Efficiency Enhanced Course Bidding: Evidence From a Field Experiment at the University of Michigan Business School*

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Abstract

Allocation of course seats to students is a challenging task for registrars' offices in universities. Since demand exceeds supply for many courses, course allocation needs to be done equitably and efficiently. Many schools use bidding systems where student bids are used both to infer preferences over courses and to determine student priorities for courses. We report a field experiment done at the University of Michigan Business School in Spring 2004 comparing its typical course bidding mechanism with the alternate Pareto-dominant stable mechanism. Our results suggest that using the latter could vastly improve efficiency of course allocation systems.

*The experiment data can be dowloaded from world wide web at "`http://home.ku.edu.tr/~uunver/research/UMBSexperimentdata.xls`"

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1 Introduction

Registrars' offices at most universities face the daunting task of allocating course seats to students. Since the learning experience of students is a direct function of the courses they take, and demand for many courses often exceeds supply, it is important that courses are allocated equitably and efficiently across students. While many schools use preference revelation mechanisms to allocate courses (e.g., Stanford Business School, Harvard Business School), others use bidding mechanisms for the same purpose. Several schools have recently moved from preference revelation mechanisms to bidding mechanisms (e.g., the University of Michigan Business School), considering the latter superior in terms of efficiency. However under the bidding mechanisms bids are not only used to infer student preferences but also to determine student priorities for courses, and this dual role is a source of potential efficiency loss (Sönmez and Ünver [2003]). We report a field experiment carried out at the University of Michigan Business School (UMBS) immediately after the bidding period for the Spring 2004 semester. The experiment is designed to test whether typical bidding systems (in particular the UMBS mechanism) result in efficiency loss in real-life applications, and if so how much efficiency improvement can be obtained through a transition to the Pareto-dominant stable mechanism. We show that the current systems in place can be vastly improved in terms of efficiency, making a large proportion of students (approximately 20% in our study) better off. The key is "separating" the two roles of the bids by simply asking students to submit their preference ranking of the courses in addition to bidding for the courses. Since the student body across all universities numbers in the millions, our results have the potential to affect the learning experience of very large numbers of people.

The mechanism design approach has recently been very fruitful in similar real-life matching problems such as *two-sided matching markets* (Roth and Peranson [1999], Roth [2002]) and *school choice* (Abdulkadiroğlu and Sönmez [2003]). While there have been a number of controlled experiments on matching mechanisms (Kagel and Roth [2000], Ünver [2001], Haruvy, Roth and Ünver [2001], Chen and Sönmez [2002,2003] and McKinney, Niederle and Roth [2004]), this is the first field experiment in this area.

2 Currently Used Course Bidding Mechanisms

Many business schools including the University of Michigan Business School (UMBS), Kellogg Graduate School of Management at Northwestern, Johnson Graduate School of Management at Cornell, Columbia Business School, Haas School of Business at UC Berkeley, Yale School of Management, and Insead rely on versions of a bidding mechanism that we refer to as the **UMBS mechanism**. Some law schools too rely on bidding systems for course allocation, e.g., the School of Law at the University of Colorado at Boulder. Under this mechanism, each student is given a bid endowment $B > 0$ at the beginning of each semester. In order to keep the notation at a minimum, we assume that the bid endowment is the same for each student. This is the case at UMBS where we conducted our field experiment. Each student is asked to allocate her bid endowment among the courses, and once all bids are submitted, course seats are assigned to students as follows:

1. *All* bids for *all* courses and *all* students are ordered in a *single* list from highest to smallest. A tie-breaking lottery is used to determine the relative ordering of two bids of the same size.

2. Each bid is considered one at a time following the order in the list. When it is the turn of bid b_{ic} of student i for course c, the bid is **successful** if (a) course c still has unfilled seats, (b) student i still has unfilled slots in her schedule, and (c) course c does not conflict with any of the courses that are assigned to student i so far. If the bid is successful, then student i is assigned a seat at course c (i.e. the bid is honored) and the process proceeds with the next bid in the list. Otherwise student i is declined a seat at course c and the process continues with the next bid in the list.

3. When all bids are handled, a *schedule* is obtained for each student and a *course allocation* is hence obtained.

Bids have two roles under the UMBS mechanism:

1. Bids are used to infer student preferences over the courses. Consider the following statement from the guidelines for Allocation of Places in Oversubscribed Courses and Sections at the School of Law, University of Colorado at Boulder:

   Each student has 100 bidding points for each semester. You can put all your points in one course, section or seminar, or you can allocate points among several. By this means, you express the strength of your preferences.

