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Gary Stark
Northern Michigan University, gstark@nmu.edu

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STOP "GOING OVER" EXAMS! THE MULTIPLE BENEFITS OF TEAM EXAMS

Gary Stark
Northern Michigan University

This article describes the use of team exams as a means of postexam feedback and explains the benefits of their use. Team exams are a simple procedure for those who use exams in their classrooms. Team exams can be a valuable experiential exercise in management classes but offer educational benefits in any class. Among the benefits of team exams are accurate feedback and active engagement of students in postexam review. Team exams can also serve to check the validity of exam questions and reduce the angst often associated with "going over" exams.

Keywords: *teams; exams; feedback; experiential*

Several years of teaching and being around teachers has taught me that one unpleasant aspect of our profession, for those of us who give exams, is the postexam review, also known as "going over" the exam. Typically in this process the instructor announces the "correct" answers, and discussion ensues as to why certain answers may or may not be better than others. Understandably this instructor-led activity can sometimes be contentious. Students, under pressure to do well in school, are quick to point out perceived flaws in the exam that may have harmed their grades. Instructors, who often regard themselves as competent creators of fair exams, may react defensively to criticisms of their exams. Still, some sort of postexam feedback for students, such as "going over" exams, seems advisable; students should know what questions they missed and why.

This article describes an alternative method of postexam review—the team exam. Team exams make postexam feedback more of a student-directed and student-centered activity. As such, team exams offer educational benefits such as allowing students to make maximum use of the brainpower of classmates to discover why answers are as they are. At the same time, team exams can be an especially meaningful experiential exercise for teaching the value of teams. Finally, team exams offer administrative benefits such as making postexam review more enjoyable and serving to check the validity of test questions. The goal of this article is to describe the administration of team exams and more fully explain the benefits of team exams as a tool for postexam review.

Whither Exams?

Before proceeding toward the goals of this article, it is important to acknowledge that exams themselves are not universally accepted as an effective tool for teaching and assessment, especially for higher cognitive levels. A common perception is that exams generally only test as high as the comprehension level of Bloom's taxonomy of educational objectives (Bloom, 1956). The issue of cognitive level is not settled as there is evidence that exams can be created to test at least as high as the analysis level (cf. Simkin & Kuechler, 2005). Whatever their purposes or cognitive level, exams *are* commonly used in education, often in conjunction with methods more commonly thought to assess higher cognitive levels (e.g., papers, presentations). Team exams may be used for exams aimed at any cognitive level.

Administering the Team Exam

The administration of team exams is fairly simple as it requires no special preparation beyond normal exam writing, with perhaps the exception of creating teams in advance of the team exam. Briefly, an exam is administered to individuals, and later the same exam is administered to teams.

First, the instructor administers the exam to individuals the "traditional way." The individuals' exams may be graded before or after the team exam; however, it is important that the individuals' exams are graded at some point as this increases individual accountability and norms of participation (Feldman, 1984).

Although not completely necessary, students seem to benefit from being reminded of their individual answers when they take the team exam. Perhaps the best way to provide students their original answers during the team exam is to ask them to provide answers for the individual exam on a separate sheet (e.g., a bubble answer sheet) and also written on the exam itself. The answer

sheet is graded, and the exam itself is used by the individuals for reference as they take the team exam. Providing students with their individual answer sheets during the team exam (as opposed to providing them with the reference exam during the team exam) can be problematic. If the individual answer sheet is graded, students will already know the answers to the team exam (the questions on the team exam are the same as the individual exam) and not benefit from the back-and-forth that normally takes place as they argue their answers for the team exam. If the individual exam or answer sheet is ungraded there is the opportunity or temptation for students to change their individual answers as they take the team exam.

After the individual exam is completed (the next class session or later in the same class session) the exams (used for reference), but not the answer sheets, are returned to individuals. Instructors may find it easier to return exams to students before they assemble in teams as the students may be easier to find in their "normal" seats. Students are then directed to assemble into teams. Preassigned teams may allow instructors the ability to build certain characteristics, such as diversity, into the team. However, most benefits of team exams will not be lost if students are allowed to form their own teams except, arguably, the benefit of more diverse viewpoints in each team.

