Chapter 3: Appendix 1B. Agricultural Science Survey report

The survey was conducted at the end of semester 2, 2001. The number of students in the class was 78, with 51 of them responding to the survey (65.4%). The unit of study is delivered two-thirds by the School of Physics and one-third by the Faculty of Agriculture. The TIF project is focused on the physics two-thirds and so resources and issues relating to this were of particular interest in this survey. Agriculture students studying this physics-based topic come from three different degree programs, but share a common first year of study.

1. Demographics

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Study pattern</th>
<th>Age range</th>
<th>Use of Internet</th>
<th>Use of email</th>
<th>Web access difficulties</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>female 56.9%</td>
<td>full-time 100%</td>
<td>17-20yrs 86.3%</td>
<td>don’t use 3.9%</td>
<td>don’t use 5.9%</td>
<td>no 98.0%</td>
</tr>
<tr>
<td></td>
<td>male 43.1%</td>
<td>part-time 0%</td>
<td>21-24yrs 7.8%</td>
<td>use 96.1%</td>
<td>use 94.1%</td>
<td>yes 2.0%</td>
</tr>
</tbody>
</table>

2. Information technology skills

The question asked here was “How comfortable would you be with using the following Information Technology skills?”.

<table>
<thead>
<tr>
<th>Information Technology skills</th>
<th>Very uncomfortable</th>
<th>Uncomfortable</th>
<th>Comfortable</th>
<th>Very comfortable</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>%</td>
<td>%</td>
<td>%</td>
<td>%</td>
</tr>
<tr>
<td>Computers</td>
<td>3.9</td>
<td>3.9</td>
<td>64.7</td>
<td>27.5</td>
</tr>
<tr>
<td>Internet</td>
<td>3.9</td>
<td>9.8</td>
<td>52.9</td>
<td>33.3</td>
</tr>
<tr>
<td>Email</td>
<td>3.9</td>
<td>7.8</td>
<td>51.0</td>
<td>37.3</td>
</tr>
<tr>
<td>Database</td>
<td>5.9</td>
<td>9.8</td>
<td>68.6</td>
<td>15.7</td>
</tr>
<tr>
<td>Word Processing</td>
<td>3.9</td>
<td>3.9</td>
<td>58.8</td>
<td>33.3</td>
</tr>
<tr>
<td>E-discussion groups</td>
<td>8.0</td>
<td>40.0</td>
<td>42.0</td>
<td>10.0</td>
</tr>
</tbody>
</table>

Correlations (using Pearson’s correlation) of age and gender with computer usage n=51

<table>
<thead>
<tr>
<th></th>
<th>Gender</th>
<th>Age</th>
<th>Internet</th>
<th>email</th>
<th>Comfortable with IT</th>
<th>Internet</th>
<th>email</th>
<th>database</th>
<th>WP</th>
<th>Discussion groups</th>
</tr>
</thead>
<tbody>
<tr>
<td>Gender</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>female=1 male=2</td>
<td>1.000</td>
<td>.127</td>
<td>-.028</td>
<td>-.287*</td>
<td>-.145</td>
<td>-.077</td>
<td>-.145</td>
<td>-.073</td>
<td>-.156</td>
<td>-.037</td>
</tr>
<tr>
<td>Age</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>1.000</td>
<td>.076</td>
<td>.845</td>
<td>.041</td>
<td>.316</td>
<td>.320*</td>
<td>.291*</td>
<td>.082</td>
<td>.153</td>
<td>.092</td>
</tr>
<tr>
<td>Internet use</td>
<td>1.000</td>
<td>.379*</td>
<td>.006</td>
<td>.061</td>
<td>.047</td>
<td>.311*</td>
<td>.202</td>
<td>.038</td>
<td>.246</td>
<td>.284</td>
</tr>
<tr>
<td>Email use</td>
<td></td>
<td>.059</td>
<td>.741</td>
<td>.312</td>
<td>.136</td>
<td>.193</td>
<td>.128</td>
<td>.082</td>
<td>.153</td>
<td>.117</td>
</tr>
<tr>
<td>Comfortable Computers</td>
<td></td>
<td>.682</td>
<td>.163</td>
<td>.198</td>
<td>.183</td>
<td>.021</td>
<td>.078</td>
<td>.063</td>
<td>.662</td>
<td>.415</td>
</tr>
<tr>
<td>Comfortable with Internet</td>
<td>1.000</td>
<td>.772**</td>
<td>.000</td>
<td>.000</td>
<td>.819**</td>
<td>.688**</td>
<td>.487**</td>
<td>.000</td>
<td>.000</td>
<td>.000</td>
</tr>
<tr>
<td>Comfortable with Email</td>
<td></td>
<td>.881**</td>
<td>.000</td>
<td>.000</td>
<td>.654**</td>
<td>.687**</td>
<td>.402**</td>
<td>.000</td>
<td>.265</td>
<td>.060</td>
</tr>
<tr>
<td>Comfortable with Database</td>
<td></td>
<td>.624**</td>
<td>.000</td>
<td>.000</td>
<td>.739**</td>
<td>.512**</td>
<td>.000</td>
<td>.000</td>
<td>.312</td>
<td>.612</td>
</tr>
</tbody>
</table>

