A self-guiding field trip for introductory soils students

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ABSTRACT

Changing enrollments in introductory soils courses create two undesirable conditions. Large classes make teaching through field experience impractical, and this situation is often compounded by the urban background of many students which leaves them unaware of the importance of soil to man's activities. To overcome these problems, a field trip was developed and offered to the students in a format that they could follow unaccompanied by teaching assistants or other trained personnel. This flexibility allowed the students to fit the all-day excursion into their own schedules but still benefit from the detailed written instructions and interpretations of experienced teachers. In order to evaluate the self-guided approach, several groups of students were guided through the field trip by their laboratory instructors. Eighty percent of the students in both the guided and self-guided groups evaluated the field trip as a valuable aid to their understanding of soils and indicated an increase in interest in soils as a result of the field trip. This report deals with experiences over three semesters with 375 students.

Additional index words: Auto-tutorial, Outdoor instruction, Student evaluations.

THE goals at the University of Maryland in teaching an introductory course in soil science have been to provide students with an overall view of the science in both theory and practical experience. Instilling the concept that there are soil differences and that these differences are important was one of the goals. Traditionally, this was attempted through a combination of lecture, laboratory, and field experiences. In recent years, however, changing enrollment resulted in large classes of more urban background students (1, 2). This made teaching through field experiences more important but less practical. Most students went through introductory soils without actually seeing soils in the field.

In an attempt to remedy this situation, a field trip was developed which exposed the participants to many aspects of soil formation, characterization, and management. The trip was designed to be self-guided. This approach has been used in less formal learning circumstances such as on nature trails in parks and in museum and building tours. Some of the anticipated benefits of the self-guided tour would be to decrease the teaching load and permit students to fit the all-day excursion into their own busy schedules while still benefiting from detailed written instructions and interpretations of experienced teachers.

The objectives of this project were to i) determine the importance of field experiences to students in introductory soils and ii) determine if a self-guiding field trip could replace a guided one.

METHODS AND MATERIALS

The field trip was scheduled after 9 weeks into the semester. This allowed time to prepare the students for the self-guiding field trip. Examples from the field trip were used throughout the lectures and laboratories. Slides of the field trip sites were used in lectures, and rock and soil samples from the stops were used as laboratory materials both for demonstration and in actual laboratory activities including soil pH, fertility, cation exchange capacity, and organic matter. In the nine laboratory sessions prior to the field trip, students were trained in necessary pedological skills. These included the use of color books, soil augers, determination of texture by feel, identification of major parent materials, and description of soil horizons both in the lab with soil monoliths and in the field at a soil pit. Students were not required to go on the field trip. The last two laboratory periods of the semester were assigned as independent study to allow the students time to prepare, at their option, a research paper, a literature review, or the field trip report. Virtually all the students opted for the field trip. Thus, the field trip essentially took the place of two laboratory periods.

The field trip was designed to cover the maximum diversity of soils with an easy day's drive of campus. This was fairly easy to do in Maryland because of the large number of geologic formations which strike northeast to southwest across the Piedmont and Appalachian provinces of the state. The trip was oriented southeast to northwest across the strike of the geology. Mountain scenic overlooks were routed into the field trip to give the students an aerial view of conservation practices, land-use and vegetation patterns, and geomorphic-geologic-pedologic relationships.

Stops chosen for the field trip were accessible, diverse, and informative. These included road cuts along infrequently traveled country roads and soil pits. Before going on a field trip, students were required to sign a form releasing landowners from liability. Resources included fields which were undergoing percolation testing. The perc-test pits provided an opportunity to examine the variability of soil profiles on a single landscape.

To assess the value of the field trip and the self-guided approach, groups of students guided through the field trip by their laboratory instructors were compared to groups of self-guided students. Both groups used the same handout. The field trip handout was written with these objectives: 1) to give explicit directions; 2) to show the diversity of local soils and their relationships to natural vegetation, landforms, soil management, and land use; 3) to direct student's activities at the stops; 4) to stimulate thought by posing questions relating to the student's field observations; and 5) to be entertaining, informative, challenging, and motivating to the students.

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Table 1. Enrollment of introductory soils students in field trips at the University of Maryland

<table>
<thead>
<tr>
<th>Field trip</th>
<th>Fall 1976</th>
<th>Spring 1977</th>
<th>Fall 1977</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Guided</td>
<td>100</td>
<td>131</td>
<td>78</td>
<td>309</td>
</tr>
<tr>
<td>Self-guided</td>
<td>18</td>
<td>30</td>
<td>18</td>
<td>66</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>118</strong></td>
<td><strong>161</strong></td>
<td><strong>96</strong></td>
<td><strong>375</strong></td>
</tr>
</tbody>
</table>

The field trip handout had, as its cover, a road map with the tour route indicated. The first section of the handout was a statement of objectives followed by a running commentary. This was intended to be read by a navigator and included the road log, points of interest, and a series of questions to be turned in for grading. These questions were intended to keep the student's attention focused on important features. Stops were numbered consecutively in the running commentary. For each stop there was, in the appendix, a topographic map (1:24,000) with the site located, and a stop activity sheet. This sheet identified the soil series, parent material, drainage, position, and location in the county soil survey. A short paragraph about the site's soil-management characteristics, history, land-use, or other significant features was included. Also included were instructions and questions to test the student's observations about the stop. In evaluating the field trip, the students were asked to assign a conventional letter grade of A through F to the handout, questions, organization, and usefulness of the field trip.

