Improving Science Students’ Communication Skills - IDEAS BANK

Fill in the G.A.P.

Genre – What format is the students using to communicate?

<table>
<thead>
<tr>
<th>Personal</th>
<th>Academic</th>
<th>Popular Culture</th>
<th>Public Affairs</th>
<th>Professional/Workplace</th>
</tr>
</thead>
<tbody>
<tr>
<td>Letter</td>
<td>Text book section</td>
<td>Magazine article</td>
<td>Opinion piece</td>
<td>Cover Letter</td>
</tr>
<tr>
<td>Reflection</td>
<td>Abstract</td>
<td>Advertisement</td>
<td>Advocacy website</td>
<td>Brochure</td>
</tr>
<tr>
<td>Blog</td>
<td>Review article</td>
<td>Bumper sticker</td>
<td>White paper</td>
<td>Technical manual</td>
</tr>
<tr>
<td>Text message</td>
<td>Experimental report</td>
<td>Comic book</td>
<td>Advocacy poster</td>
<td>Email</td>
</tr>
<tr>
<td>E-mail</td>
<td>Poster</td>
<td>Greeting card</td>
<td>Policy brief</td>
<td>Grant Proposal</td>
</tr>
<tr>
<td>Tweet</td>
<td>Research proposal</td>
<td>Tweet/ snap chat</td>
<td>Documentary film</td>
<td>Press release</td>
</tr>
<tr>
<td>Facebook page</td>
<td>Presentation</td>
<td>Online Forum</td>
<td>Persuasive speech</td>
<td>Chemical Register</td>
</tr>
</tbody>
</table>

Audience – Who is the student communicating with?

<table>
<thead>
<tr>
<th>Personal</th>
<th>Academic</th>
<th>Professional</th>
<th>Public Affairs</th>
</tr>
</thead>
<tbody>
<tr>
<td>Self</td>
<td>First year students</td>
<td>Funding Bodies</td>
<td>Advisory panel</td>
</tr>
<tr>
<td>Family member</td>
<td>Researchers</td>
<td>Customers/patients</td>
<td>Advocacy group</td>
</tr>
<tr>
<td>Future/past self</td>
<td>High school teachers</td>
<td>Other professionals</td>
<td>Tourists</td>
</tr>
<tr>
<td>Dear Abby</td>
<td></td>
<td>Boss/colleague</td>
<td>Journalists</td>
</tr>
</tbody>
</table>

Purpose – Why is the student communicating?

- To inform
- To present results
- To give instructions
- To express feelings
- To provide an opinion
- To provide a solution
- To teach

- To imagine
- To entertain
- To influence
- To justify
- To convince
- To highlight significance

- To plan
- To evaluate
- To explain
- To critique
- To compare
- To answer a question
- To summarise

Examples – being specific helps students focus and makes it easier for you to assess

<table>
<thead>
<tr>
<th>Audience</th>
<th>Purpose &amp; Genre</th>
</tr>
</thead>
<tbody>
<tr>
<td>Naive audiences who need new information or a clear explanation of something. Here the student is the expert.</td>
<td>A student who missed last week’s lecture: Explain the difference between velocity and acceleration in a 2 min video</td>
</tr>
<tr>
<td>Your boss who is seeking options to do X and has asked you to provide a recommendation</td>
<td>Your boss who is seeking options to do X and has asked you to provide a recommendation: Do the research and lay out the options in a technical report to clarify the different options for analysing a dataset</td>
</tr>
<tr>
<td>A person who submits a question to the “Dr Science” Q&amp;A Facebook page</td>
<td>A person who submits a question to the “Dr Science” Q&amp;A Facebook page: You are “Dr Science”. Write a Facebook entry in less than 250 words to resolve an argument about ….. Don’t confuse the writer by using any special scientific terms unless you explain clearly what they mean.</td>
</tr>
<tr>
<td>Puzzled audiences with sceptical tendencies who are of equal status to the student. The students’ role is to present, through critical analysis and thinking, a ‘best solution’ to a problem.</td>
<td>A chemist/clinician requires a chemical solution to do X and has asked you to provide a recommendation: Create a technical report that details the options for different chemical solutions and concentrations and provide a recommendation</td>
</tr>
<tr>
<td>The association of farmers for sustainable futures need to provide a recommendation to its stakeholders about Y</td>
<td>The association of farmers for sustainable futures need to provide a recommendation to its stakeholders about Y: Create an oral presentation that evaluates the scientific basis of X and Z and, based on this, provide a recommendation them</td>
</tr>
<tr>
<td>You are a research assistant to a state legislator who needs to decide whether or not to support a new law about Y</td>
<td>You are a research assistant to a state legislator who needs to decide whether or not to support a new law about Y: Using the analysis tools/literature debate we have learned in class, write a recommendation memo to your boss.</td>
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<tr>
<td>Busy audiences who need a distillation of the take home message or most important points. This requires the student to synthesize and summarise</td>
<td>Busy audiences who need a distillation of the take home message or most important points. This requires the student to synthesize and summarise: In less than 145 characters write a tweet that summarizes the main finding or key message of the research article Y</td>
</tr>
<tr>
<td>A fellow scientist wants to keep up with the latest findings on the topic of X</td>
<td>A fellow scientist wants to keep up with the latest findings on the topic of X: In less than 145 characters write a tweet that summarizes the main finding or key message of the research article Y</td>
</tr>
<tr>
<td>Your lab mate wants to know the most important finding from your recent set of experiments on Z</td>
<td>Your lab mate wants to know the most important finding from your recent set of experiments on Z: Write an email that begins by highlighting the most important finding from your experiments followed by a full description of your results.</td>
</tr>
<tr>
<td>You encounter a potential employer on a ride in the lift to the 11th floor of a building</td>
<td>You encounter a potential employer on a ride in the lift to the 11th floor of a building: Deliver a spoken ‘elevator pitch’ that summarizes X in under two minutes</td>
</tr>
</tbody>
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UQ Teaching and Learning Week  Produced by Dr Louise Kuchel and Rebecca Mills
The School of Biological Sciences
The University of Queensland
Lead-in activities – Making the PROCESS of communication explicit