2. Bids are also used to determine who has a bigger claim on each course seat and therefore choice of a bid-vector is an important strategic tool.

The following statement from the Bidding Instructions of both Columbia Business School and Haas School of Business at UC Berkeley shows that these two roles may easily conflict.

> *If you do not think a course will fill up, you may bid a token point or two, saving the rest for courses you think will be harder to get into.*

What happens when bids are used for both purposes (infer preferences and determine seat claims) is that students may bid a high number of points on more popular courses, and bid few points on less popular courses, even if they prefer the latter courses. However, it is easy to see that this conflict may result in efficiency loss because a student may be declined a seat at one or more of her preferred courses, despite "clearing the market" (i.e. although her bid is high enough), simply because she clears the market in too many other less preferred courses for which she has submitted higher bids. Moreover, Sönmez and Ünver [2003] shows that efficiency may be lost in this way even if the students are expected utility maximizers, and therefore there is no reason to expect that such efficiency loss is a rare event. They also describe how the above mentioned efficiency loss can be avoided. The key is "separating" the two roles of the bids by simply asking students to submit their preference ranking of the courses in addition to bidding for the courses. In this way the registrar's office no longer needs to "guess" what student preferences are. Once the bids and preference ranks are obtained, a central mechanism in the two-sided matching literature, the *Pareto-dominant stable mechanism*, may be used for improved efficiency, which we describe in Section 4.

3 Course Bidding at UMBS

The question now is whether the potential efficiency loss under the UMBS mechanism occurs in practice and how prevalent it is. At UMBS, prior to, and during the bidding period, students review course descriptions and time schedules on the UMBS intranet. Professors may also make available syllabi or additional information on the course. Once the bidding period begins, students can visit a webpage within the UMBS intranet which lists all courses available to them. The webpage also contains information on the bidding system, timetables, "Tips & Tricks," rules and regulations, etc. In addition, it has information on previous market clearing prices for all the courses.

Each student is allocated 1000 bid points for the semester. On the webpage, each course has a place to enter a bid value. As a student bids on a course from her allocated 1000 bid points, the bid amount is deducted from the 1000 allocated points and the balance is shown. Once 1000 points have been allocated, the student is prevented from entering any more bids. Students can adjust these bids as they wish (by deducting from one, then adding to another), until the bidding period closes.

We got permission from UMBS to collect rank data from students in addition to the bid data. So as not to contaminate the bidding process in place, we collected rank data *after* bidding was over but *before* course allocations were made. This was a (very short) one week window of time.

3.1 Students and Courses

We have a sample of $n_I = 535$ students who bid for $n_C = 135$ classes scheduled for Spring 2004 semester. Let $I = \{i_1, i_2, ..., i_{535}\}$ be the set of students and $C = \{c_1, c_2, ..., c_{135}\}$ be the set of classes. Each class is either the sole section of a course or one of the multiple sections of a course. Therefore, we will refer to each class as a **section**. At UMBS, there are two mini-semesters in each semester. Each mini-semester lasts about 7 weeks, and the semester lasts about 14 weeks. Sections can be scheduled for the whole semester, for the first mini-semester, or for the second mini-semester. Our section sample consists of 57 first mini-semester sections, 47 second mini-semester sections, and 31 full semester sections. Each mini-semester-long section is worth 1.5 credits and each full semester-long section is worth 3 credits.

3.2 Feasibility Conditions

In the context of course-bidding, there are feasibility conditions on individual schedules as well as feasibility conditions on the course allocation. While a student can bid for as many sections as she wishes, she can be registered in

1. no more than 9 credits (or an equivalent of 6 mini-semester-long sections) for the first mini-semester,

2. no more than 9 credits (or an equivalent of 6 mini-semester-long sections) for the second mini-semester, and

3. no more than 16.5 credits (or an equivalent of 11 mini-semester-long sections) for the whole semester.[1]

An additional feasibility constraint on individual schedules rules out any conflict within a schedule. Two sections **conflict** if either they are both sections of the same course or their weekly meeting times overlap. While a student can bid for two conflicting sections, she cannot be registered in both of them. In our sample, 497 pairs of sections conflict out of 9045 section pairs. We refer to any set of sections that satisfy these feasibility constraints as a **schedule**.

