Agricultural literacy or a lack thereof is a direct result of the transition from a rural to an urban concentration in population. The knowledge base about agriculture becomes further removed from the vast majority of Americans over time. As a result, today’s population is ill equipped to make informed decisions about food and fiber in their personal lives (Mayer & Mayer, 1974; NAS, 1988; & Tisdale, 1991). Of great concern to agriculture, the loss of knowledge means that a poorly informed public majority has input in policy decisions that may affect the agricultural industry's ability to function efficiently in an increasingly competitive world market (NAS, 1988). Communicating accurate agricultural information that is clear, concise, and complete is necessary for the population to make informed personal and public decisions.

It is important to understand the public’s knowledge and opinions toward agriculture. However, it is of utmost importance to understand the way that a given population assimilates information on which it bases its decisions and/or choices. That population is educators. They are the professionals who prepare students for tomorrow’s careers. Their impact on society is multiplied exponentially as each class of new graduates enters the workforce.
Consensus by many leading agricultural professionals, and verified in various recent studies, indicates that an increasing proportion of the population is unable to answer questions posed about basic agricultural concepts - i.e., they are not agriculturally literate (ECOP, 1987; Elliot & Dado, 1992; Elliot & Frick, 1995; Horn & Vining-Koch, 1986; NAS, 1988; Perry, 1989; Russell, et al. 1990; Zurbrick, 1990 & Zurbrick, 1991). This study measured and assessed two components that are integral to one's agricultural literacy - knowledge base and opinions. Underlying forces that contribute to the formation of one's knowledge base and opinions, and that were foundational to this study are presented in the conceptual framework.

It is important to understand that this project is item four of a four phase effort to improve the public's understanding of agricultural and environmental issues called, "Identifying and Understanding Arizona Consumers' Agricultural and Environmental Issues," The four phases include:
1. Phase one was devoted to identifying agricultural and environmental issues and comparing them with current AES research priorities and other lists of priorities.

2. Determining and testing an agricultural literacy model comprised the second phase.

3. The third phase focused on assessing the levels of knowledge and understanding attitudes that Arizona people have on the agricultural and environmental issues.

4. The final phase evaluated the effectiveness of educational and other strategies or models designed to improve agricultural and environmental literacy.

**Purpose and Research Questions**

The purpose of this study was to determine if attending an agricultural literacy conference improves the agricultural knowledge base and opinion levels of educators. The research questions developed to address the above stated purposes were:

1. Is there a difference between the agricultural knowledge base of educators who attended an agricultural literacy conference and educators who planned to attend the conference but were no shows?

2. Is there a difference between levels of agreement (opinions) toward agricultural issues by educators who attended an agricultural literacy conference and educators who planned to attend the conference but were no shows?

3. What relationships existed among the respondents' knowledge base, opinions and demographics?

**Methods and Procedures**

The research employed a descriptive survey design, using a mail survey technique, and
the study was a descriptive and relational study. An 80-statement instrument was modified from an existing instrument (Birkenholz, et al., 1992; Flood & Elliot, 1994 & Elliot & Frick, 1995).

A modified true/false format for the collection of knowledge base data was developed. Table 1 illustrates the knowledge coding process. The modified true/false format asked respondents to answer whether or not the first 40 statements were true or false, and additionally to indicate whether or not they were sure or not sure of their initial response. This technique allowed for the construction of a knowledge base continuum model (see Figure 2), and statistical analysis of the true/false data at the ordinal level.

A 4-point Likert scale was used for the collection of opinion data in statements 41-80. Validity was established by experts in the field. The instrument was pilot tested, and reliability coefficients, using the Cronbach's alpha method, were calculated at 0.83 for the knowledge base portion of the study, and 0.85 for the opinion portion of the study.

