Assessment of student study habit effects on academic performance in introductory agronomy courses

Diana G. Helsel and Randall J. Miles

ABSTRACT

A survey of Introductory Plant Science and Introductory Soil Science students was conducted to assess their personal study habits, which were then related to the students' performance in the classes. Some impediments to good classroom performance were identified. Students appear to overestimate the length of time that they can concentrate in study. Most felt they could study for more than an hour. Students spend less time studying than faculty feel is usually necessary. Only 25% of students keep pace with reading assignments. Instructional objectives are rarely referenced until just before an exam. Last-minute preparations coupled with passive learning habits (e.g., rote memorization) cause poor class performance. It is possible that the use of multiple choice exams, low level learning objectives, and lack of individual student counseling allows many freshmen and sophomore students to continue these study habits.

Additional index words: Concentration span, Attention span, Instructional objectives, Study time, Academic performance, Passive learning, Active learning.

In introductory courses, we frequently believe that students could perform better if they were critical of their own study habits and knew how those habits related to their classroom performance. Additionally, it would be helpful for instructors and advisors to have data on student study habits to assess various teaching strategies and formats. Moser (1984) stated that some students are able to vary their learning styles. The instructor also may cope with learning diversities of students through using different approaches to instruction and counseling.

To begin to document the relationship of student study habits to grade performance, we surveyed students in the Introductory Plant Science and Introductory Soil Science classes at the University of Missouri in the winter of 1984. The survey was designed to assess student study habits, personal habits, and attitudes toward classes. Our objective was to associate these habits and attitudes with student grade performance and class standing in these courses.

MATERIALS AND METHODS

During the winter of 1984, students in the Introductory Soil Science and Plant Science courses at the University of Missouri...
responded to a 37-item survey designed to assess their study habits and attitudes. The items in the survey fell into the following categories: individual study habits, habits in lecture, and personal habits.

All responses were requested in a multiple choice format. Responses were computer coded and analyzed. Collection of information on individual students [e.g., class rank, grade point average (GPA)] was compiled through use of computerized student records. Thus, official GPA's were insured.

The students surveyed represent a cross-section of departments in the College of Agriculture. The most frequently represented major was Agricultural Economics. There are no prerequisites for Plant Science. This course also fulfills a college natural science requirement, resulting in a population of either young (e.g., freshmen) students, or older, non-science oriented students. The introductory soils course requires college algebra and chemistry, thus students are both older and more science-oriented than those enrolled in Plant Science. Combining results from these two courses provided a reasonably good representation of the College of Agriculture in terms of age, sex, major, class rank, and GPA.

RESULTS AND DISCUSSION

Study Habits Associated with Good Grades

Instructional Objectives

A wealth of information is available on the construction, implementation, advantages, and disadvantages of instructional objectives (Ebel, 1970; Mager, 1975). Many instructors devote a great deal of time and effort to developing instructional objectives designed to help the students organize and evaluate the importance of course material. Few students utilize this resource on a consistent basis, thus perhaps the greatest advantage of instructional objectives is helping instructors orient their teaching to the students perspective.

The ideal method of utilizing instructional objectives (provided they are available to students) is for students to review them prior to lecture periods. This helps them create an organizational framework for lecture material as well as aiding recognition of significant items they encounter during class activities.

Only about 10% of the students surveyed used instructional objectives prior to lectures (Table 1). Usage of instructional objectives improved after lectures: Approximately half of the students used them at this time. The time at which instructional objectives are used most frequently is prior to exams (Table 1).

Prior to major exams it appears that freshmen and sophomores tend to use instructional objectives more often than do juniors and seniors. We suspect that the more advanced students feel they already have sufficient experience in subject matter areas. Thus, they do not feel the need for the guidance the instructional objectives are designed to provide. Interestingly, students with higher grade point averages use them less than those with lower grade point averages. These students may be sensitive to signals that lecturers give that distinguish particularly important points, thus making instructional objectives a luxury but not a necessity.

It is probable that students do not recognize the importance of using instructional objectives properly. When queried as to whether they use them in other courses, if provided, a majority took advantage of this learning device sporadically (Table 2). As instructors, it is important for us to point out to students the proper times and methods for using instructional objectives.