The last feasibility condition pertains not to individual schedules, but concerns the **course allocation**. Each section has a **capacity** which is a cap on the number of students who can be registered in the section. Let $q = (q_c)_{c \in C}$ denote the capacity vector of the sections. In our sample, the smallest capacity is 5 and the largest capacity is 430. The most common capacities are 65 and 30, applying to 58 sections and 20 sections respectively. In our sample, 35 courses received more bids than their capacities.

3.3 Bids

As we already indicated, each student is endowed with 1000 bid points that she can use to bid across desired sections. Bid points cannot be transferred between semesters and bids should be integer values. A student should bid at least 1 point in order to be registered in a section. Students can

[1] When a student registers for a full semester section, she "consumes" 1.5 credits from the first mini-semester and 1.5 credits from the second mini-semester.

bid for as many sections as they wish including conflicting sections. Let $B = [b_{ic}]_{i\in I, c\in C}$ denote the bid matrix. Here, b_{ic} is the submitted bid of student i for section c, and $b_{ic} = 0$ if student i did not bid for section c. There are 5665 positive bids in our sample. Many students submitted the same magnitude of bid for multiple sections. Similarly, many sections received the same magnitude of bid from multiple students. We find the most repeated bid to be '1', followed by '100', '2', '50', '150', '200', '5', '10', '13', and '20'. The top-10 bids are used a total of 2135 times. A strict bid ordering is needed to implement the UMBS mechanism and the administrators at UMBS rely on a tie-breaking lottery for this purpose. A random real number $\phi_{ic} \in (0,1)$ is drawn from the uniform distribution for each student-section pair (i, c), and each positive bid $b_{ic} > 0$ is modified as $b'_{ic} = b_{ic} + \phi_{ic}$ in order to break ties. Let $b'_{ic} = b_{ic}$ whenever $b_{ic} = 0$ and let $B' = [b'_{ic}]_{i\in I, c\in C}$ be the modified bid matrix. The administrators at UMBS provided us with their tie-breaking lottery draw for Spring 2004.

3.4 Preferences over Sections

We surveyed students to learn their preferences over sections. Within a few hours of the official closure of bidding, we sent each of the 535 students who had submitted bids a customized e-mail asking each student to rank the sections she bid upon. Each e-mail contained an explanation of our study and a list of all the sections that the student had bid upon. The sections were listed by descending order of bid points, but the actual bid points were left off.[2] A permission from the Associate Dean was obtained to use his name as the sender of this e-mail in order to lend credibility and urgency to the survey. Two reminder e-mails were sent to students within the same week (see the Appendix for the original and subsequent e-mail messages). We received 489 responses out of a total of 535 students. In addition to 46 missing responses, 32 students submitted preferences with indifferences (although they were specifically asked not to). In order to measure the efficiency loss under the UMBS mechanism, we need strict preferences for all students. Using the 489 responses, we constructed a strict preference ranking $P = (P_i)_{i\in I}$ for all 535 students to analyze the *best case scenario* for the UMBS mechanism:

1. For each of the 32 students who indicated indifferences, we broke indifferences in favor of sections for which the student has a higher bid based on the modified bid matrix B'.

2. For each of the 46 students with missing preferences, we assumed that sections with higher bids are preferred to sections with lower bids.

   Formally, for any student i with missing preferences and for any two sections c, d where student i has submitted positive bids we assumed that

$$cP_i d \qquad \text{if and only if} \qquad b'_{ic} > b'_{id}.$$

[2] This practice is in favor of UMBS mechanism, since non-motivated students may just give ranks 1,2,3 ....

This preference construction results in the *lower bound* of the efficiency loss under the UMBS mechanism. That is the case because any efficiency loss here is an implication of students possibly preferring sections for which they have lower bids to sections for which they have higher bids. We say that a student i has **bid-monotonic** preferences if for any two sections $c, d \in C$,

$$cP_id \qquad \text{if and only if} \qquad b'_{ic} > b'_{id}.$$

As we have already emphasized, we assumed that each of the 46 students with missing preferences has bid-monotonic preferences. In addition among the 489 students who responded to the survey, 82 submitted bid-monotonic preferences. Some of these need not reflect true preferences, but be driven by the survey instrument which made this response easy to give. However a vast majority of the students, 375 of them, submitted preferences that are *not* bid-monotonic, indicating the role of the strategic aspect of bidding in the UMBS process. This suggests that the efficiency loss can be quite significant under the UMBS mechanism.

