

Readability of Required Undergraduate Agriculture Textbooks

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Textbooks play an important role in most undergraduate agriculture courses. Many instructors identify one or more required course textbooks and expect their students to supplement classroom and/or laboratory instruction by completing designated reading assignments. According to Ornstein (1989), textbooks have a profound affect on student learning experiences.

Given the importance of textbooks in the teaching and learning process, the selection of appropriate textbooks should be of utmost concern to agricultural educators. Wood and Rosati (1990) studied the methods which university agricultural mechanics faculty used to select introductory course textbooks. The researchers found that informal methods such as recommendations from colleagues, tradition, and publisher recommendations were most commonly used. According to Wood and Rosati (1990, p. 3), "Few instructors at the post-secondary level use empirical measures when selecting textbooks."

One factor which should be considered in textbook selection is readability. By definition, a well-written textbook should be readable. A textbook which expresses ideas and concepts in simple, everyday language is a readable textbook (Davison, 1986).

Unfortunately, readability is an often neglected factor in textbook selection (Wood and Rosati, 1990). For example,

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Chavez, Reneau, Legacy and Stitt (1983) determined that the mean readability of agriculture textbooks used in one community college was higher than the mean reading level of the students enrolled. In such circumstances, textbooks may actually hinder student learning.

It should be noted that reading grade level is not the only factor affecting readability. Readability formulas are not designed to determine how interesting a section of text will be. However, as stated by Thorndike (in Wittrock, 1986, p. 830), "Books do not have to be bad literature; but the vocabulary and sentence structure must not thwart comprehension of what the book tells, and that must be something that the pupil cares to be told."

Purpose and Objectives

The purpose of this study was to determine the readability of textbooks required in undergraduate agriculture courses at Mississippi State University during the Fall 1990 semester. Specific objectives were to:

1. determine the overall readability of textbooks required in undergraduate courses;
2. determine the readability of required undergraduate agriculture textbooks by academic department;
3. determine the readability of required undergraduate agriculture textbooks by course level (as indicated by course number); and
4. determine the relationship between textbook readability and course level (as indicated by course number).

Procedures

The official university course schedule was used to compile a list of all undergraduate agriculture courses offered during the Fall 1990 semester. Examination of the course schedule indicated that 126 courses were offered during the period (excluding Special Problems courses). Through consultation with individual course instructors and the manager of the university bookstore, 73 different required undergraduate agriculture textbooks were identified. Each of these 73 textbooks was evaluated for readability.

The Gunning-FOG Index (Gunning and Mueller, 1981) formula was used to estimate textbook readability. The formula is used to calculate readability (reading grade level) based on average sentence length and percentage of polysyllabic words per 100 word passage. When using the Gunning-FOG Index, low scores indicate more easily readable text while high scores indicate harder to read text.

The Gunning-FOG Index (Gunning and Mueller, 1981) formula was selected for use in this study due to its adaptability for calculation by computer. Although other formulas

are also used for calculating readability, previous research shows that these formulas and the Gunning-Fog Index formula produce results which are highly correlated.

A coding form was developed by the researchers in order to collect the information required for estimating readability. A sample of text (100 word minimum) was randomly selected from the first, middle, and last chapter of each textbook. Readability scores for the three samples were averaged to estimate the overall readability of each textbook. The coding form was also used to record information concerning the academic department, course title and course number associated with each textbook.

Results

The overall readability of undergraduate agriculture textbooks required at Mississippi State University during the Fall 1990 semester was 14.79 (S.D.=2.04). This indicates the average textbook was written to be easily understood by an individual with nearly 15 years of formal education (second semester sophomore).

When textbooks were grouped by academic department, agricultural and extension education textbooks received the lowest mean readability score while poultry science textbooks received the highest mean readability score. Table 1 presents descriptive statistics for the readability of textbooks by academic department.

When grouped by course level, junior-level course textbooks received the lowest mean readability score; sophomore-level course textbooks received the highest mean readability score. Table 2 presents mean readability scores for textbooks at each course level.

The final objective of this study was to determine if a significant ($p < .05$) relationship existed between textbook readability and course level. The calculated Pearson product-moment correlation coefficient of .190 indicated that no significant relationship existed between these two variables. The r^2 value of .036 indicated that less than 4% of the variance in readability could be explained by the level of the course in which the textbook was required.

Conclusions/Recommendations

Undergraduate agriculture textbooks required during the Fall 1990 semester were found to have an appropriate overall readability level. However, there were textbooks in specific courses which were written at extremely high readability levels.

The mean readability of textbooks between academic departments was relatively uniform. In addition, the readability level of textbooks within each academic department was fairly consistent.

There was no logical sequencing of textbook readability by course level. In fact, no statistically or practically significant relationship existed between course level and textbook readability. In addition, textbooks in sophomore-level classes may be written at too high a readability level.

The following recommendations were made based on the findings of this study:

1. The college instructional improvement committee

Table 1. Readability of Required Undergraduate Agriculture Textbooks by Department - Fall Semester 1990.

| Department | Number of Textbooks | FOG Readability Score | | | |
|--------------------------------|---------------------|-----------------------|------|-------|--------|
| | | X | S.D. | Min | Max |
| Agricultural & Extension Ed.10 | | 13.91 | 1.72 | 11.10 | 16.61 |
| Ag. & Bio. Engr. | 6 | 14.43 | 3.84 | 8.98 | 19.21* |
| Agricultural Economics | 6 | 14.91 | 2.80 | 11.88 | 19.56* |
| Agronomy | 10 | 15.41 | 0.60 | 14.71 | 16.56 |
| Animal Science | 5 | 14.80 | 1.17 | 13.20 | 15.75 |
| Biochemistry | 4 | 15.69 | 1.24 | 14.66 | 17.15* |
| Dairy Science | 5 | 14.81 | 2.26 | 11.96 | 17.31* |
| Entomology | 4 | 15.72 | 3.51 | 10.57 | 18.09* |
| Food Science & Technology | 5 | 14.01 | 2.19 | 11.55 | 16.95 |
| Horticulture | 2 | 14.59 | 0.03 | 14.57 | 14.62 |
| Poultry Science | 4 | 15.86 | 0.83 | 15.17 | 16.84 |
| Weed Science | 3 | 15.19 | 2.95 | 11.83 | 17.37* |
| Landscape Architecture | 9 | 14.31 | 1.59 | 12.24 | 17.59* |

*above 16 years (B.S. level)

Table 2. Readability of Required Undergraduate Agriculture Textbooks by Course Level - Fall Semester 1990.

| Course Level | Number of Textbooks | FOG Readability Score | | | |
|-------------------------|---------------------|-----------------------|------|-------|-------|
| | | X | S.D. | Min | Max |
| Freshman | 5 | 13.76 | 2.76 | 8.98 | 15.73 |
| Sophomore | 11 | 15.49 | 2.57 | 10.58 | 19.56 |
| Junior | 19 | 13.56 | 1.54 | 11.10 | 16.61 |
| Senior | 18 | 15.35 | 2.05 | 11.80 | 19.21 |
| Adv. Undergraduate/Grad | 20 | 15.34 | 1.39 | 11.96 | 17.37 |

should sponsor a faculty workshop on textbook selection with emphasis on readability.

2. Instructors should solicit input from students enrolled in their courses concerning the readability of required course textbooks.
3. Further research should be conducted to determine the match (or mismatch) between student reading ability and required course textbook readability.

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