* Correlation is significant at the 0.05 level (2-tailed)  ** Correlation is significant at the 0.01 level (2-tailed)
Chapter 3: Appendix 1B. Agricultural Science Survey report

3. Interaction with other Agricultural Science students for study and the extent of collaborative study

Students were asked a number of questions about their use of other students as a resource and then a set of questions to indicate how much collaborative study goes on with the class.

<table>
<thead>
<tr>
<th>Have you:</th>
<th>No %</th>
<th>Yes %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Discussed aspects of Agricultural Science with other students?</td>
<td>15.7</td>
<td>83.3</td>
</tr>
<tr>
<td>Shared/exchanged lecture and/or practical notes with other AgSci students?</td>
<td>19.6</td>
<td>80.4</td>
</tr>
<tr>
<td>Helped other Agricultural Science students catch up?</td>
<td>30.0</td>
<td>70.0</td>
</tr>
<tr>
<td>Met with other students to study Agricultural Science?</td>
<td>54.9</td>
<td>45.1</td>
</tr>
<tr>
<td>Met regularly with another student to study Agricultural Science?</td>
<td>78.4</td>
<td>21.6</td>
</tr>
<tr>
<td>Organised a group of students to study Agricultural Science together?</td>
<td>70.6</td>
<td>29.4</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Do you prefer to:</th>
<th>Yes %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Always study alone?</td>
<td>15.7</td>
</tr>
<tr>
<td>Mostly study alone, sometimes collaborate with others</td>
<td>68.6</td>
</tr>
<tr>
<td>Equally study alone and collaborate with others</td>
<td>15.7</td>
</tr>
<tr>
<td>Rarely study alone, mostly collaborate with others</td>
<td>0</td>
</tr>
<tr>
<td>Always study collaboratively</td>
<td>0</td>
</tr>
</tbody>
</table>

Correlations (using Pearson’s) of gender and age with collaborative work and study  