3.5 Preferences over Schedules

We need a way to compare alternative course schedules for a student and determine which will be preferable to her. We take a conservative approach here, making the safest assumption.

Given her preferences over courses P_i, a student i **unambiguously prefers** a schedule S to another schedule S' if and only if

1. schedule S has at least as many credits as schedule S' does, and
2. each section in $S \setminus S'$ is strictly preferred to each section in $S' \setminus S$ based on the preference ranking P_i.

Therefore, we will only conclude that a student has an improvement in her schedule if she receives at least as many credits and also if any replacement in her schedule is a favorable one. Clearly, we will not be able to compare many pairs of schedules and in such cases we call the welfare comparison **ambiguous**.

4 The Pareto-Dominant Stable Mechanism

The efficiency of course-bidding can be improved by adopting the **Pareto-dominant stable mechanism** (or simply the **Stable mechanism**) which has been a highly influential mechanism in the *two-sided matching* literature. Two-sided matching markets have been extensively studied (see Roth and Sotomayor [1990] for a survey), and their theory is successfully applied in American and British entry-level labor markets (Roth [1984, 1991]).

The following notation is useful to ease the description of this mechanism:

Given a preference ranking P_i and a subset of sections $D \subseteq C$, construct the **best schedule** $\mathcal{B}(D)$ as follows: Start by including the best section among sections in D based on the preference ranking P_i. Next, add the second best section under P_i provided that neither the credit requirements are violated nor is there any conflict with the section that is already included. Next, add the third best section under P_i provided that neither the credit requirements are violated nor are there any any conflicts with one or more of the sections that are already included in $\mathcal{B}(D)$. Proceed in a similar way until either the credit requirements do not allow for any addition or there are no sections left with a positive bid. Define $\mathcal{B}(\emptyset) = \emptyset$. When the preferences over schedules satisfy a condition known as the *substitutability* condition in the two-sided matching literature, the best schedule is preferred to any other schedule (Kelso and Crawford [1982]).

Under the Stable mechanism, students are asked not only to submit their bids but also their preference ranking over the courses they bid upon. Based on the student preferences $P = (P_i)_{i \in I}$, the modified bid matrix B', and the capacity vector $q = (q_c)_{c \in C}$, the outcome of the Stable mechanism can be obtained via the following version of the **student-proposing deferred acceptance algorithm** (Gale and Shapley [1962], Kelso and Crawford [1982]):

Step 1. Each student proposes to all sections in her best schedule from the set of all sections C. Each course c rejects all but the highest bidding q_c students among those who have proposed. Those who are not rejected are **kept on hold**.

In general, at

Step t. Each student proposes to all sections in her best schedule from the set of sections which have not rejected her in earlier steps. Each course c rejects all but the highest bidding q_c students among those who have proposed. Those who are not rejected are **kept on hold**.

The procedure terminates when no proposal is rejected and at this stage the course assignments are finalized.

5 Data Analysis

We provide two sets of results. In the first set of results, we compare the efficiency of the two mechanisms for the Spring 2004 UMBS tie-breaker lottery draw and the modified bid matrix B'. In the second set of results we provide a robustness check with Monte Carlo simulation.

5.1 Analysis Using the UMBS Tie-Breaker Draw

Our analysis reveals that a potential transition to the Stable mechanism is likely to result in significant efficiency improvement.

We observe that 10 first-quarter sections, 12 second-quarter sections, and 5 full semester sections filled their capacities under the stable mechanism whereas 9 first-quarter sections, 11 second-quarter sections, and 5 full semester sections filled their capacities under the UMBS mechanism.

Full Sections	**Stable**	**UMBS**
Quarter 1	10	9
Quarter 2	12	11
Regular Semester	5	5

Table 1: Number of sections that are full under the UMBS and Stable allocations using the UMBS tie-breaker lottery draw.

Out of the 489 students who responded to the survey, 456 receive the same credit load under both mechanisms. Among them

- each of 366 students is assigned the same schedule under both mechanisms,
- each of 83 students unambiguously prefers her schedule under the Stable mechanism to her schedule under the UMBS mechanism,
- no student unambiguously prefers her schedule under the UMBS mechanism to her schedule under the Stable mechanism, and
- the welfare comparison is ambiguous for 7 of these students.