Reading

Textbooks are selected to enhance course material, yet based on exam responses, it appears they are often not read. Our survey indicates that most students use their texts only to a limited extent. Seniors do the assigned readings more frequently than the other class groups (42% for seniors, 25% for juniors, and 17% for sophomores and freshmen).

Approximately half of the students keep up on reading assignments on a weekly basis, while very few keep up with material daily. With wide variance in reading of outside materials, it is important for instructors to remind students of the reading assignments and to integrate them into the course material.

Questions

In introductory courses, terminology and definitions may not be understood by students. We decided to assess how frequently students use a dictionary. Only 18% of the students surveyed routinely looked up words in a dictionary.

Infrequent use of dictionaries may indicate more than "laziness" on the part of the student. Dictionaries do not contain many of the technical terms that students need. Many introductory texts do not contain glossaries of technical terms, either. This places the students in the awkward position of not knowing terms and not being able to look them up in a reference.

The next logical step would be for the student to ask questions of the instructor. This also is rarely done. Only 20% of the students in this survey asked questions if they did not understand course material. We do not know what factors may cause this reluctance to question

<table>
<thead>
<tr>
<th>Level and performance</th>
<th>Before instruction objectives</th>
<th>After instruction objectives</th>
<th>Before major exams</th>
</tr>
</thead>
<tbody>
<tr>
<td>Academic rank</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Freshmen (n = 27)</td>
<td>11</td>
<td>56</td>
<td>89</td>
</tr>
<tr>
<td>Sophomore (n = 52)</td>
<td>15</td>
<td>46</td>
<td>94</td>
</tr>
<tr>
<td>Junior (n = 45)</td>
<td>13</td>
<td>47</td>
<td>82</td>
</tr>
<tr>
<td>Senior (n = 35)</td>
<td>9</td>
<td>49</td>
<td>74</td>
</tr>
<tr>
<td>Mean</td>
<td>12</td>
<td>49</td>
<td>85</td>
</tr>
</tbody>
</table>

| Academic performance  |                             |                             |                    |
| 1.0-2.0 (n = 27)      | 15                          | 44                          | 89                 |
| 2.0-3.0 (n = 84)      | 15                          | 50                          | 86                 |
| 3.0-4.0 (n = 44)      | 7                           | 45                          | 82                 |
| Mean                  | 12                          | 45                          | 86                 |
Table 2. Frequency of use of instruction objectives according to academic rank.

<table>
<thead>
<tr>
<th>Academic rank</th>
<th>Never or seldom</th>
<th>Sometimes</th>
<th>Frequent</th>
<th>Always</th>
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</thead>
<tbody>
<tr>
<td>Freshmen (n = 27)</td>
<td>11</td>
<td>56</td>
<td>19</td>
<td>15</td>
</tr>
<tr>
<td>Sophomore (n = 52)</td>
<td>12</td>
<td>42</td>
<td>29</td>
<td>17</td>
</tr>
<tr>
<td>Junior (n = 45)</td>
<td>15</td>
<td>38</td>
<td>33</td>
<td>13</td>
</tr>
<tr>
<td>Senior (n = 35)</td>
<td>20</td>
<td>23</td>
<td>31</td>
<td>26</td>
</tr>
</tbody>
</table>

Table 3. Perceived concentration span in lecture according to academic performance.

<table>
<thead>
<tr>
<th>Academic performance</th>
<th>&lt; 30</th>
<th>30-60</th>
<th>&gt; 60</th>
</tr>
</thead>
<tbody>
<tr>
<td>1.0-2.0 (n = 27)</td>
<td>15</td>
<td>74</td>
<td>11</td>
</tr>
<tr>
<td>2.0-3.0 (n = 84)</td>
<td>21</td>
<td>61</td>
<td>18</td>
</tr>
<tr>
<td>3.0-4.0 (n = 44)</td>
<td>16</td>
<td>59</td>
<td>25</td>
</tr>
</tbody>
</table>

the instructor, but fear of showing their lack of knowledge may be one.

