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The Comparative Effects of Assignment Size and Pacing Contingencies on the Academic and Social Behavior of High School Students

Linda M. Campbell
Western Michigan University

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Linda M. Campbell
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INTRODUCTION

Teachers typically are concerned with two main categories of student behavior: academic performance and classroom conduct. Most teachers feel that these behaviors are related in that certain classroom social behaviors are regarded as prerequisite to adequate academic performance. The converse is also assumed: academic performance is dependent upon classroom conduct. Countless classroom interventions have been initiated with the implication of eventually improving academic performance by increasing "achievement related" conduct behaviors and/or decreasing disruptive behaviors incompatible with them (Hall, Lund & Jackson, 1968; Hall, Panyan, Rabon & Broden, 1968; Iwata & Bailey, 1974; Kaufman & O'Leary, 1972; Surratt, Ulrich & Hawkins, 1969; Thomas, Becker & Armstrong, 1968). These studies, however, often neglected to show data on actual academic performance. Regarding their classroom intervention designed to increase working behavior, Surratt et al. (1969)¹ note, "The "working" behaviors modified in the present experiment are assumed to be correlated with the actual accomplishment of assigned work, and ultimately with academic achievement."

Current research is objectively examining this assumed relationship. Experiments have been designed to determine whether the modi-


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fication of classroom conduct leads to a correlated change in academic performance and vice versa by documenting the effects of experimental procedures on non-target as well as target behaviors. An inconsistent relationship between classroom conduct and academic performance has been revealed. Conflicting results were obtained in experiments which directly manipulated either (a) classroom conduct or (b) academic performance, while measuring changes in both.

These studies measured classroom conduct through operational definitions of studying behavior and/or rule violations (Allyon & Roberts, 1974; Koenig, unpublished; Leys, unpublished; Surratt, Ulrich & Hawkins, 1969). Academic performance has been examined across a broad range of subjects, e.g. reading, math, spelling and standardized achievement tests. Within the specified subject areas, academic performance has been measured variously as percent of correct of total, percent correct of number attempted, rate of work output and change in grade-equivalent test scores (Allyon & Roberts, 1974; Chadwick & Day, 1971; Farritor, Buckholdt, Hamblin & Smith, 1971; O'Leary, Becker, Evans & Saudargas, 1969; Sulzer, Hunt, Ashby, Konairski & Kramas, 1971).

Kaufman and O'Leary (1972), investigating the relationship between classroom conduct and completion of math drill problems, found that the number of math problems completed increased when tokens were delivered for appropriate conduct. However, when Iwata & Bailey (1974) replicated the experiment, they found that tokens contingent upon appropriate social behavior increased the rate of completion of
math problems, but the accuracy of the work remained at baseline level.

In another instance, Allyon and Roberts (1974) eliminated discipline problems in a fifth-grade reading class using token reinforcement of academic performance. However, Ferritor et al. (1971) found that reinforcing accuracy on math problems increased the percent of correct problems completed, but caused attending to decline and disruptions to increase. Conversely, when students were reinforced for appropriate social behavior during math class, appropriate classroom conduct increased but academic performance remained unchanged. Only when reinforcement was contingent upon both academic performance and classroom conduct was the desired outcome of increased attending with decreased disruptions and increased accuracy achieved. Ferritor et al.² warn that "Speculations of change in other than target behaviors may be misleading." Specifically, they³ claim that "contingencies that increase attending behavior and reduce disruptions do not necessarily increase student performance" and advise that if one desires improvements in various areas, "contingencies should be structured specifically for each of these target behaviors.

³Ibid.
Sulzer et al. (1971) conducted a similar study with elementary school students in reading and spelling classes. They compared the effectiveness of giving points for items correct to giving points for on-task behavior in relation to their effects on both academic and social performance in the two subject areas. Results indicated that during the reading sessions both types of point contingencies were equally effective in increasing the target and non-target behaviors simultaneously. Spelling tasks, however, produced differing results. When points were delivered for items correct, both the accuracy and the percent of on-task behavior increased. When points were delivered for on-task behavior only, a spread of effects was not found; on-task behavior increased but accuracy declined to that of initial baseline.

The inconsistent results exemplified by these studies indicate that unspecified factors affect the relationship between academic performance and classroom conduct in different settings. The appropriate question now appears to be one of determining what variables may affect the spread of effects from the target behavior to the non-target behavior when either academic performance or classroom conduct is manipulated. Then one must determine how these variables may be isolated and manipulated.

A closer analysis of the above studies suggests several factors which may account for the inconsistency in the relationship between academic performance and classroom conduct. The Ferritor et al. (1971) study involved randomly selected math drill problems, while
the Allyon and Roberts (1974) study involved reading material. Reading tasks require a sustained amount of attention, while math problems may be correctly worked during periods of attention alternated with periods of disruption. Allyon and Roberts (1974) themselves suggest that the difference in preskills between their subjects and those in the Ferritor et al. (1972) study may contribute to conflicting results. The subjects in the Ferritor et al. (1972) study may not have had the preskills needed to increase the number of math problems accurately completed. Data show that the number of problems correctly completed decreased as the percent of correct problems increased. Evidently, students completed fewer problems to increase their accuracy score and qualify for reinforcement. Since less work was attempted it is not surprising that reinforcement contingencies for correct work4 "appeared to correlate with disruptive behavior."

In addition, disruptive behavior was at a minimum at the outset of the study and could not show a treatment effect to any appreciable degree. The percent of disruptive behavior averaged below 20% and the percent of attending behavior averaged above 70% during the baseline of the Ferritor et al. (1972) study.

The difference in the complexity of the tasks, reading and spelling, in the Sulzer et al. (1971) study, may have caused the difference in the spread of effects. Other factors which may affect

4ibid.
the relationship between classroom conduct and academic performance, and the spread of effects from one to the other, are: time allowed to complete the task, establishment of a minimum criterion, the type of reinforcement given, the clarity of directions, and the length of the assignment block.

