectation |
| 0 | Achieved the level of the curriculum expectation |
| - | Achieved below the level of the curriculum expectation |
| -- | Achieved much below the level of curriculum expectation |

## CONCLUSION

The Cut-the-Cake Peer Assessment grading method helps motivate students to win biggest slice of cake for their team and benefit themselves by reinforcing their learning, while at the same time allowing the instructor to assess their mastery of content, receive feedback on teaching and keep the Cut-the-Cake reliable from class to class.

## REFERENCES

Bloom, B.S. 1956. **Taxonomy of Educational Objectives: The Classification of Educational Goals**, 201-207.

Chickering, Arthur W., and Gamson, Zelda F., 1987. Seven Principles for Good Practice, **AAHE Bulletin**, 39: 3-7.

Dochy, F. Segers, M. and Sluijsmans, D., 1999. The use of self, peer and co-assessment in Higher Education: A review, **Studies in Higher Education**, 24(3), 331-350.

Glaser, R. 1963. Instructional technology and the measurement of learning outcomes. **American Psychologist**, 18, 510-522..

Huitt, W. 1996. Measurement and evaluation: Criterion-versus norm-referenced testing. **Educational Psychology Interactive**. Valdosta, GA: Valdosta State University. Retrieved [April 12, 2008), from http://chiron.valdosta.edu/whuitt/col/measeval/crnmref.html.

Orpen, C. 1982. Student versus lecturer assessment of learning: a research note. **Higher Education**, 11, 567-572.

Weaver, W. and Cotrell, H.W. 1986. Peer evaluation: a case study. **Innovative Higher Education**, 11(1), 25-39.

**Dr. Keyu Jiang** is an Assistant Professor at Fort Hays State University where he leads the Information Assurance Program within the Department of Information Networking and Telecommunications. He is also a lead Research Fellow in the Department of Information, Networking and Telecommunications. Dr. Jiang has published widely. His research interests include information assurance, distributed system computing and organizational management. He has conducted sponsored research for DARPA and NASA. He has an impressive background in conducting research for both government and private industry. He has multiple patents. One of these was the basis for a successful business of which he was CEO before selling it and returning to academia. He obtained his Ph.D. in Computer Science from Arizona State University in 2001.

**Mark Bannister** is the Chair of the Department of Information Networking and Telecommunications and Director of the Information Enterprise Institute at Fort Hays State University. He is also a Senior Policy Fellow of the Docking Institute of Public Affairs. Bannister teaches course work on legal issues and management of information technologies. Bannister supervises and participates in research and programming on telecommunications, strategic planning, and community

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development. Bannister has published academic articles in publications including The Federal Communications Law Journal, Economic Development Review, Economic Development Journal, Kansas Policy Review, and the Kansas Business Review. His writing and research focuses on telecommunications and technology regulation, intellectual property, information security, and economic development. As Chair of the Department of Information Networking and Telecommunications, he has overseen the growth of the program from 58 undergraduate students in 1999 to more than 300 current undergraduate and graduate students. The Department was named the "Outstanding Undergraduate Program of the Year" in 2008 by the International Telecommunications Education and Research Association. Bannister served as Director of the Docking Institute of Public Affairs and Executive Assistant/General Counsel to the President of Fort Hays State University. Prior to arriving at Fort Hays State University, Bannister served professionally as Chief of Staff for the Kansas Senate President and as Associate General Counsel to the Kansas Board of Regents. Bannister earned a Juris Doctorate in Law and a Masters of Communication Studies from the University of Kansas. His Bachelors degree is from Fort Hays State University. Bannister has been recognized by the International Telecommunications Education and Research Association as a Senior Fellow.