<table>
<thead>
<tr>
<th>Gender (female=1, male=2)</th>
<th>1.000</th>
<th>.127</th>
<th>.267</th>
<th>.231</th>
<th>.413**</th>
<th>.722**</th>
<th>.313*</th>
<th>.480**</th>
<th>.071</th>
<th>.014</th>
<th>.923</th>
</tr>
</thead>
<tbody>
<tr>
<td>Age</td>
<td>1.000</td>
<td>-.044</td>
<td>-.192</td>
<td>-.341*</td>
<td>.014</td>
<td>.037</td>
<td>-.196</td>
<td>-.159</td>
<td>-.264</td>
<td>-.200</td>
<td>.115</td>
</tr>
<tr>
<td>Discussed Ag with other students?</td>
<td>1.000</td>
<td>.738**</td>
<td>.457**</td>
<td>.283*</td>
<td>.045</td>
<td>.226</td>
<td>.160</td>
<td>.193</td>
<td>.262</td>
<td>.176</td>
<td>.002</td>
</tr>
<tr>
<td>Shared notes with other Ag students?</td>
<td>1.000</td>
<td>.547**</td>
<td>.348*</td>
<td>.012</td>
<td>.045</td>
<td>.226</td>
<td>.160</td>
<td>.193</td>
<td>.262</td>
<td>.176</td>
<td>.002</td>
</tr>
<tr>
<td>Helped other Ag students catch up?</td>
<td>1.000</td>
<td>.514**</td>
<td>.249</td>
<td>.337*</td>
<td>.016</td>
<td>.068</td>
<td>.176</td>
<td>.216</td>
<td>.262</td>
<td>.176</td>
<td>.002</td>
</tr>
<tr>
<td>Met to study with other Ag students?</td>
<td>1.000</td>
<td>.483**</td>
<td>.712**</td>
<td>.016</td>
<td>.068</td>
<td>.176</td>
<td>.216</td>
<td>.262</td>
<td>.176</td>
<td>.002</td>
<td></td>
</tr>
<tr>
<td>Met regularly to study with another student?</td>
<td>1.000</td>
<td>.708**</td>
<td>.000</td>
<td>.000</td>
<td>.016</td>
<td>.068</td>
<td>.176</td>
<td>.216</td>
<td>.262</td>
<td>.176</td>
<td>.002</td>
</tr>
<tr>
<td>Organised an Ag study group?</td>
<td>1.000</td>
<td>.000</td>
<td>1.000</td>
<td>.045</td>
<td>.000</td>
<td>.000</td>
<td>1.000</td>
<td>.000</td>
<td>.000</td>
<td>.045</td>
<td>.752</td>
</tr>
<tr>
<td>Collaborative study preference</td>
<td>1.000</td>
<td>.000</td>
<td>1.000</td>
<td>.045</td>
<td>.000</td>
<td>.000</td>
<td>1.000</td>
<td>.000</td>
<td>.000</td>
<td>.045</td>
<td>.752</td>
</tr>
<tr>
<td>Prefer to study from web-based materials</td>
<td>1.000</td>
<td>.000</td>
<td>.000</td>
<td>1.000</td>
<td>.045</td>
<td>.000</td>
<td>1.000</td>
<td>.000</td>
<td>.000</td>
<td>.045</td>
<td>.752</td>
</tr>
</tbody>
</table>

** Correlation is significant at the 0.01 level (2-tailed),  * Correlation is significant at the 0.05 level (2-tailed)

4. Study materials preference

<table>
<thead>
<tr>
<th>Do you prefer to:</th>
<th>Yes %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Study from just the textbook and lecture notes</td>
<td>41.2</td>
</tr>
<tr>
<td>Study from both textbook and web-based materials</td>
<td>54.9</td>
</tr>
<tr>
<td>Study from just web-based materials</td>
<td>3.9</td>
</tr>
</tbody>
</table>

Chapter 3: Appendix 1B – ii
5. Use of resources for learning Agricultural Science

Students were asked to indicate which resources they used during the semester unit and how useful they found them.