Manipulation of the assignment block concerns the area of pacing. A relatively long assignment block requires students to self-pace between the deadlines. Studies with college students have shown that imposing no contingencies except completion of all work by the last day of the term typically results in a large percentage of students doing little work during the first half or more of the time period and a large amount of work during the last part of the time period (Sutterer & Holloway, 1975; Lloyd & Knutzen, 1969; Semb, Conyers, Spencer & Sosa, 1975). In college classes, where attendance is not required, an initial low work rate does not result in classroom disruptions. However, in mandatory attendance situations, a period of not working provides increased opportunity for disruptive behavior (Koenig, unpublished).

Semb, Conyers, Spencer and Sosa (1975) compared four pacing contingencies in a college child development course and showed that students with no pacing contingencies put off almost all the course work until the last two-fifths of the term. The consequences of falling below the minimum work rate were not revealed by test scores, however, as students were allowed to take alternate forms of the quizzes until they passed. No data on initial test performance were
offered. The authors concluded that pacing contingencies had no discernable affect on students who worked rapidly of their own accord, "but perhaps they provided extra encouragement for slow students to keep going." Groups that had contingencies applied to work rate showed a larger percentage of students completing the course than groups that had no contingencies on work rate.

Lloyd and Knutzen (1969) conducted a similar investigation in a college psychology course in which grades were determined by how far a student had progressed through the course work in terms of number of activities completed (no tests given). Students were required to do the activities in sequence. Completion of minimal plus above-minimal activities earned progressively higher grades. The authors found a "direct relationship between the time at which the student began to turn in appreciable amounts of work and the final grade he received." Evidently, students who showed a very low initial work rate did not have time to complete all activities required for an "A" or "B." Less than 25% of the students completed all of the work in the course needed to an "A."

Semb et al. (1975) and Miller, Weaver and Semb (1974) report

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that setting intermediate target dates with warnings and/or contingencies effectively controls students' work rate. Miller et al. (1974) set target dates for the completion of 26 of 39 lessons in a college psychology course. When each student's rate of lesson completion was compared with and without target dates, they found that students completed an average of 1.0 lessons a day with the target date contingency and 0.3 lessons per day without it.

The present study attempted to determine whether breaking down unit assignments into daily assignments with feedback or contingencies on work rate would affect the academic performance and/or classroom conduct of high school students in a Consumer's Education class.
METHOD

Subjects and Setting

A Consumer's Education class composed of four sophomores, ten juniors and three seniors in a small high school served as subjects. All students are required to take the course for graduation. The teacher described the present students as typically "wasting a lot of time in class" and then either working very hard during the last class period before assignments were due or completing activities outside of class. The academic performance of the entire class was investigated.

High and low academic performers were chosen as target students to test for differential affects of the experimental variable. The three students with the highest grade point averages of the class at the end of the first marking period were selected as the target high academic performers. The three students with the lowest grade point averages of the class at the end of the first marking period were identified as target low academic performers. The three students identified as high performers were all females in their junior year of high school. The three low academic performers consisted of one female and two male students. One of the males was a senior and the other two students were in their junior year of high school.

Manipulation of assignment length with and without pacing contingencies was conducted on the class as a whole. The classroom conduct of the six target students was observed and recorded during
class for thirty minutes each day, four days a week. Data on assignment and quiz scores were gathered for all seventeen students through teacher records and verified by the actual work product.

Materials

The assigned materials for each unit always included reading the textbook, *The American Consumer*, and answering chapter questions, and reading and outlining articles from the magazines "Changing Times" or "Current Consumer." Activities sometimes included films, guest speakers or field trips.

Measurement

**Academic performance.** Unit and semester grades were obtained by assigning point values to assignment and quiz answers. The percentage of assignment and quiz points earned was computed for each class member. Ninety to 100% of all possible points earned an "A," 80 - 89% earned a "B," 70 - 79% earned a "C," 60 - 69% earned a "D," and below 60% earned an "E." Any questions not answered earned zero points.

**Daily progress.** Students were required to fill out brief reports of the work they completed each day during the progress report conditions. The information to be recorded included the date, number of the activity worked on, whether the student completed all, more than half or less than half of the activity, and the work to be done to complete the activity. The form was signed by the student and initialed by the teacher or experimenter before the student was
excused from class. See Appendix A for an example of a Progress Report form.

Classroom conduct. Daily observations of the six targeted students were conducted for approximately the fifth through thirty-fifth minutes of the fifty-minute class period. Observations were made at the end of every ten-second interval on a rotating basis through all six subjects each minute. The order of observation was randomized each session.

Observations were made from the back of the classroom. Students sat on the outer sides of two rows of tables which were placed end-to-end the length of the classroom. The observers sat at a round table at the back of the room between the two rows of tables. The students faced each other across the room; the observers faced the students at an angle. A tape recorder was used to cue the observers as to which subject to observe and when to record. The volume was set low enough for the observers but not the students to hear the cue.

Classroom conduct was measured by seven categories of social behavior which defined appropriate and inappropriate conduct. The categories of classroom conduct employed in the present study were:

1. Attending: sitting in seat with eye contact directed toward lecturing teacher, reciting classmate, appropriate reading material or appropriate writing.

2. Appropriate Verbal: includes appropriate verbal or gestural response to teacher query, task-oriented conversation with peer or teacher, appropriate out-of-seat behavior (i.e. walking to teacher’s
desk to receive assistance or walking to magazine cabinet), and raising hand to obtain teacher's assistance.

3. Talk-out: any audible verbalization uttered without permission, including singing, talking and humming; eye contact with someone who is speaking off-task to the target student.

4. Not Attending: includes sitting in seat with eye contact not directed toward task material or teacher or peer addressing the class.

5. Inappropriate Verbal: inappropriate verbal responses such as an off-task response to a task oriented question, or an inappropriate response to the teacher such as, "Shut up," or "You can't make me do this." Also includes inappropriate out-of-seat behavior in which talking is not involved such as wandering around the room or standing and looking out the window.

6. Disruptive: any physically disruptive action such as hitting a classmate, throwing an object, tearing paper, jumping or pushing peer or table.

7. Other: any behavior not covered in the above code. Includes the student leaving the room. This code letter must be followed by a descriptive word or phrase.

Appropriate classroom conduct was calculated per subject by combining intervals scored as attending or appropriate verbal within each session. Intervals scored in all other categories were combined as inappropriate classroom conduct. Percentages of appropriate plus inappropriate classroom conduct equaled 100% per session.
Student preference. A questionnaire was designed to determine which assignment conditions students preferred. Students completed the questionnaire at the end of the semester after experiencing the sequence of five assignment conditions across eight Consumer’s Education units. An example of the Questionnaire is displayed in Appendix B.