Each team is provided with one answer sheet, rather than one answer sheet per individual. All students in the team are asked to place their names on the answer sheet. Recall that at this point all individuals have their exams to use as reference. Finally, the team answers the test questions as a team on the team answer sheet.

In summary, students take the exam as individuals, the individuals' exams are graded at any point, and then teams take the same exam as the individuals did.

POINT VALUES AND TEAM SIZE

I typically limit team sizes to three to five members to allow each member opportunities for input. As for points allocated to team exams, I have varied them from 13% to 42% of the point value of the individual exam. I was originally surprised to find that such variations had little effect on team exam scores and on student reactions to team exams. At each point value I have observed that students engage each other in serious discussion of the material to the same end—that of understanding the material better than they did before. I have been delighted by students' intellectual debates about the nuances of difficult material and the "aha" moments when a group member understands a concept he or she did not understand before. I no longer regard the noneffect of exam values on success as a surprise. Rather, I take it as evidence that it is the student-centered nature of this exercise that makes it effective, not the points.

CONTRAST TO "TEAM LEARNING"

Larry Michaelsen and his colleagues have done a great deal of research to demonstrate the benefits of a course system they call "team learning" (cf. Michaelsen, Fink, & Knight, 1997). Team exams are different from team learning. Team learning requires a fundamental rethinking and retooling of most courses as teams are integrated into nearly every activity in the course from readiness assessment to learning activities to final assessment. At first glance, team exams may seem identical to team learning; however, it is important to recognize that team exams focus on postexam review and feedback. Thus, team exams can be used in any class structure that uses exams. Team exams do not require the fundamental rethinking and retooling of the course structure that team learning does.

Team Exams as Experiential Management Learning

As I discuss the multiple benefits of team exams throughout this article I hope it becomes clear that they may be of value in any course, discipline, or curriculum. However, team exams seem to be especially useful for courses in management because team exams provide a natural experiential exercise in group performance.

Although my students almost always warm to the idea of team exams, they are often initially resistant to groupwork because of bad experiences, such as social loafing, in previous groups. It is difficult to teach students the value of working in teams when a great number of their group experiences have been bad. Indeed, in spite of conventional wisdom that groups outperform individuals, research shows that performance on many team tasks is often no better than that of the best-performing individual in the team (cf. Libby, Trotman, & Zimmer, 1987). Work by Michaelsen and his colleagues (Michaelsen et al., 1997; Michaelsen, Watson, & Black, 1989) and by Stasson and Bradshaw (1995) reconcile the opposing arguments about the superiority of group performance by identifying the conditions wherein teams work best and outperform individuals. I believe that team exams are effective because they meet many of these conditions (identified below). My careful observation of the teams during team exams reveals very little social loafing, suggesting at least an implicit recognition by students that team exam conditions favor all members' active participation.

Among the conditions that favor group performance are multipart tasks. Teams outperform the best individuals on multiquestion exams (a multipart task) because the best individual on the overall exam (the student with the highest score) will generally not be the best individual on every question (Stasson & Bradshaw, 1995). This suggests that weaknesses by the "best performer" can be complemented by other group members' strengths. My

analysis of more than 1,000 group exam scores reveals that in less than 1% of cases did the highest performer on the exam outperform his or her group.

Another condition that favors group performance is a task that is complex, integrative, and requires a concrete solution (Hill, 1982; Michaelsen et al., 1989). Challenging exam questions can certainly meet these conditions. The benefit of synergy is most likely to occur when group members can share knowledge reciprocally to select the correct answer to a problem (Stasson & Bradshaw, 1995). Team exams are designed specifically for such reciprocal sharing. In contrast, written papers often do not benefit as much from team work because writing is an inherently individual task that tends to encourage pooled (vs. reciprocal) interdependence (Michaelsen et al., 1997).