<table>
<thead>
<tr>
<th>Resource</th>
<th>Did not use %</th>
<th>Not useful %</th>
<th>Useful %</th>
<th>Extremely useful %</th>
</tr>
</thead>
<tbody>
<tr>
<td>Attendance at lectures</td>
<td>2.0</td>
<td>2.0</td>
<td>70.6</td>
<td>25.5</td>
</tr>
<tr>
<td>Attendance at workshops</td>
<td>0</td>
<td>5.9</td>
<td>66.7</td>
<td>27.5</td>
</tr>
<tr>
<td>Attendance at practical classes</td>
<td>0</td>
<td>9.8</td>
<td>78.4</td>
<td>11.8</td>
</tr>
<tr>
<td>Attendance at Camden field trips</td>
<td>3.9</td>
<td>35.3</td>
<td>52.9</td>
<td>7.8</td>
</tr>
<tr>
<td>Practical notes</td>
<td>0</td>
<td>9.8</td>
<td>80.4</td>
<td>9.8</td>
</tr>
<tr>
<td>Climatology textbook</td>
<td>0</td>
<td>7.8</td>
<td>60.8</td>
<td>31.4</td>
</tr>
<tr>
<td>Physical Principles &amp; Processes textbook</td>
<td>2.0</td>
<td>10.0</td>
<td>56.0</td>
<td>32.0</td>
</tr>
<tr>
<td>El Niño web site</td>
<td>3.9</td>
<td>9.8</td>
<td>51.0</td>
<td>35.3</td>
</tr>
<tr>
<td>Transfer processes web site</td>
<td>3.9</td>
<td>11.8</td>
<td>49.0</td>
<td>35.3</td>
</tr>
<tr>
<td>Bureau of Meteorology web site</td>
<td>5.9</td>
<td>15.7</td>
<td>54.9</td>
<td>23.5</td>
</tr>
<tr>
<td>Peer group</td>
<td>2.0</td>
<td>14.0</td>
<td>72.0</td>
<td>12.0</td>
</tr>
<tr>
<td>Internet</td>
<td>2.0</td>
<td>11.8</td>
<td>64.7</td>
<td>21.6</td>
</tr>
<tr>
<td>Library</td>
<td>23.5</td>
<td>23.5</td>
<td>43.1</td>
<td>9.8</td>
</tr>
</tbody>
</table>

Pearson’s correlation was used to see the links between use of different resources.
6. Open-ended questions were used to investigate five areas further:

- **Web-based modules**
  
  There were two web-based modules specially developed for this unit of study. What do you think was the purpose of these web-based modules? Why do you think the unit coordinators arranged for these special modules to be included? How relevant do you think these ideas will be to your future in agriculture?

  68.6% of respondents answered this question. The purpose and reason for including the web-based modules was seen to be:
  
  - to provide a variety of learning and teaching methods or materials (42.8%). The students felt that the web-based material was more visual, more interesting and a self-paced style of research which was different to the normal lecture-based material.
  - to provide opportunities and skills in using the web for research and information gathering (28.6%)
  - to help in learning the material (22.9%)

  80% of respondents felt that the web-based modules were very relevant. Only one student found the modules irrelevant to future agricultural needs.

- **Workshops**
  
  One lecture per week was replaced by a special workshop in this unit of study. What do you think was the purpose of these workshops? Why do you think the unit coordinators included these workshops in your unit?

  68.6% of students responded to this question. Response to the workshops was overwhelmingly positive. Some students gave more than one reason. Purpose and reason for inclusion of the workshops was seen to be:
  
  - to provide opportunity for discussion, cooperation or interaction among peers (30.5%)
  - to help in understanding or comprehension of the concepts (20.3%)
  - to complement lectures, give examples of things in lectures or develop ideas presented in lectures (16.9%)
  - to encourage independent study (8.5%)
  - to provide a variety of learning methods (8.5%)
  - to see practical relevance of the material (8.5%)

  The students thus seemed to feel that they were learning without being formally ‘taught’ by the lecturers and they enjoyed that experience. Three students felt that the workshops gave them valuable practice answering questions, and one felt that there was opportunity to ask the lecturer questions. The only negative comment about the workshops came from one student who felt that the notes for the workshops were too detailed and it was hard to find the central idea.

- **Practical work**
  
  The practical component of the unit of study consisted of laboratory classes and field trips. What do you think was the purpose of the practical component? Why do you think the unit coordinators included field trips? How did the practical component help support your understanding of physical concepts relevant to agriculture?

  38 students (74.5%) responded to this question. The responses to these questions overlapped. Many students gave more than one point for comment.

  Perceived purpose was:
  
  - to provide real-world or practical application of theory (46.5%)
  - to help with the understanding of the physical concepts (25.6%)
  - to have some “hands-on” experience (16.3%)
  - to assist teamwork or social interaction (7%)
  - to provide another way of learning or a variety of learning experiences (4.7%)

  Several students mentioned that the practicals were useful or good. However, a greater number (23.7%) questioned the relevance of the field trips to Camden. The main problem here seemed to be,
the travel and effort required for the trip did not seem to warrant the outcomes. It should be noted here that, according to the course coordinators’ records more students commented on the field trips than the number who actually participated in them and due to staff changes in the Faculty of Agriculture the scheduling of the field trips was unfortunate (the first was scheduled for the day after the Faculty of Agriculture ball and the second for the last day of semester).