Out of the 489 students who responded, 21 students receive more credits under the Stable mechanism and

- each of 18 of them unambiguously prefers her schedule under the Stable mechanism to her schedule under the UMBS mechanism, whereas
- the welfare comparison is ambiguous for the remaining 3.

Out of the 489 students who have responded, 12 students receive more credits under the UMBS mechanism and

- each of 2 of them unambiguously prefers her schedule under the UMBS mechanism to her schedule under the Stable mechanism, whereas
- the welfare comparison is ambiguous for the remaining 10.

So altogether, 366 of the 489 students who responded are indifferent between the two mechanisms, 101 of them unambiguously prefer the Stable mechanism, 2 of them unambiguously prefer the UMBS mechanism, and a conclusion cannot be drawn for 20 students.

One last point deserves clarification: It is clear why many students prefer the Stable mechanism to the UMBS mechanism. This is because they get the courses they really want and do not end up with a situation where they get more popular courses that they strategically bid more on, but

Valid Responses	**Indifferent**	**Prefers Stable**	**Prefers UMBS**	**Ambiguous**	**Total**
Same Credit Load	366	83	0	7	**456**
More Credits under Stable	-	18	-	3	**21**
More Credits under UMBS	-	-	2	10	**12**
Total	**366**	**101**	**2**	**20**	**489**

Table 2: Among students who have responded, comparison of student preferences over the UMBS and Stable allocations using the UMBS tie-breaker lottery draw.

like less (and get closed out of courses they like more but bid less on). What may be less clear is why two students prefer the UMBS mechanism to the Stable mechanism. The reason is quite simple. These two students got "lucky" under the UMBS mechanism and were assigned one or more courses despite their relatively low bids because some other students with higher bids were denied seats and were instead assigned seats at their less preferred courses (where they bid even higher). Since such "mistakes" are corrected under the Stable mechanism, and the courses filled up, the two lucky students suffer a welfare loss under the Stable mechanism.

5.2 Robustness Check: Simulation for the Tie-Breaker Lottery

As we have reported earlier, the indifferences are broken with a tie-breaking lottery at UMBS and we have already reported the results for the Spring 2004 lottery draw. In the following table we report the results of a robustness test where we draw random lotteries to break ties, and repeat this 1000 times. The results are virtually the same as the UMBS lottery draw.

Valid Responses	**Indifferent**	**Prefers Stable**	**Prefers UMBS**	**Ambiguous**	**Total**
Same Credit Load	367.853 (3.221)	82.590 (3.265)	0.247 (0.431)	7.642 (1.247)	**458.332** **(2.225)**
More Credits under Stable	-	16.953 (1.674)	-	1.366 (0.527)	**18.319** **(1.632)**
More Credits under UMBS	-	-	2.217 (1.018)	10.132 (1.217)	**12.349** **(1.631)**
Total	**367.853** **(3.221)**	**99.543** **(3.189)**	**2.464** **(1.082)**	**19.14** **(1.804)**	**489**

Table 3: Among students who have responded, comparison of student preferences over the UMBS and Stable allocations using the Monte-Carlo simulation. Averages and standard errors (in parentheses below the averages) are reported for the sample.

5.3 Improvement in Ranks

We also computed the improvement in mean ranks among all courses allocated by the UMBS versus Stable mechanisms for the modified bid matrix B'. In order to do this across both full semester and mini-semester courses, all full semester courses were treated as a package of two mini-semester courses with the same rank applying to both. Across all students, the average rank improvement by using Stable versus UMBS is 1.1053. Across the 124 students who were assigned different schedules under Stable vs. UMBS, the average rank improvement is 4.3943.

6 Conclusion

We believe that the field test carried out at UMBS shows quite clearly that the UMBS mechanism results in significant efficiency loss due to the two possibly conflicting roles of the student bids. The stable mechanism has the potential to make a substantially larger proportion of students better off (approximately 20% in our study) than the UMBS mechanism which is currently in place at many schools. Given that the change required is relatively minor and that the changes can affect the education of millions of students, letting them learn what they truly want to learn, our hope is that many schools and universities will adopt the Stable mechanism. One other thing we should mention is that during the add-drop period, many of these students would be able to transfer from a less preferred course that they bid high points on and got into, to a more preferred course that they bid less on and did not get assigned. However, unnecessary add-drop creates a lot of upheaval in the registrar's office and even worse is the fact that the class takes longer to get settled, reducing the quality of education in the early weeks of the semester. Perhaps, it is due to the inefficient allocation process that UMBS allows two full weeks for add-drop in a mini-semester that is only 7 weeks long. Clearly, this needs to be changed.