Reliability

In order to assess the accuracy of the observer's records, frequent reliability checks were made by a second observer. Checks on classroom conduct were taken for 15 of the 34 sessions. Checks on progress reports were taken once during each of the two times they were presented and the recording of bonus and minus points was checked twice during that condition. Reliability was calculated for each session by dividing the total number of agreements by the total number of agreements plus disagreements and multiplying the quotient by 100%. An agreement was scored if both observers recorded the same behavior in the same interval. A disagreement was scored if one observer recorded a behavior and the other observer did not record that behavior in that interval. As the behavioral categories included both appropriate and inappropriate classroom behavior, every interval was scored.

Procedures

Each type of assignment was regarded as an experimental condition. The academic performance of the seventeen students in the
class and the classroom conduct of the six target students was studied. Academic data were obtained through teacher records for the five pre-baseline units and through teacher records verified by the researcher through the actual work products for all experimental conditions. Classroom conduct data were collected during each experimental condition. Experimental conditions changed with each new unit and lasted approximately one week. The assignment sheet for the new unit was given to students immediately following the quiz on the previous unit. The five types of assignments were:

- **Unit assignments.** Unit assignment sheets consisted of a list of required and optional activities which were due and graded at the end of the unit.

- **Daily assignments.** The students were given assignment sheets that included required and optional activities with specified dates as to when to work on each activity in order to complete the unit by the target date. No consequences were given for following or not following the pacing suggestions on the assignment sheet. All activities were due and graded at the end of the unit.

- **Unit assignments with progress reports.** Students were given the unit assignment sheet at the beginning of the unit. Progress report forms were handed out daily to be completed by the students before they left class. Activities were due and graded at the end of the unit.

- **Daily assignments with progress reports.** The assignment sheet specified which activities should be completed each day. Progress
report forms were handed out daily and completed by students before they left class. Activities were due and graded at the end of the unit.

**Daily assignments with bonus points and minus points.** Students were given the same type of daily assignment sheet. However, they could now earn bonus points for following the pacing suggestions and turning in the specified assignment at the end of the class period. The assignment was required within the first five minutes of the next class period to earn full credit. An assignment turned in after the first five minutes of the next class period was considered late and points were deducted.

**Experimental Phases**

The order of presentation of the various types of assignments and the name of the unit each accompanied, listed in parenthesis, is as follows:

1. Unit assignment (Investing)
2. Daily assignments (Banking)
3. Unit assignment (Credit)
4. Unit assignment with daily progress reports (Food and Clothing)
5. Daily assignments (Transportation)
6. Daily assignments with daily progress reports (Buying Housing)
7. Unit assignments (Renting Housing)
8. Daily assignments with bonus/minus points (Furniture and Appliances)
RESULTS

Reliability

Reliability data on classroom conduct yielded an overall mean of 94.5% agreement. The reliability scores were computed for 15 observation sessions and ranged from 89% to 98% agreement. Two reliability scores were obtained for progress report data, one for unit assignments and one for daily assignments, yielding scores of 100% and 95% agreement, respectively. The two reliability checks taken for the bonus/minus point condition both yielded 100% agreement.

Student Pacing

Data on student progress through the units, defined as rate of activities completed, was obtained by examining the daily progress reports completed in two units, by examining teacher records of points earned in the bonus point unit and by examining student folders after class in the remaining units. Figure 1 presents the number of activities completed per day by individual target students during the two progress report conditions (maximum number of activities is 4 per student) and during the bonus point condition (maximum number of activities is 4 per student). Subjects 1, 2 and 3 are the target high academic performers; Subjects 4, 5 and 6 are the low academic performers. No class time was available to work on activities on the last day of a unit. The varying lengths of activities and days allowed to complete them makes it difficult to compare
Figure 1: Number of activities completed per day by individual target students during progress report and bonus/minus point conditions.
PROGRESS REPORTS

Subject 1 Subject 2 Subject 3 Subject 4 Subject 5 Subject 6

BONUS-MINUS POINTS
progress across units. However, general trends are apparent. The target high performers show a higher daily rate of activities completed with daily assignments than with unit assignments, although the total number of activities completed remained approximately the same. The three low academic performers, however, showed both a higher rate and a higher total of activities completed when daily assignments rather than unit assignments were issued. These trends are consistent with the trends observed in other units within the daily and unit assignment conditions; the progress reports themselves did not appear to alter within-condition pacing trends. The highest daily rate and highest percentage of activities completed by the low academic performers occurred when pacing contingencies (bonus and minus points) were in effect. Although the two groups of target students showed different pacing trends when no contingencies were applied to work rate, the introduction of contingencies resulted in quite similar pacing patterns. All six target students turned in assignments in time to receive either bonus points or full credit. The six target students earned 93% to 123% of the activity points possible during the bonus point condition, compared to a range of 0% to 133% earned over all other conditions.

Figure 2 presents the percentage of activities completed each day by the entire class during progress report conditions. Data collected from the progress reports and from checking folders after class suggest that the overall completion of activities was more uniform and at a higher rate during daily assignment conditions,
Figure 2: Percentage of activities completed per day by the class during progress report and bonus/minus point conditions.
PERCENT OF ACTIVITIES COMPLETED

Daily Assignments + bonus/ minus points

Daily Assignments + progress reports

Unit Assignments + progress reports

DAY IN UNIT

PERCENT OF ACTIVITIES COMPLETED

100
90
80
70
60
50
40
30
20
10
0
1 2 3 4 5 6
with the most consistently high output occurring during the bonus/minus point condition.

**Academic Performance**

Figure 3 presents the mean percentages of quiz and activity points earned by the entire class across pre-baseline and experimental conditions. The pre-baseline conditions consisted of unit assignments of the same type as issued during unit assignment experimental conditions. During pre-baseline, classroom conduct was not observed.

The introduction of daily assignments, with and without daily progress reports, did not produce a significant change in average quiz scores earned by the class. However, the class mean of activity points earned improved from 79% in both the pre-baseline and unit assignment experimental conditions to 85% earned during the daily assignment conditions.