- **Relevance of the unit of study**

  *This unit of study is specially designed to help you learn physical concepts relevant to agriculture. How worthwhile do you think the unit of study has been to you? How has it helped you appreciate the role of physics in agriculture? How has it changed your view of the world? What else would you like to see in this unit of study?*

A majority of respondents answered these questions (68.6%). Of these, 45.7% considered the unit worthwhile, 31.4% fairly worthwhile, and 14.3% not relevant to the study of agriculture. Only six students mentioned change to their world view. Four stated that it had not changed their world view.

31.4% of students suggested some changes to the unit of study. These included:
- changes to the practical work
- more help and explanation required
- more time needed to cover the content
- content is too detailed and specific
- the physics needs to be more related to Agriculture

- **Balance of the unit of study**

  *This unit of study has lectures, workshops, web-based material, laboratories and field trips. What do you think about the current amount of each of these components in this unit of study? Should any particular components be increased or decreased?*

60.8% responded to this question. Of these, 58.1% were very happy with the current balance of the unit of study and several remarked that the variety of components made the unit interesting and enjoyable. The remainder of respondents (41.9%) felt that there should be some changes to the unit components or balance:
- decrease the lecture program or make it more comprehensible (23%)
- increase in web-based materials (13%)
- more workshops (13%)
- fewer workshops (13%)
- more field work (10%)
- less field work (10%)
- less practical work or more relevant practical work (10%)
- “less hard physics” (3%)

**Discussion**

**Skills with computers**

Well over 90% of students use email and the Internet and report having no difficulties with Internet access. Regarding electronic media, 84% were comfortable or very comfortable with database use, and 92% were comfortable or very comfortable with the use of word processing. The only computer-based skill that the students were uncomfortable with was the use of online discussion groups, where 48% reported discomfort. There is no structured use of email within this unit either from the lecturer for communication, or in a chat-line or discussion group situation.

**Correlation of age and gender with computer usage**

- More female than male students use email
- Older students are more likely to feel comfortable using the Internet and email
- Not surprisingly, Internet and email uses are positively correlated
- Using computers in general has a strong positive correlation with feeling comfortable using the Internet, email, database, word processing and electronic discussion groups
Email use, Internet use, database use, and use of computers in general have strong, positive intercorrelations. The correlation between feeling comfortable with electronic discussion groups and feeling comfortable with email and word processing was not significant however.

**Extent of collaborative study**

Peer group interaction is built into the unit of study structure. Students are put into groups of 4 for laboratory work, workshops and field trips.

When studying, 84% of the respondents prefer to study partly collaboratively, although 55% of students have not actually done so. Informal collegial help with study is common, with around 80% discussing some aspects of the unit with others and exchanging lecture notes and helping other students.

Males are more likely than females to have helped another student catch up. They are also more likely than females to have met with other students to study, met regularly with another Agriculture student to study, and to have organised an Agriculture study group.

There is a web of intercorrelations between virtually all of the “helping others with study” factors such as meeting with other students to study, sharing notes, discussing Agriculture with others and organising a study group. Most of the helping behaviours are common, with sharing lecture notes, discussing Agriculture with peers and helping another catch up being the most common (70-83%). Less common, at 45% was meeting with another student for study. Even less common was meeting with another student regularly for study (22%).

**Study materials preference**

There is a small majority of students who prefer to study using both web-based materials and text-based materials (55%). A large minority (41%) of students are happy with studying from just the textbook and lecture notes (and presumably the laboratory notes), but despite this, 96% had tried two of the web sites and 94% tried the third web site. This web site usage may well have been in the workshops, where two of the sites formed part of an exercise. Of the students who tried the web sites, the approval rating was high with an average of 83% finding them either useful or extremely useful.

There is no significant correlation between preference for studying from web-based materials versus print and gender, age, helping behaviours and collaborative study.