Instructors may need to make additional reference material available to students so that they can clarify and define terms. To draw students' attention to the importance of terminology and definitions, it may be necessary to print terminology lists with each unit of a course, in addition to instructional objectives.

Conducive Environment

Most students believe they study in quiet places, particularly students with high GPA's. Half of the 3.0 to 4.0 GPA students study in quiet places. A relatively low percentage of students study with the radio and/or television (about 15%). We believe it is important for the student to be in an environment in which they feel they can concentrate efficiently.

Get Rest

Most students study in the evenings (60%). Unfortunately, 18% of the students we surveyed stay up all night to study for exams. Freshmen are most likely to stay up all night, as well as 2.0 to 3.0 GPA students. It is important for students to realize that they need to be physically, as well as mentally prepared, for quizzes and exams (O'Connell, 1981).

Misconceptions about Studying

Concentration/Attention Span

Studies of student attention span in lectures indicate that after 10 min both attention and recall decline precipitously (McKeachie, 1980). Students may overrate the length of time they can concentrate. Lecture periods on most campuses are approximately 50 min, traditionally with instructors moving from one topic to the next without a halt. Most students believe they can concentrate for most of this period (Table 3). Overall academic performance does not appear to alter this student perception: fewer than 20% of the students in any grade point bracket rated their concentration span in lecture at less than 30 min.

This trend was even more obvious when students indicated the length of time they believed they could concentrate while studying (Table 4). Freshmen were most optimistic about their concentration spans with 44% believing they could concentrate over an hour at a time. This optimism is reflected in the frequency with which students take study breaks. Most try to study 1 to 2 h before taking breaks. Students probably equate perseverance with concentration since educational psychologists indicate that the average adult concentration span is only 10 to 15 min.

As instructors, it would be appropriate for us to break our lectures in segments that can be covered in approximately 15 min (Elkins, 1983). This capsuling of concepts should coincide much better with the concentration period of many students.

Study Time

This survey involved courses with lecture, learning center, and discussion section components. We believe thorough studying for regular quizzes may shorten the study time needed for hourly exams and may assist in integrating concepts. Weekly quizzes are given during discussion sections over learning center material designed to require a minimum of 4 h participation per week. Most students spent only 1 to 2 h, on the average, preparing for these quizzes. It is possible that their study in the learning center has been effective enough to allow them to minimize their out-of-class study time, but it is more likely that their study time is inadequate.

Study times for major hourly exams (typically, 3 or 4 exams per 16-week semester) were almost always less than 10 h. The most common cumulative duration for exams was 2 to 5 h. We strongly believe that this is inadequate for most university courses that are offered for 4 to 5 semester credits. However, there was no association between longer study times and higher cumulative grade points. We do not know if these study times are indicative of the survey population’s study
habits in other courses than ours. But, if they are representative, it would imply that either the typical college course is not challenging enough or students underestimated the amount of time they spent preparing for exams. This question, as written on the survey, did not attempt to integrate time with efficiency of study time or individual study strategies.

Passive Learning

The study strategies that students adopt are important determinants of how quickly they master the material and how thoroughly they understand it. Passive learning or rote memorization and repetition is a poor learning strategy. Many college students attempt to relate what they learn to everyday situations, so they tend towards an elaborative type of studying (Helsel and Hughes, 1983) as opposed to a rote memorization, repetitive form of studying. Seniors are more likely to study by elaboration (47%) than any other group (41% juniors, 37% sophomores, 41% freshmen). Seniors also tend to try relating class material to everyday life more frequently than other students. It may be that seniors have either gradually learned these techniques through experience or have a broader basic background to integrate the information in a meaningful manner. We believe it is critical to introduce underclass students to higher level instructional objectives and test questions to develop integrative study and problem solving skills as soon as possible.

RECOMMENDATIONS

Based on the results of this survey, it may be useful for introductory agronomy instructors to consider the following points while planning their teaching strategy:

1. Teach concepts in units of 15 to 20 minute segments.
2. Inform students that instructors use instructional objectives to organize lecture and laboratory materials as well as quizzes and exams.
3. Utilize higher level instructional objectives and test questions to initiate greater active learning processes.
4. Consider whether your course is sufficiently challenging to your class.

REFERENCES