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A Appendix: E-mail Messages Requesting Student Preference Rankings

The Initial E-mail Message

Subject Line: Your Course Bids: Immediate Reply Required

Dear [FIRSTNAME],

In the spirit of continuous improvement, the School is currently reviewing its course bidding process to find ways to help more students get enrolled in the courses they really want.

But we need your help!

The ranking question below is designed to help us gauge how well our current bidding process matches up student preferences with available seats in classes. It should take less than 3 minutes and all answers will be kept strictly confidential. Your answers will in no way affect the bids you just submitted or the allocation of courses. Rather, they will help us in improving the course bidding process in the future.

In addition, at the end of your response, please feel free to provide any suggestions for improving the process of course bidding that you would like us to consider.

Please take a few minutes to participate in this process. It is critical that we receive a response from every student. As a token of our appreciation, we are offering a UMBS mug with the new logo for the first 50 respondents as well UMBS fleeces to three, randomly chosen respondents.

Your immediate reply is essential; please submit your completed ranking by this Sunday, November 9th.

If you have any questions, please e-mail: bidranking@umich.edu

Thank you,

Gene Anderson, Associate Dean

INSTRUCTIONS

To complete your course ranking, please select "reply" to this message, then provide the information requested below in the body of your reply message.

Listed below are the courses and sections for which you submitted a bid. In the body of your reply message, please rank each course and section in the order of how important it is for you to get into that course and section. A rank of 1 indicates this course and section is most important to you to get into, a rank of 2 indicates this course and section is the second most important to you to get into, and so on, until all courses have a rank. Please do not use ties, i.e., do not give 2 courses or even 2 sections of the same course the same rank. So, if you bid on 15 course and sections, you should give ranks 1 through 15. Note that this is a ranking you place on how important a course is for you and should NOT depend on how tough it is to get into the course -

so if you really want a course and you know it never gets full, do not rank it low - rank it based on your "utility" for that course. Also, do not worry about time conflicts in giving your ranking.

Once you have completed your ranking, scroll to the end of the reply e-mail to add any comments or suggestions for the bidding process you would like us to consider.

Once again, if you have any questions, please e-mail: bidranking@umich.edu

Type in your ranking after each course.

[Course 1]:

[Course 2]:

[Course 3]:

[Course 4]:

[Course 5]:

[Course 6]:

⋮

Please ignore any empty space and scroll to end for final question.

What suggestions do you have for improving the process of course bidding that you would like for us to consider?

The Second E-mail Message

Dear [Firstname]:

Earlier in the week, you received an e-mail with a request to rank the courses you recently bid on. This research is important to improving our course bidding system for next year's course bidding process and we would greatly appreciate cooperation from every student. We need to get a 100% response rate to best understand how well our current bidding process matches up student preferences with available seats in classes. This information is critical for us to continue to improve how well our course bidding process works for all concerned.

So far, we have received responses from 294 of the 534 students that bid on courses. We wanted to remind you that the deadline to complete the ranking is this Sunday, November 9, 2003 by 8:00 pm. If you are receiving this e-mail, it means we have not yet received your completed response as yet. We would appreciate it if you could respond as soon as possible.

Another copy of the original request is included below for your convenience.

If you have any questions, please e-mail bidranking@umich.edu.

Thank you,

Gene Anderson, Associate Dean

[1st letter and course list inserted here]

The Third E-mail Message

Subject Line: Oops! Did you forget? Your Course Bids – Immediate Reply Required

Dear [firstname]

Earlier in the week, you received an e-mail with a request to rank the courses you recently bid on. We understand how very busy you are - however, by taking less than a minute to complete the ranking, you can make a great contribution to the improvement of your school.

Because achieving 100% response rate is so critical to this project's success, we have decided to extend the deadline by 24 hours. If you are receiving this e-mail, it means you are one of the few people from whom we have not yet received your completed response. We would appreciate your cooperation by responding by Monday November 10, 2003, 10:00 pm.

Another copy of the original request is included below for your convenience.

If you have any questions, please e-mail bidranking@umich.edu.

Thank you,

Gene Anderson, Associate Dean

[1st letter and course list inserted here]