**Use of resources for learning**

At the time of this survey, there were two books of course notes for this unit of study – *Physical Principles & Processes in Agriculture* and *Climatology*. Despite the two book resources gaining a favourable rating from students, 23% have not used the library and a further 23% did not find the library a useful support to their learning.

The practical notes and practical classes are found to be overwhelmingly useful or very useful by students with 90% finding them useful or very useful.

The Camden field trips were found not useful by a large 35% of students and a small percentage (4% or 2 respondents) did not go to them. 61% of students found the Camden field trips useful or very useful.

- There was no correlation between gender and the use of any resources.
- There was general agreement between the usefulness of just about all the resources for this subject.
- There was a significant positive correlation between the usefulness of the Climatology book and the Physical Principles & Processes book, the usefulness of all 3 web sites, the field trips, practical classes, practical notes and attendance at lectures.
- The older students were more likely to find the Physical Principles & Processes book useful, the Camden field trips useful and the three web sites useful.
- The usefulness of attendance at practical classes was positively and significantly correlated with that of field trips, both books, two of the three web sites and the Internet in general.
- Surprisingly, those who saw the library as useful were also more likely to see the Internet as useful to their studies.
Open-ended questions were used to further investigate five areas.

- **Web-based modules**
  
  *There were two web-based modules specially developed for this unit of study. What do you think was the purpose of these web-based modules? Why do you think the unit coordinators arranged for these special modules to be included? How relevant do you think these ideas will be to your future in agriculture?*

  69% of respondents answered this question.

  Fifteen out of the 35 responses (43%) felt that the purpose of the web-based modules was to provide a variety of learning and teaching methods or materials. The students felt that the web-based material was more visual, more interesting and a self-paced style of research which was different to the normal lecture-based material. This was expressed:

  - Keeps the learning process interesting by varying the way you are being taught.
  - They were provided as another way of teaching the material.
  - To complement the lecture information and give a visual component to the written information to help us understand the topics in an interactive way.
  - To encourage people to work on their own accord; to make learning more ‘interactive’
  - Purpose – to provide interactive learning and ensure that the material was understood.
  - Independent study and research skills.
  - Gain info. from diff. source
  - Self-learning
  - They can take their time to learn

  The second most prevalent reason seen by the students for the introduction of the web-based modules was to provide opportunities and skills in using the web for research and information gathering. Roughly twenty nine percent (29%) saw the purpose in this way. This was expressed:

  - To give an idea on using the web for info gathering. So as to allow us to develop our own research skills.
  - Purpose and reason for inclusion: to develop skills in researching a topic and summarising information; to provide opportunity specifically for web-based research.
  - To get us to use the Internet to gain knowledge.
  - Purpose – to integrate the Internet skills into the course, and to present and learn the info in a different way.
  - To learn – refresh how to access web sites and understand them.
  - To get us to do individual work in our own time, improve our computer and Internet skills.

  The third most prevalent reason, with 23% of the respondents, was simply to help in learning the material. This was expressed:

  - I thought the purpose was to help us understand the topics more by researching and summarising it ourselves.
  - To summarise and consolidate principles and phenomenas – diagrams, animation, etc.
  - Helped understand through visual, relevant and useful.
  - Purpose was to help learn and understand

  One student, perhaps wanting to express the idea that the modules reinforced learning, made a stronger statement –

  - To enforce lecture based learning by making students enforce their understanding through personal study.

  One student felt that the web-based material introduced new material, but most felt it was an aid to learning material already introduced via other media to the students.

  The remaining part of the questions on the web-based modules asked:

  *How relevant do you think these ideas will be to your future in agriculture?*

  Most respondents commented on the relevance of the web-based modules. Eighty percent of those commenting thought the modules were very relevant. This was expressed:
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- The modules are very relevant especially at the farm level and when it comes to conducting farm analysis.
- I found it very relevant to what we were studying and it will be beneficial in the future.
- Having an understanding could help in predicting climate
- Relevance: both topics were relevant to environmental issues and should be useful in the future
- They will be helpful for use as we can predict the weather and what crops to plant.

Only one student found the modules irrelevant to future agricultural needs. The other unfavourable comments were only weakly critical:
- May be useful, but not to a great extent for Ag.
- Not that relevant/Some will?
- These ideas were somewhat relevant.