Progress reports did not significantly affect activity or quiz scores for the class in either the daily assignment or the unit assignment condition. The daily assignment plus bonus point condition produced an increase in activity scores, while quiz scores remained the same. The average class activity score for the daily assignment plus bonus point condition was 90%, while the activity scores for the other daily assignment conditions averaged 83%. Activity scores for the unit assignment condition averaged 79%.

Quiz and activity scores for each unit were combined to yield a unit grade. The number of students receiving "A"s and "B"s as the unit grade remained approximately equal across all conditions,
Figure 3: Mean percentages of quiz and activity points earned by the class across pre-baseline and experimental conditions.
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with the exception of the fourth pre-baseline unit in which only five students earned "A"s and "B"s. The average number of students earning "A"s and "B"s per unit was 9 in pre-baseline, 9.5 in unit assignment conditions and 11 in daily assignment conditions.

Table 1 presents the mean quiz and mean activity scores per condition for each target student. The target high academic performers, Subjects 1, 2 and 3, showed little or no change in quiz and activity scores across conditions. The low academic performers, however, all showed appreciable increases in both quiz and activity scores with the use of daily assignments. The conclusions that may be drawn from the changes in activity and quiz scores for Subject 4 are questionable as the scores improved from pre-baseline units in which unit assignments were given, to experimental units in which unit assignments were given. Scores earned by Subject 4 in pre-baseline units fluctuated between 0% and 83%, while the scores earned during the unit assignment experimental conditions were more stable. Subjects 5 and 6 showed no change in either quiz or activity scores in going from pre-baseline unit assignments to experimental unit assignments.

Subject 4 earned a mean of 47% of the quiz points in pre-baseline units, 69% with experimental unit assignments and 80% during daily assignment conditions. Subject 5 earned mean percentages of 72%, 72% and 82% of quiz points, respectively, across the conditions. Subject 6 earned quiz scores averaging 71%, 72% and 84% of possible points across pre-baseline, unit and daily assignment conditions.
Table 1: Mean percentages of quiz and activity points earned per condition by individual target students.
TABLE 1

<table>
<thead>
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<th>Subjects</th>
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<th>Unit Assignments</th>
<th>Daily Assignments</th>
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<td></td>
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<td>Activity</td>
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<tr>
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<td>4 (Low)</td>
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<td>6 (Low)</td>
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With regard to activity scores, Subject 4 showed an increase from 47% to 66.5% from pre-baseline to unit assignment experimental conditions and a further increase to 76.5% with daily assignments. Subject 5 earned means of 31%, 29% and 69%, respectively, across the conditions; while Subject 6 earned means of 61%, 62.5% and 91.5%, respectively.

Table 2 presents the percentages of quiz points earned per unit by target students across conditions. Subjects 1, 2 and 3 earned quiz scores ranging from 66% to 100% with means of 89% in pre-baseline, 91% in unit assignment and 92% in daily assignment conditions. Quiz scores obtained in progress report conditions did not differ appreciably from scores earned in other conditions and were similarly unaffected by the availability of bonus points.

Subjects 4, 5 and 6, the target low academic performers, earned quiz scores ranging from 0% to 100%. The mean of the quiz scores earned by this group was 63% during pre-baseline units, 71% during unit assignment experimental conditions and 84% during daily assignment conditions. Unlike the target high performers, the three low academic performers' quiz scores showed clear changes across the various conditions. The increase in mean scores from pre-baseline to unit experimental assignments is the result of the large increase shown by Subject 4. The quiz scores for Subjects 5 and 6 remained equivalent across pre-baseline and unit assignment experimental conditions.

The highest scores earned by Subject 6 during the unit assign-
Table 2: Percentages of quiz points earned per unit by individual target students.
<table>
<thead>
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<td>1 (High)</td>
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<td>100</td>
<td>100</td>
</tr>
<tr>
<td>2 (High)</td>
<td>97</td>
<td>100</td>
<td>66</td>
</tr>
<tr>
<td>3 (High)</td>
<td>88</td>
<td>100</td>
<td>100</td>
</tr>
<tr>
<td>4 (Low)</td>
<td>83</td>
<td>67</td>
<td>0</td>
</tr>
<tr>
<td>5 (Low)</td>
<td>90</td>
<td>100</td>
<td>33</td>
</tr>
<tr>
<td>6 (Low)</td>
<td>72</td>
<td>80</td>
<td>50</td>
</tr>
</tbody>
</table>

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ment conditions occurred with the use of progress reports. However, the quiz scores earned by Subjects 5 and 6 did not show systematic changes with the use of progress reports in the unit assignment conditions. In the daily assignment condition the introduction of progress reports coincided with the highest quiz scores within that condition for Subjects 5 and 6, but the lowest for Subject 4. Quiz scores earned with the addition of bonus and minus points is the lowest in the daily assignment condition for Subject 5, but no different than scores earned in other daily assignment units for Subjects 4 and 6.

Mean percentages of activity points earned by individual subjects is presented in Table 3. Subjects 1, 2 and 3 showed a "ceiling affect" in that the mean percents of activity points they earned in pre-baseline and unit assignment conditions were 111% and 107%, respectively. The introduction of daily assignments resulted in a mean of 107.5% of total activity points. These high percentages of activity points with unit and daily assignments preclude the possibility of an effect by progress reports or bonus points.

The target low academic performers earned means of 51% of possible activity points during pre-baseline conditions, 53% during unit assignment experimental conditions and 81% during daily assignment conditions. The activity scores earned by this group did not show a systematic change when progress reports were used during either unit or daily assignment conditions. The introduction of bonus points, however, did produce a significant change in percent of activity points.
Table 3: Mean percentages of activity points earned per unit by individual target students.
<table>
<thead>
<tr>
<th>Subjects</th>
<th>Unit Assignments</th>
<th>Daily Assignments</th>
</tr>
</thead>
<tbody>
<tr>
<td>Pre-baseline</td>
<td>Daily Assignments</td>
<td>Progress Reports</td>
</tr>
<tr>
<td></td>
<td>1</td>
<td>2</td>
</tr>
<tr>
<td>1 (High)</td>
<td>113</td>
<td>110</td>
</tr>
<tr>
<td>2 (High)</td>
<td>115</td>
<td>115</td>
</tr>
<tr>
<td>3 (High)</td>
<td>113</td>
<td>115</td>
</tr>
<tr>
<td>4 (Low)</td>
<td>23</td>
<td>60</td>
</tr>
<tr>
<td>5 (Low)</td>
<td>28</td>
<td>43</td>
</tr>
<tr>
<td>6 (Low)</td>
<td>75</td>
<td>30</td>
</tr>
</tbody>
</table>

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earned by the low academic performers. Excluding the scores earned during the bonus point condition, the mean percentages of activity points earned during the daily assignment condition are 71%, 61% and 90% for Subjects 4, 5 and 6, respectively. The activity scores earned by the same subjects for the bonus point condition are 93%, 93% and 119%, respectively.