Table 1

<table>
<thead>
<tr>
<th>Knowledge Coding Process</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Participant Response</strong></td>
</tr>
<tr>
<td><strong>True or False and Sure</strong></td>
</tr>
<tr>
<td>Respondent is Correct</td>
</tr>
<tr>
<td><strong>True or False and Not Sure</strong></td>
</tr>
<tr>
<td>Respondent is Correct</td>
</tr>
<tr>
<td><strong>True or False and Not Sure</strong></td>
</tr>
<tr>
<td>Respondent is Incorrect</td>
</tr>
<tr>
<td><strong>True or False and Sure</strong></td>
</tr>
<tr>
<td>Respondent is Incorrect</td>
</tr>
</tbody>
</table>
The target population for this study was Arizona educators. The accessible population was Arizona educators who planned to attend a summer agricultural literacy conference entitled, “Teaching in the World Around Us.” The all day conference included 15 educational displays, 12 different workshops and a keynote speaker. One-hundred-thirty-nine educators registered for the conference. Ninety-seven educators actually attended the conference, leaving 42 educators as no shows.

The questionnaire was administered to all 139 registered educators using the Total Design Method (Dillman, 1978). The two comparison groups were those educators who attended the conference and those who registered but were no shows. Forty-seven percent of the educators returned questionnaires. There were eight unusable or returned questionnaires. However, Forty-nine percent of the educators who attended the conference returned questionnaires and only 33% of the no shows returned questionnaires. Early and late respondents were compared and no difference was found between the two groups, so generalizing to the entire group of registered educators is feasible (Miller & Smith, 1983). One should use caution when generalizing the results beyond the respondents due to a variety of possible selection bias concerns. Data were analyzed with SPSS/PC+, and employed frequencies, means, standard deviations, and t-tests as statistical measures. An alpha level of 0.05 was determined a prior.
Results and Conclusions

The following results should be viewed as generalizable only to the respondents:

**Research Question 1**

1. Grouped knowledge base analysis revealed that more than 15% of the accepting sample responded incorrectly to knowledge inquiries, and that almost 7% were sure of their incorrect responses. Sixty-nine percent of the respondents were sure and correct (see Table 2).

2. A comparative group knowledge base analysis showed that the educators who attended the “Teaching in the World Around Us” conference were statistically higher in correct responses than the no show educators. (see Table 2).

**Table 2**

**Grouped Analysis of Knowledge Base Assessment**

<table>
<thead>
<tr>
<th>Value</th>
<th>Label</th>
<th>Attended</th>
<th>No Shows</th>
<th>TOTAL¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>incorrect, sure</td>
<td>4.4</td>
<td>15.4</td>
<td>6.9</td>
</tr>
<tr>
<td>2</td>
<td>incorrect, not sure</td>
<td>6.7</td>
<td>15.4</td>
<td>8.6</td>
</tr>
<tr>
<td>3</td>
<td>correct, not sure</td>
<td>13.3</td>
<td>23.0</td>
<td>15.5</td>
</tr>
<tr>
<td>4</td>
<td>correct, sure</td>
<td>75.6</td>
<td>46.2</td>
<td>69.0</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100.0</td>
<td>100.0</td>
<td>100.0</td>
</tr>
</tbody>
</table>

¹Note: Due to different number of respondents from the 2 groups, the total is not an average of the two values, but an actual weighted figure.

²Note: A statistically significant difference between the two groups in correct responses was found.
Research Question 2

3. The grouped analysis for opinion assessment produced a mean of 3.04 on 4-point scale, placing the mean between strongly agree (4) and agree (3). A majority (84.5%) of the respondents felt favorable toward the opinion statements (see Table 3).

4. The educators who attended the “Teaching in the World Around Us” conference were statistically more favorable in their opinions on agriculture than the no show educators (see Table 3).

Table 3

Grouped Analysis of Opinion Assessment

<table>
<thead>
<tr>
<th>Value</th>
<th>Label</th>
<th>Attended</th>
<th>No Shows</th>
<th>TOTAL¹</th>
</tr>
</thead>
<tbody>
<tr>
<td>4</td>
<td>strongly agree</td>
<td>33.3</td>
<td>23.0</td>
<td>31.0</td>
</tr>
<tr>
<td>3</td>
<td>agree</td>
<td>55.6</td>
<td>46.2</td>
<td>53.5</td>
</tr>
<tr>
<td>2</td>
<td>disagree</td>
<td>8.9</td>
<td>23.0</td>
<td>12.1</td>
</tr>
<tr>
<td>1</td>
<td>strongly disagree</td>
<td>2.2</td>
<td>7.7</td>
<td>3.4</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>100.0</td>
<td>100.07</td>
<td>100.0</td>
</tr>
</tbody>
</table>

¹Note: Due to different number of respondents from the 2 groups, the total is not an average of the two values, but an actual weighted figure.