RESULTS AND DISCUSSION

A total of 375 students participated over three semesters (Table 1). Students were given a choice between guided and self-guided trips. Those who chose self-guided trips (18%) did so, for the most part, because they were excluded from guided trips by: enrollment limitations, schedule conflicts, or poor weather. Of these, many took advantage of the long drive into the county and extended the trip to go camping or enjoy other recreational opportunities. Even though students were reluctant to take the self-guided tour, post field trip evaluations revealed, in general, a high degree of satisfaction with the field trip and only small differences between the opinions of the guided and self-guided groups of students. The handout, which was the same for both groups, was graded high by both (Fig. 1). The mean grade, if A = 1 and F = 5, was 2.0 ± 1.1 and 1.8 ± 0.8 for the self-guided and guided groups, respectively. The self-guided students had to depend on the hand-out entirely and therefore may have been somewhat more critical of it. Answering questions proved equally unpopular with both groups: They gave fewer A grades to the post-trip questions than to any other item evaluated (Fig. 2). The mean grade, if A = 1 and F = 5, was 1.8 ± 0.8 and 1.5 ± 0.7 for the self-guided and guided groups, respectively. Field trip organization received the highest percentage of A grades, 60%, and the highest mean grade 1.5 ± 0.7 from the guided students. Forty two percent of the self-guided students gave organization an A and the mean grade was 1.8 ± 0.8 (Fig. 3). Having a teaching assistant along to help explain the guide book could make the field trip seem more organized. When asked to rate the overall usefulness of the field trip, both groups rated it highly. The guided students rated it only a little
FIELD TRIP USEFULNESS

![Field Trip Usefulness Graph]

STUDENT EVALUATION

Fig. 4. Student evaluation of field trip usefulness. The mean grades if A = 1 and F = 5 were 1.9 ± 0.9 and 1.7 ± 0.7 for the self-guided and guided students, respectively.

TOTAL FIELD TRIP EXPERIENCE

![Total Field Trip Experience Graph]

STUDENT EVALUATION

Fig. 5. Student evaluation of total field trip experience. The mean values were 2.7 ± 0.8 and 2.7 ± 0.9 for the self-guided and guided students, respectively.

higher, mean grade 1.7 ± 0.7, than the self-guided students, mean grade 1.9 ± 0.9 (Fig. 4). The students were also asked to rate the educational value of the field trip in a slightly different manner. Instead of the A, B, C, D, F grading system, the students were asked to assign an evaluation of 1 through 5 with: 1—superb, 2—the best use of time to get the most knowledge possible, 3—good-educational, 4—OK, and 5—a waste of time. With this system, 1, 2, and 3 ratings are about the same as an A or B grade, and the results were similar (Fig. 5). Mean values were 2.7 ± 0.8 and 2.7 ± 0.9 for the self-guided and guided groups, respectively.

The students were also asked to comment on what they liked best and least about the field trips. The comments tended to vary with the weather; the better the weather, the more positive the comments. Some of the items which the students liked best were: the weather, the scenery, and the aesthetics of the countryside; a chance to see soil diversity, which could not be adequately done in laboratory or lecture; practical application of soils information; the outdoors used as a classroom; and an increased interest in soils as a result of the field trips. The guided students also mentioned the informal learning experience and close contact with enthusiastic teaching assistants as important. Some of those who chose the self-guided approach missed the help and enthusiasm of their teaching assistants, although others appreciated the opportunity to work on their own. Since the guided trips ran rain or shine, some of the more negative comments were made on rainy trips. A few more optimistic students, who went in the rain, commented positively upon seeing soil erosion at work.

SUMMARY AND CONCLUSIONS

Hands-on field experiences are of vital importance in the education of today's urban soils students. These students strongly supported field trips as valuable aids, both to their understanding of and to their interest in soils. The best field trip would involve an experienced instructor and a small group of students. When manpower constraints do not permit this ideal situation, a well planned self-guiding field trip is a good alternative. This has an added advantage of schedule flexibility, something not possible in large field trips. With the self-guided approach, students must be taught basic soil skills prior to taking the trip. The field trip guide must be well written and revised frequently to accommodate land-use changes. The students who choose the self-guided tour must be sufficiently motivated to work without an enthusiastic teaching assistant to inspire them. And without an instructor, it could be difficult to evaluate the learning experience. Some students may have merely copied the post-trip questions without taking the trip. Despite these short-comings, the self-guided field trip was deemed worthwhile.

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LITERATURE CITED