**Classroom Conduct**

The mean percentages of intervals in which appropriate classroom conduct was exhibited by target high and low academic performers across conditions are presented in Figure 4. Appropriate classroom conduct was computed per individual subject by combining intervals scored as "attending" or "appropriate verbal" within each session. Appropriate classroom conduct during unit assignment conditions generally showed a sharp increasing trend throughout each unit. Appropriate conduct generally was higher during daily assignment conditions than when unit assignments were given. The increasing trend of appropriate conduct was not as pronounced with daily assignments as when unit assignments were given.

Mean percentages of appropriate classroom conduct exhibited by the three target high academic performers, Subjects 1, 2 and 3, ranged from 33% to 95% across all conditions. During unit assignment conditions, appropriate conduct ranged from 33% to 93% with a mean of 68% and a standard deviation of 18 percentage points. During daily assignment conditions, the target high academic performers dis-
Figure 4: Mean percentages of appropriate classroom conduct displayed per session by target high and low academic performers.
played appropriate conduct that averaged from 63% to 95% with a mean of 85% and a standard deviation of 9 percentage points. Progress reports did not affect the within-condition trends. The addition of bonus points resulted in the highest daily average of appropriate classroom conduct for the target high academic performers, 91%, and the smallest standard deviation of any single condition, 11 percentage points.

The target low academic performers produced means of appropriate classroom conduct ranging from 5% to 65% per session across unit assignment experimental conditions and from 30% to 90% across daily assignment experimental conditions. Their appropriate classroom conduct averaged 40% with a standard deviation of 17 during unit assignment conditions, and improved to an average of 70% with a standard deviation of 21 during daily assignment conditions. Progress reports with the unit assignments show a steadily increasing average of appropriate conduct throughout the unit, but within a smaller and higher range. Target low academic performers exhibited a daily average of 41% appropriate conduct during the unit-assignment-with-progress-report condition and 73% during the daily-assignment-with-progress-report condition. The standard deviation associated with these two conditions are 17 and 6 percentage points, respectively. As with the high academic performers, the bonus points resulted in the highest average and lowest standard deviation of appropriate classroom behavior exhibited by target low academic performers. The bonus points resulted in an average of 87% appropriate classroom conduct with a
standard deviation of 4 points.

Figures 5 and 6 present mean percentages of appropriate classroom conduct displayed by individual target students across experimental units. Figure 5 presents data from unit assignments and Figure 6 shows the percentages recorded during daily assignments. Subject 1 exhibited a daily average of 61% appropriate conduct during unit assignment conditions and 84% during daily assignment conditions. Means of 75% and 92%, respectively, were obtained for Subject 2 and means of 64% and 81% for Subject 3 across the two main conditions. The target low academic performers, Subjects 4, 5 and 6, displayed means of 51%, 41% and 29%, respectively, during unit assignment conditions, compared to means of 68%, 68% and 71%, respectively, displayed during daily assignment conditions.

Progress reports did not significantly alter percent intervals of appropriate conduct within the two main conditions. However, the target low academic performers displayed somewhat smaller variations in work rate in units which used progress reports. Five of the six target students displayed higher averages of appropriate classroom conduct in the bonus point condition than in any of the seven other units. Subject 2 displayed an average of appropriate classroom conduct that was slightly higher in the second daily assignment condition than in the bonus point condition.

The mean percentages of intervals scored in each behavioral category for high and low target students are displayed in Table 4. The category scored with the highest frequency was "attending" fol-
Figure 5: Mean percentages of appropriate classroom conduct displayed per session by individual target students during unit assignment conditions.
Figure 6: Mean percentages of appropriate classroom conduct displayed per session by individual target students during daily assignment conditions.
Table 4: Mean percentages of each category of classroom conduct displayed by high and low achieving target students.
<table>
<thead>
<tr>
<th>Behavioral Category</th>
<th>Target Group</th>
<th>Unit Assignments</th>
<th>Daily Assignments</th>
<th>Bonus/Minus Points</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Attending</td>
<td>High</td>
<td>57</td>
<td>67</td>
<td>78</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>37</td>
<td>60</td>
<td>77</td>
</tr>
<tr>
<td>Appropriate Verbal</td>
<td>High</td>
<td>10</td>
<td>17</td>
<td>13</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>3</td>
<td>10</td>
<td>10</td>
</tr>
<tr>
<td>TOTAL APPROPRIATE</td>
<td>High</td>
<td>68</td>
<td>85</td>
<td>91</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>40</td>
<td>70</td>
<td>87</td>
</tr>
<tr>
<td>Talk-out</td>
<td>High</td>
<td>25</td>
<td>12</td>
<td>8</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>37</td>
<td>18</td>
<td>10</td>
</tr>
<tr>
<td>Not Attending</td>
<td>High</td>
<td>7</td>
<td>3</td>
<td>1</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>23</td>
<td>10</td>
<td>3</td>
</tr>
<tr>
<td>Inappropriate Verbal</td>
<td>High</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>Disruptive</td>
<td>High</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Other</td>
<td>High</td>
<td>1</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>0</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>TOTAL INAPPROPRIATE</td>
<td>High</td>
<td>33</td>
<td>15</td>
<td>9</td>
</tr>
<tr>
<td></td>
<td>Low</td>
<td>60</td>
<td>30</td>
<td>13</td>
</tr>
</tbody>
</table>
lowed by "talk-out." The high academic performers showed increases in both the attending and appropriate verbal categories across unit assignments, daily assignments and bonus points conditions. Concurrent reductions were seen in the frequency of talk-outs and intervals of not attending. Low academic performers showed similar trends of increasing percentages of attending and appropriate verbal responses while decreasing off-task talking and time spent not attending. The low academic performers showed the greatest changes, increasing attending behavior by 40% and appropriate verbal responses by 7%, while decreasing talk-outs by 27% and not attending by 20%. The high academic performers increased attending 21% while appropriate verbal responses remained the same. These subjects reduced talking by 17% and instances of not attending by 6% when contingencies for work rate were in effect. Under the bonus/minus point condition, high and low academic performers showed very similar mean percentages in all categories of classroom conduct.