²Note: A statistically significant difference between the two groups in favorable (agree and strongly agree) opinions was found.
Research Question 3

5. Individuals who raised plants responded to inquiries in the knowledge base portion of the study significantly higher than those with no such experience.

6. There were no significant differences on knowledge and opinion scores between those individuals with previous agricultural education experience and those individuals who reported no previous experience.

7. There were no significant differences on knowledge and opinion scores with the following variables: gender, home location, relatives or friends in farming or agricultural business, FFA and/or 4-H membership and experience raising animals.

Educational Importance of the Study and Recommendations

1. Educators’ knowledge and opinion levels indicated a good basic knowledge and opinion about agricultural issues. This news is encouraging until the comparison between the two groups is made and the importance of attending an agricultural literacy conference is noted.

2. Educators who attended the “Teaching in the World Around Us” conference were statistically more favorable in their opinions on agriculture and more knowledgeable (agricultural literate) than the no show educators. Effective educational programs need to be developed and actively promoted so as to reach as many educators as possible. As this study indicates, quality agricultural literacy programs can make a positive difference on the targeted population.
References


FOOD AND AGRICULTURAL AWARENESS OF ARIZONA
PUBLIC SCHOOL REACHERS- A Critique

Linda Whent, University of California, Davis

This study served to evaluate the effectiveness of educational and other strategies or models designed to improve agricultural and environmental literacy. The authors should be commended for addressing a timely topic. Agricultural and environmental literacy issues continue to challenge our profession as people become more and more removed from their food, fiber, and flora systems. Instructional approaches that increase agricultural and environmental literacy levels will continue to be of paramount importance to agricultural educators.

Conceptual Framework – This descriptive study served to determine if attending an agricultural literacy conference improved the agricultural knowledge base and opinion levels of educators. The authors provided a thorough discussion of the background and need for the study. A strong theoretical base was selected for the research. The purpose and objectives of the study were clearly stated and presented.

Methodology - The knowledge portion of the instrument was modified from existing instruments. It was not clear who developed or validated the opinion instrument. An explanation would have been helpful. In addition, was the instrument field-tested, and if so, were reported reliabilities from the field test or the actual study? In the purpose statement, I would have liked to see that raising plants and agricultural education experience were part of the demographics used in determining relationships. I commend the researcher in asking respondents to indicate whether they were sure or not sure of their initial response, allowing for the construction of a knowledge base continuum model and analysis of the true/false data at the ordinal level. The target population for this study was Arizona educators. The accessible population was Arizona educators who planned to attend the literacy conference. The comparison groups included 49% of the educators attending the conference and 33% of the educators registered for the conference, but who were no shows. A mail survey using Dillman method was used. I wonder if educators, who declined to register for the conference, would have given different results than the no show group. Would a pre-test and post-test of educators attending the agriculture literacy conference provide better measures of change in knowledge and opinions?

Findings –The author stated that the results should be viewed as generalizeable only to the respondents. If we are using only the respondents, there is nothing to generalize to; they are the total population. Did the researcher mean that the findings should be viewed as generalizable to those pre-registered for the literacy conference? In the methodology section the researcher reported that frequencies, means, standard deviations, and t-tests were employed as statistical measures. Yet only frequencies were reported in tables and text. The researcher reported significant differences between groups for questions 1 and 2, but no t-test measures were reported. Question 3 sought to explore relationships between respondent’s knowledge, opinions, and demographics. Yet correlation data were not presented, instead the findings of these questions reported no significant differences. I was surprised to see no significant difference on knowledge and opinion scores with respect to agriculture related demographics. Did most self-selected respondents have agriculture backgrounds?

Conclusions and Importance of the Study - This study indicates how important agricultural literacy programs are to educators in the general public. This study had important implications as a baseline study in which to measure agriculture literacy studies. I commend the researchers for undertaking this study on a timely and important topic.