Work by Michaelsen and colleagues (Michaelsen et al., 1997; Michaelsen et al., 1989) suggests that teams work best with individual accountability and when the teams are rewarded as teams. With team exams, the individual accountability is accomplished by administering the individual exam first and making it clear that students are graded for their performance on the individual exams. Teams are rewarded for their performance on the team exam as each member receives the team's grade on the team exam.

In sum, it appears that students' bad experiences with previous teams may be the result of poorly conceived tasks. Evidence from teacher evaluations (see the appendix) indicate that students like and see the benefits of team exams. This provides evidence that the structure of team exams may be the type of task that teaches the value of teams.

Team Exams' Benefits for Learning in All Subjects

Team exams can be a valuable tool in any class (not just management) because they provide a number of conditions that help students learn, reinforce, and retain material.

ACCURATE FEEDBACK

When I first started doing team exams as a postexam review, my intent was to use the technique to allow students to provide postexam feedback to each other. Feedback is vital to learning (Gagne & Driscoll, 1988), and learning theorists (e.g., Astin, 1984) and motivational theorists (Hackman, 1987) indicate that student-centered or autonomous learning leads to improved performance and satisfaction. My experience with exams shows teams averaging scores of about 96% versus a 74% average for individuals. Given this high level of team performance it seems reasonable that teams are "correct" enough to be an accurate feedback mechanism. In fact, the teams will often

answer each others' questions more effectively than the instructor. Student comments reflect the power of teams as a feedback mechanism. For example, "The group exams allowed for a healthy debate during which learning was instilled. Perhaps how one student remembered to get it right made more sense than how it was presented or the notes reflected."

ACTIVE ENGAGEMENT IN LEARNING

Accurate feedback from any source is valuable. My experience and the research cited in the previous paragraph indicate that feedback from fellow students may be especially valuable. However, team exams offer an additional advantage over traditional forms of one-way communication feedback in that students are more actively involved in the feedback process; that is, students actively engage each other in working toward the correct test answers and, in the process, provide each other feedback on their original answers. This active engagement improves learning (Webb, Farivar, & Mastergeorge, 2002). Given this observation it is not surprising to find research that indicates that being tested on material (a form of active engagement and practice) can be as effective for learning material as time spent reviewing (Cull, 2000) or even studying (Dempster, 1992; Nungester & Duchastel, 1982). It is important to note, this testing benefit also holds for retesting previously tested material (Catanzano & Wilson, 1977; Rohm, Sparzo, & Bennett, 1986), which, of course, is the nature of team exams when used for postexam review. In particular, it seems that team exams help reduce the temptation of students to "dump" everything from their memory after an exam. The idea that team exams helps students learn, reinforce, and retain materials is supported by the following student comment and by comments in the appendix: "I think the group exams are great! Normally after a test I just forget everything that was tested over. With group exams I have to remember the material for a little longer and it sticks with me afterwards."

LEARNING BY EXPLAINING

It seems clear from my experience, from student comments, and from the cited research that team exams are beneficial to those who may not have understood the material during the individual exam but have it explained to them during the team exam. One more benefit of team exams beyond those that accrue to "explainees" is the benefit to "explainers." It is often said (and I am sure most of us have experienced) that the best way to learn something is to teach it. On a smaller scale that is exactly what is happening during group exams. Students must convince their peers that their answers are correct. The value to the "teacher" of this type of peer teaching is borne out in research in educational psychology that describes that as "explainers"

prepare their explanations to their team members this increases their own understanding (Bargh & Schul, 1980; Webb, 1989; Webb et al., 2002). This "explainer" benefit is echoed in the following student comment: "Personally, it really helped me to retain the information so much better when I was tested on it a second time. But also because if I disagreed with a team member I had to *persuade* them to pick 'my answer' through my knowledge of the subject. It really forced me to know what I was talking about."