**Student Preference**

The student questionnaire revealed that eight students preferred daily assignments with bonus/minus points available, six preferred unit assignments and three indicated a preference for daily assignments with all work due at the end of the unit. Twelve students reported that they preferred unit assignments with no feedback to unit assignments with progress reports. Eight students indicated that turning in assignments at the end of class helped them pace their
work, while nine stated that it did not.

Within the progress report options, thirteen students reported that progress reports were more useful when coupled with unit assignments and four indicated that they were more helpful with daily assignments. All seventeen students indicated that progress reports did not help them pace their work. Thirteen students stated that if they were teaching the course they would not want students to fill out daily progress reports. Reasons for rejecting progress reports ranged from "a waste of time" and "no use" to "boring," "stupid," "dumb," and "confusing." The only reason given for using progress reports with students was to "see what they're doing."

Fifteen students answered the question asking them to indicate the unit they liked best. Food and clothing was mentioned most often (6), with units on housing (4), banking (3) and cars (2) following. The choice of units and rejection of progress reports did not appear to be correlated with the expected grade indicated on the questionnaire. As the teacher kept the students informed as to the points they earned, the expected grades closely matched the grades actually given.
DISCUSSION

The results of the present experiment support the use of explicit pacing instructions and/or pacing requirements to increase the number of assignments completed by low achieving students. The class mean of points earned for assignments increased with the introduction of daily assignments (explicit pacing instructions), and showed a further increase with the addition of bonus and minus points (pacing requirements). Target low achieving students showed increases parallel to the group results, while the scores of the high achieving students remained high across conditions. An attempt to encourage self-pacing through daily progress reports did not effect the class mean of activity scores or the scores of either the high or the low achieving target students.

In accordance with the studies with college students (Sutterer & Holloway, 1975; Lloyd & Knutzen, 1969; Semb, Conyers, Spencer & Sosa, 1975), the results of the present study indicate that when students are given only a target date for completion of all work, the majority of assignments are completed during the last part of the time period. Semb et al. (1975) had reported that pacing contingencies had no discernible affect on students who worked rapidly of their own accord. As far as grades are concerned, the present study supports their conclusion. However, Semb at al. (1975) were referring to college students in a situation where attendance was not mandatory and classroom behavior was not a concern. The results
of the present experiment show that even those high school students who were "A" students when no contingencies were in effect showed an increase in classroom working behavior when pacing contingencies were introduced. High school students do not necessarily come to class to work, whereas that possibility is more likely in college when students voluntarily come to class.

The present study supported the conclusion of Lloyd and Knutzen (1975)\(^7\) in that a "direct relationship" was found "between the time at which the student began to turn in appreciable amounts of work and the final grade he received." Despite this relationship, however, all students in the present high school class showed increases in daily output near the end of the units and some students completed work outside of class near the end of the units. The present study dealt with time periods of about one week, while the Lloyd and Knutzen (1975) data was accumulated for one target date set for the end of the semester.

The Semb, Conyers, Spencer and Sosa (1975) and the Miller, Weaver and Semb (1974) conclusions are supported: target dates with warnings and/or contingencies did effectively control student work rate. The originally discrepant work rates of the target high and low academic performing groups of students became more similar with the introduction of daily assignments and became nearly indistinguishable when contingencies were applied to work rate.

\(^7\)ibid.
Kazdin (1973) commented that when it has been demonstrated that treatment contingencies are shown responsible for the direct changes in behavior, it may be fruitful to investigate the non-target correlates that change as well. The results of the present study indicate that pacing suggestions and requirements affected not only the target variable of assignment scores, but also caused a change in quiz scores for some students and affected changes in classroom conduct for all students. The class generally appeared to exhibit a higher percentage of appropriate classroom conduct when daily assignments, rather than unit assignments, were given, and an even higher rate of on-task behavior when bonus points for early completion and minus points for late completion of assignments were employed. The teacher rated the class as "working more" under daily assignments, "especially with bonus points." The class mean of activity scores was higher with daily assignments, but the class mean of quiz scores remained the same across treatments.

Progress reports had no discernible affect on the academic performance of the class during either daily or unit assignment conditions. It had been hypothesized that progress reports would prompt students to individually plan and pace their progress through the unit, but this effect was not seen. Students complained that progress reports were a "waste of time" and appeared to regard them as a device for the teacher to check up on them, rather than as a tool to be used for their own benefit.

Reporting on what has been accomplished when one has not been
working may be a punishing experience. The low academic performers did show a slight increase in appropriate classroom conduct, i.e. "working" behavior, when progress reports were used, but this change was not reflected in their assignment scores. Even though filling out daily progress reports may have been punishing, it evidently was not motivating enough to cause a substantial increase in work output. However, progress reports were used only in two non-consecutive units. Over a longer period of time, students may have learned to use them to their benefit.

The teacher also expressed a negative attitude toward progress reports because they had to be approved every day and took 10 - 15 minutes of the teacher's time. Perhaps the teacher, too, would have found benefit in progress reports over time. Comments and observations led the experimenter to believe that progress reports helped orient the teacher toward noting students' daily progress, which consequently led to her giving more prompts and offers of assistance.

Perhaps a more convenient record-keeping method would have been more readily accepted by the teacher.

Bonus and minus points similarly fulfill the function of keeping students and teacher aware of daily progress. The contingencies had an added facet that may have caused them to be better liked than progress reports: they included the positive element of bonus points for daily work output. Progress reports carried a more subtle positive element in that they provided a prompt for the teacher to verbally reinforce students for work output. However, verbal praise
may be an unreliable reinforcer for high school students. In addition, the teacher did not always take the opportunity to praise students for work they had done. Perhaps giving points on a clearly specified basis provided a more consistent and more appropriate reinforcement for these students.