- Workshops

One lecture per week was replaced by a special workshop in this unit of study. What do you think was the purpose of these workshops? Why do you think the unit coordinators included these workshops in your unit?

35 students (69%) responded to this question. The two questions on the workshops were answered together. Many students gave more than one point for comment.

The responses to the workshops were overwhelmingly positive. One student just wrote Good. Others were more voluble:
- WORKSHOPS WERE GREAT! They helped us to understand important concepts
- The workshops are useful as they cover topics and give examples of the things we study in lectures.
- They were extremely useful in learning, which is why I thought they were included.

A majority of respondents felt that the workshops were included to provide opportunity for discussion, cooperation or interaction among peers (30% of responses). This was expressed:
- To help us learn, to interact and work in a group
- To fully understand the topics by using discussion and tasks
- To learn in a group: to share ideas and cooperate
- Workshops provided opportunity for group work where we could discuss ideas with peers and practise working cooperatively

A second major theme (20%) was that the workshops helped in understanding or comprehension of the concepts. This was expressed:
- Workshop helped a lot. Helped us understand. Very useful.
- Show we can comprehend and reinterpret results and info. To see we understood the units.
- The purpose of the workshops is to have the students analyse and comprehend physical things in agricultural situations.
- To help understand the concepts of the topics.

Another major theme was to complement lectures, give examples of things in lectures or develop ideas presented in lectures (17%). This was expressed:
- The purpose of the workshops was to develop our knowledge of lecture material
- To go over lecture material, reinforce the concepts
- Complement lecture information

To encourage independent study, to provide a variety of learning methods, and to see practical relevance of the material were 8% of the reasons given. The independent study reason is interesting in the light of the collaborative nature of the workshops and their perceived reason for introduction. It was expressed in the following way:
- The workshop was designed to help with self-learning. It enabled us to research and learn independently.
- To break up the boredom of lectures and to allow for self-learning and peer group consultation.
- ... provide the opportunity to learn and interact with peers while compiling information.
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The students thus seemed to feel that they were learning without being formally ‘taught’ by the lecturers and they enjoyed that experience.

Three students felt that the workshops gave them valuable practice answering questions, and one felt that there was opportunity to ask the lecturer questions. The only negative comment about the workshops came from one student who felt that the notes for the workshops were too detailed and it was hard to find the central idea.

- **Practical work**

  *The practical component of the unit of study consisted of laboratory classes and field trips. What do you think was the purpose of the practical component? Why do you think the unit coordinators included field trips? How did the practical component help support your understanding of physical concepts relevant to agriculture?*

38 students (74%) responded to this question. The responses to these questions overlapped. Many students gave more than one point for comment.

- **Real-world or practical application of theory** was the major purpose perceived by the respondents (46% of responses). This was expressed:
  - To apply theory to the practical side – more relevant to the outcomes of this degree.
  - Purpose was to show how principles might be applied. Fluid or heat practicals are great! They will be very useful in the future.
  - To demonstrate practical applications of theory in the real world.
  - The lab classes may help to study visually what is seen in lectures.

A related purpose perceived by 16% of reasons was to have some ‘hands-on’ experience. This was expressed:
  - Purpose: hands-on experience with tutors with different ideas
  - ... to get hands-on experience and to be able to relate topics back to real world situations
  - ... practical experience of topics being studied.

- **The practical components helped with the understanding of the physical concepts.** This was mentioned by 26% of responses. This was expressed:
  - Helped understand the concepts
  - Field trips link physics to ag.

Several students mentioned that the practicals were useful or good. However, a greater number (24%) questioned the relevance of the field trips to Camden. The main problem here seemed to be, the travel and effort required for the trip did not seem to warrant the outcomes. It should be noted here that, according to the course coordinators’ records more students commented on the field trips than the number who actually participated in them and due to staff changes in the Faculty of Agriculture the scheduling of the field trips was unfortunate (the first was scheduled for the day after the Faculty of Agriculture ball and the second for the last day of semester). This was expressed:
  - Practical component didn’t really have any relevance to agriculture.
  - I have no idea as to what the practical component was for. The prac which we conducted mostly seemed to have little relevance to our course. Time could have been better spent doing almost anything.
  - I didn’t find the prac component very useful. It was ambiguous, and could have been more conveniently completed on the uni campus.
  - I think the field trips were unnecessary and could have easily been conducted at uni. However in general I think the practicals were beneficial.