Administrative Benefits

Certainly the greatest value in any learning exercise is how well it helps students learn the material. Team exams appear to be of value in that regard. Beyond that though, team exams offer a unique set of administrative benefits relative to "going over" exams. Namely team exams are efficient, offer a good way to check exam validity, and generally create a positive feeling about postexam review.

EFFICIENCY

I am often asked if I feel it is "worth it" to spend an entire class period (or, up to 75 minutes) on group exams. Part of my response is that before I used team exams for postexam feedback and review I would often spend as much as an entire class period "going over" an exam. The point here is that one benefit of team exams is efficiency. I get the benefits that team exams provide over "going over" the exam without spending much, if any, more time than I would "going over" the exam.

VALIDITY CHECK

As mentioned earlier, teams score an average of 96% of the total points available on exams. With such a high success rate, it is instructive to examine the exam questions that teams miss. I find that about one half of these exam questions, namely the questions that almost every team misses, are of suspect validity (the other one half, the questions that are missed by some, but not most teams, do not show any consistent pattern). In fact, the questions that most groups miss are usually the same questions that statistical analysis of the individual exams suggests are the questions with the lowest validity; that is, the questions that most teams miss are often not very good exam questions. This points out an important administrative benefit of team exams. Team exams help diagnose the validity of exam questions. I spend time with each team during the team exams listening carefully to how they explain their answers to each other. Often the questions that teams struggle to explain are the questions that most teams miss, and this leads me to listen more closely to judge the

questions' validity. For example, if there is considerable argument over interpretation of the question I may have not made the question clear enough.

In effect, each team member in each team is working as rater a to determine each question's interrater reliability. If several different raters (students) disagree on the exam question, it is a sign that the exam question may not be doing its job. There are other ways to determine the validity of exam questions (e.g., statistically) and, of course, the teams' discussion is not the ultimate validity check; however, team exams provide one further piece of evidence not easily available in other forms of postexam review.

PLEASANT MOOD

A final benefit that team exams bring is the more pleasant moods surrounding the postexam review. As suggested in the introduction to this article, perhaps one of the greatest benefits to team exams is no longer having to dread "going over" exams. Part of this positive mood may have to do with the fact that students are not shocked by their grades since they begin to estimate their grades during the course of the team exam. Furthermore, as students collaboratively learn from their groups they also understand why they've missed each question as they review it rather than just that they have missed a question. Finally, the fact that team exams create a student-directed review means that the instructor is reduced to an authority figure. An exam situation inherently holds the instructor in a high control position, and if we want students to gain control over their situation then team exams can help. Students' enjoyment of the team exam process is reflected in several of the quotes throughout this article and in the appendix. Perhaps the strongest statement is from a student who wrote, "I told some of my other friends about the group exams and why you said you use them, every single one said that they agreed and wished their professors would use them."

Appendix
Representative Student Comments About Team Exams

"Group tests were very effective in the learning process. This worked well to reinforce the material learned."

"Group tests were *awesome* in that it was a great way to reflect and truly answer the questions you were unsure of or missed on your own."

"I thought the group exams were effective. When I was wrong, I understood why and when I was right it helped reinforce my confidence."

"The group exams were very helpful—too often I take a test and do not know what I missed, why I missed it, etc. I had the chance with group exams to reconcile my 'problem questions.' Group exams cemented whole topics (in my mind). Being able to see the way other people in the group analyze questions was good for me too."

"The group exams helped to bring my grade up and brought up info again, but most of the time was spent arguing."

"Group exams were helpful in remembering the material. Also an effective example of conflict resolution."

"I think the group exams were helpful. They really give the chance to learn the material again and work with other team members to try to work out the answers when there is a conflict. Being able to talk through the objectives again is helpful in learning."

"At first I did not like group exams, but after I took the first one I understood why you use them. The group tests helped me understand the material much better."

"You got to hear and understand [other students'] thoughts on the subject. They also helped us see why another answer was more appropriate (on the ones missed)."

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