In addition to class reactions to the various manipulations, we may investigate changes in individual target students. Targeting high and low academic performers allows an evaluation of the effectiveness of progress reports, daily assignments and bonus/minus points relative to the two groups. The encouragement of self-pacing through daily progress reports apparently did not cause a significant change in pacing during the unit assignment condition for any target student. As no contingencies were attached to daily progress during this condition, students did not refrain from doing and recording "nothing" on the progress report. The pacing of daily work was more consistent during daily assignment conditions, in general. Progress reports did not seem to significantly improve the daily work rate over that obtained in other daily assignment units. Classroom conduct displayed by the low academic achieving students was more stable and more appropriate when daily assignments were combined with progress reports than when they were not. Progress reports did not result in changes in classroom conduct for any target students during unit assignment conditions. The target students' academic performance within unit and daily assignment conditions did not change when progress reports were added.
Pacing instructions in the form of specific daily assignments did have an affect on both the academic performance and the classroom conduct of the low academic performers. Daily assignments caused an increase in the work rate and the percentage of appropriate classroom conduct of the low academic performers so that both figures approached those earned by the high academic performers. The high achievers seemed to have been pacing their work more than the low achievers during unit assignments. They showed little change in academic performance when daily assignments were introduced, but did show an improvement in classroom working behavior during the first few days of a new unit, which suggests that more work was accomplished in class and less outside of class. With specific instructions for pacing their work, the target low academic performers accomplished activities at a rate closer to that of the high academic performers.

Pacing contingencies, bonus points for early and minus points for late completion of assignments, produced an effect in both groups. Unlike the Ferritor et al. (1971), but like the Allyon and Roberts (1974) data, classroom conduct in the present experiment did improve when academic performance was reinforced. The present experiment, however, reinforced both rate and accuracy and used a double contingency of bonus and minus points, the effects of which cannot be separated. Perhaps one of the contingencies would have been as effective as both. The double contingency seemed to create an emphasis on daily completion of activities and eliminate student procrastina-
tion. When the contingencies were applied, the high academic achievers showed a higher percentage of appropriate classroom conduct and a higher initial rate of completion of activities than when daily assignments were presented without contingencies. The low academic achievers increased their initial work rate and showed a steady high work output throughout the unit in which bonus and minus points were applied. Consequating daily work rate appeared to be the most effective technique for reducing the discrepancies in work rate and classroom conduct between the target high and low academic achievers.

Through progress reports, observing students in class and checking folders after class, it became apparent that under the unit assignment condition the high academic performers completed activities both in class and outside of class. The number of activities completed by the high performers increased progressively throughout the units. The institution of daily assignments appeared to increase the amount of work done in class and decrease the amount done outside of class. The addition of bonus points nearly eliminated out-of-class working, as assignments were generally completed during class and handed in at the end of the period. This change is reflected in the increased percentage of appropriate classroom conduct displayed by the high performing subjects during the daily assignment and bonus point conditions. Quiz and activity scores remained high across conditions. Although the Ferritor et al. (1972) and Iwata and Bailey (1974) studies appeared to show a ceiling affect in classroom conduct, the present experiment demonstrated a ceiling affect in the academic
performance of the target high performers. The high baseline levels of quiz and activity scores may have obscured the possibility of change.

The low academic achievers, on the other hand, generally completed activities in class on a highly variable basis and none outside of class during unit assignment conditions. Subject 6 was an exception, completing three activities outside of class the night before assignments were due during the unit-assignment-with-progress-report condition. The introduction of daily assignments with bonus and minus points appeared to increase in-class working behavior and induce out-of-class completion of assignments for the target low achievers. Consequently, increases were seen in activity scores, quiz scores and intervals of appropriate conduct for these target students.

Observer comments showed that the high performing target students exhibited quite similar behavior patterns; namely high rates of working behavior alternated with talking to neighboring students. An exception was Subject 3 who once left class to work on her geometry and once spent the class period working on geometry homework. The target low achievers originally showed behavior patterns that were quite different from each other and from the high achievers. For instance, Subject 4 exhibited a large percentage of non-attending behavior during unit assignment conditions. He often appeared to stare into space, not talking or working. Subject 5 generally displayed inappropriate conduct in two categories: non-attending due to reading car magazines and talk-outs to other students about the
the magazine. Subject 6 showed high rates of inappropriate behavior in the same two categories. Comments showed she generally slept, read novels or talked with other students. Subjects 4, 5 and 6 all reduced the percentage of classroom time spent engaging in inappropriate activities with the introduction of daily assignments. The use of contingencies reduced inappropriate classroom conduct in all six subjects and resulted in nearly identical patterns of social behavior, i.e., high rates of working behavior.

In summary, progress reports did not effect changes in academic performance and caused a slight improvement in classroom conduct among low achievers during the daily assignment condition. All target students showed higher and more stable levels of appropriate classroom conduct with daily assignments, and the highest, most consistent levels when contingencies were applied to work rate. The discrepancy in the classroom conduct of the high and low academic groups of target students decreased with the introduction of daily assignments. The percentages became even more similar when contingencies were applied. Target low academic performers showed an increase in academic performance with the introduction of daily assignments and a further increase with bonus points. The quiz and activity scores of the high academic achievers remained at a high stable level across conditions. Thus, daily assignments and contingencies also lessened the difference in academic performance between the two groups of target students.

A number of variables must be taken into consideration, however,
when comparing data across units and conditions. Although the teacher and experimenter worked together to make the units as equivalent as possible, it is probable that students found the material presented in some units more appealing than that presented in others. Some units employed more reading activities than others, some units offered more options than others and some activities were longer than others. These variables themselves may have affected student working behavior and rate of progress.

The test scores also may have been affected by uncontrolled variables. A comparison of activity and test items shows that items found in the unit review activity correlated most highly with test items across units. Therefore, it appears possible that students could have completed only one activity, the unit review, and still received a high quiz score. Pretests were not given, adding to the difficulty of determining the relationship between activity scores and quiz scores. Tests that were mostly teacher-constructed tended to result in higher quiz grades than those tests that used a majority of items from the text publisher. This inconsistent test-construction procedure makes a comparison of quiz scores across units difficult.