Several students (7%) of reasons felt that the practical component was included to assist teamwork or social interaction. A smaller number (5% of reasons) felt that the practical component provided another way of learning or a variety of learning experiences.
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- **Relevance of the unit of study**

  *This unit of study is specially designed to help you learn physical concepts relevant to agriculture. How worthwhile do you think the unit of study has been to you? How has it helped you appreciate the role of physics in agriculture? How has it changed your view of the world? What else would you like to see in this unit of study?*

  A majority of respondents answered these questions (69%). Again, because of the four questions in one section, not all parts were addressed by all respondents.

  The **perceived relevance of the unit of study** was seen to be 46% worthwhile, 31% fairly worthwhile, and 14% not relevant. Comments reflecting this range of opinions were:

  - *(Worthwhile)* Very useful – essential – best subject done so far. Very relevant to know the physical concepts to understand how agricultural systems work.
  - *(Worthwhile)* This unit has been very worthwhile as it has presented a lot of relevant information backed up by practical reference to show the role of physics in Agriculture.
  - *(Fairly worthwhile)* The unit was relevant to some degree. I can appreciate weather a lot more – simple things are more clear now.
  - *(Fairly worthwhile)* I enjoyed the topic and felt it was fairly relevant. Liquid flow and temperature stuff I felt was particularly useful.
  - *(Not relevant)* As I learnt nearly all of what was taught during the lectures and pracs some time during junior high school I found it boring irrelevant and somewhat elementary.
  - *(Not relevant)* Not useful at all – no relevance to Ag

  Only six students mentioned **change to their world view**. Four stated that it had **not changed their world view**. The two positive replies were:

  - It has changed my view of the world – physics is involved.
  - More appreciative of the environment.

  A large minority of students suggested some **changes to the unit of study** (31%).

  Three students referred to the practical work. They desired:

  - More interesting pracs
  - More relevant field exercises
  - More outdoor pracs with a horticulture bent

  Two students felt that **more help and explanation was required**:

  - The unit of study in itself seems good, but the demonstrators need to give more actual help. They don’t ever answer the question just talk over things. We need direct help to answer questions.
  - More help and explanation

  Two students felt that **more time was needed to cover the content**. Another two students felt that there was too much content or that the **content was too detailed and specific**:

  - Its great to know specific agricultural concepts but not how water moves
  - I don’t think we need to know about it in such depth.

  A further two students felt that the **physics needs to be more related to Agriculture**, but one student wanted “more physics”.

- **Balance of the unit of study**

  *This unit of study has lectures, workshops, web-based material, laboratories and field trips. What do you think about the current amount of each of these components in this unit of study? Should any particular components be increased or decreased?*

  Of those in the survey group, 61% responded to this question. Of these, 58% were **very happy with the current balance of the unit of study** and several remarked that the variety of components made the unit interesting and enjoyable.

  The remainder of respondents (42%) felt that there should be some changes to the unit components or balance.
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The most frequent suggestion (23%) was to decrease the lecture program or make it more comprehensible:

- Lectures should be decreased or made more comprehensible
- Lectures hard to comprehend
- Too much content in lectures
- Lectures should be made more interesting (2 students)
- Decreased lectures

An increase in web-based materials was requested by 13% of respondents. There were no suggestions to decrease the amount of web-based materials.

The workshop component attracted an equal number of students suggesting more workshops (13%) and fewer workshops (13%).

The field work component again attracted equal numbers suggesting more field work (10%) and less field work (10%).

However, in regard to practical work, 10% of respondents suggested either less practical work or more relevant practical work. There were no suggestions to increase the amount of practical work.

One student pleaded for “less hard physics”, while another student suggested that the simpler physics such as electricity would be better substituted with weather patterns.