In general, percentages of appropriate conduct correlated highly with activity scores. This relationship became flawed, however, when students did not turn in completed activities. The assignments appeared to be of sufficient length to necessitate using the majority of entirety of each class period to finish the work in class. Those students more skilled in reading, outlining and other academic pro-
cedures could afford to exhibit some off-task behavior during class and still complete the assignments within the class period. For the less skilled students, more time was needed to complete each activity and off-task classroom behavior was more likely to result in the need to work outside of class to complete the assignments. However, assuming that the more skilled students are the target high academic performers, the data show that they generally exhibited less off-task behavior than the less skilled students. The application of contingencies to daily work rate resulted in approximately equivalent percentages of in-class working behavior for the two groups. With the contingencies, the high academic achievers apparently reduced out-of-class completion of activities, while the low academic achievers increased out-of-class working.

Given factors such as clear directions, work appropriate to the student's skill level, objective grading criteria and an amount of work appropriate to the time available, the results of the present study suggest that teachers may increase both the academic performance and appropriate classroom conduct of their students by issuing pacing suggestions or requirements for daily work. In this way, the teacher introduces an academic variable which may also improve conduct behavior without a direct management procedure.

Further research is suggested to investigate other factors which may produce a direct relationship between academic and social classroom performance, such as activity length and number, mastery criteria, grading procedures and type of contingencies in relation to the age
of the students. An investigation into the relative effectiveness of bonus points, minus points and the combination of both could be pursued. An investigation of teacher behavior as well as student behavior may reveal additional correlated factors. Clarification of the variables affecting the relationship between academic performance and classroom conduct is needed to produce efficient classroom procedures.

After this study was written, the experimenter revisited the classroom to review the progress of the new group of students taking the Consumer's Education class. The teacher had decided to continue daily assignments and, generally, bonus and minus points. The new group of students had been characterized as "very difficult" and "not willing to work" by their previous teacher. The class consisted of 12 males and 4 females. The Consumer's Education teacher reported no conduct problems. She said the students seemed to respond well to daily assignments and worked for most of the class time.

Academic data gathered from the teacher's records showed that five students had earned "A"s, 2 "B"s, 2 "C"s, 3 "D"s, and 4 "E"s. The class average of total points earned was 75%.

Classroom observation of three high academic performers and three low academic performers showed that both groups of students displayed high percentages of appropriate classroom conduct. The target high achievers averaged 84% and 88% appropriate behavior, respectively for the two observation sessions. The target low achievers averaged 81% and 60%, respectively. The decrease in appropriate conduct for the
low achieving group was due primarily to Subject 6, who was informed that his point total was too low to earn a passing grade for the marking period even if he earned the maximum amount of points left. His working behavior was recorded as 90% during Session 1 and 27% during Session 2. The teacher commented that the low achievers were working more than usual, probably because failure notices recently had been sent to their homes.

As can be seen by the data and as confirmed by the teacher, the present group of students generally conduct themselves in an appropriate manner in the classroom. However, four students are failing the course. The procedure of daily assignments plus pacing contingencies appears to increase the consistency of daily working for most students, but is effective in solving both academic and conduct problems only when grades are motivating to the student. For students who have trouble working for grades, another source of motivation may be needed. The combination of a point system of grading and clearly specified daily assignments lends itself to contracting with the student to attach contingencies to a more suitable motivator. Contracts are being investigated for interested students in the current Consumer's Education class.
REFERENCES


Farris, H.E. The Schoolcraft project: a teacher developed teaching program, Western Michigan University, 1975.


Appendix A. Progress report form.
Today I worked on Activity # ____.
I completed ___all of it.
   ___more than half of it.
   ___less than half of it.
To complete this activity I must ______________________

________________________

(approved) (signed)
Appendix B. Student questionnaire.
Throughout this semester you have had several different types of assignment sheets and requirements. Please answer the following questions so we have your recommendations when we decide how to make the assignment sheets next semester. Thank you.

1. Which do you prefer?
   ____ A. an assignment sheet that lists activities only, all due at the end of the unit.
   ____ B. an assignment sheet that lists activities and days when each activity should be done, all due at the end of the unit.
   ____ C. an assignment sheet that lists the activity to do and turn in that day for bonus points or the next day for full credit.

2. Choose one:
   ____ A. I like to do a regular amount of work each day in class.
   ____ B. I like to do a lot of work some days and less work other days.
   ____ C. I like to work at home as well as in class.

3. Choose one:
   ____ A. Filling out progress reports at the end of class helped me pace my work.
   ____ B. Filling out progress reports at the end of class did not help me pace my work.

4. Choose one:
   ____ A. Turning in assignments at the end of class helped me pace my work.
   ____ B. Turning in assignments at the end of class did not help me pace my work.

5. I think progress reports are more helpful when the assignment sheet:
   ____ A. lists activities to do each day, all due at the end of the unit.
   ____ B. lists the activities for that unit, all due at the end of the unit.

6. I think that most of the people in this class:
   ____ A. need help pacing their work.
   ____ B. don't need help pacing their work.

7. I think that I:
   ____ A. need help pacing my work.
   ____ B. don't need help pacing my work.
8. Which do you prefer?
   ____ A. an assignment sheet that tells what to do each day,
      all due at the end of the unit, with daily progress reports.
   ____ B. an assignment sheet that tells what to do each day,
      all due at the end of the unit, without daily progress reports.
   ____ C. an assignment sheet that tells what is due at the end of the hour for bonus points.

9. The unit I liked best this semester was the one about ________.

10. The unit I got the highest grade in this semester was the one about ________.

11. What final grade do you think you will get for this course? ___

12. Which do you prefer?
   ____ A. an assignment sheet that lists activities, all due at
      the end of the unit.
   ____ B. an assignment sheet that lists activities, all due at
      the end of the unit, with daily progress reports.

13. Choose one:
   ____ A. I don't care to know how many points I have during
      the semester.
   ____ B. I want to know how many points I have during the semester.

14. If you were teaching this course, would you want students to complete daily progress reports? _____ Why or why not?
   ____________________________________________

15. Next semester should activities be due each day or at the end of the unit?  ___________________________

16. Additional comments: ____________________________
   _____________________________________________

Thanks and have a good semester!!