These activities also provide opportunities for students to obtain FEEDBACK BEFORE submitting their assignment.

1. Getting students started. Have students…
   • Brainstorm ideas to stimulate thinking about a topic or an approach or lines of argument
   • Generate a tree of questions and sub-questions that might be used to address the topic
   • Create an annotated bibliography where the relevance of each reference is summarised

2. Getting students to clarify & plan. Have students…
   • Create a dot-point outline of the assignment
   • Submit a storyboard
   • Speak for 2 min in class about the main experimental finding or message
   • Write for 2 min about an idea or question to clarify their thinking (called a minute paper)
   • Identify parts of a topic or steps in a process they don’t yet understand (= muddiest point)
   • Present a sketch of graphs with legends that illustrate the most important study findings

3. Getting students to revise. Have students…
   • Peer review drafts in answer to questions about communication
   • Write a summary and swap with a partner for feedback on clarity or quality of argument
   • Debate arguments with classmates
   • Peer review aims or concluding paragraphs
   • Write/ask questions in response to concluding paragraphs written by other students
   • Self or peer assess their assignment
   • Peer review aims or concluding paragraphs
   • Write/ask questions in response to concluding paragraphs written by other students
   • Self or peer assess their assignment
   • Create a dot-point outline of the main message/topic in each paragraph of their assignment to check organisation of ideas

4. Getting students to polish. Have students…
   • Peer edit and proof reading session
   • Complete a checklist of formatting instructions
   • Practice (for oral or performance assessment)

G.A.P.O.M. – explicit marking criteria for communication

The suggestions for criteria below are not exhaustive and the examples focus on aspects of communication.

<table>
<thead>
<tr>
<th>Criteria</th>
<th>Example wording/ideas</th>
</tr>
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</table>
| **Genre: are the specific conventions, rules or design principles followed?** | Essay
  • Is the writing structured with a clear introduction, body and conclusion?
  • Do the lines of argument support the thesis statement?
  • Have reference sources been correctly cited in text and in the reference list?
| **Scientific journal article / lab report** | Is the writing structured with appropriate information presented in each section?
  • Does the introduction specify the aims of the study?
  • Is the most important data presented in a figure or table?
| **Webpage or poster** | Is the text presented in small chunks?
  • Does the page contain pictures/graphics and/or white space between the text?
  • Is the page visually appealing?
| **Email** | Does it have a subject line that informs the reader about the content of the email? |
| **Audience: does it suit?** | Is the language and vocabulary suited to this audience?
  • Are jargon and technical terms explained in a way suitable for this audience?
  • Is sufficient background information provided for this audience to understand the information?
  • Has information not essential for this audience been excluded? |
| **Purpose: is it focused?** | Has information essential to this purpose been included? And non-essential excluded?
  • Does the assignment elicit the intended outcome/response for this purpose (eg, persuade, inform, call to action, answer the question, etc)? |
| **Organisation of content** | Does the content have a logical flow of ideas? Are paragraphs/sections in a logical order with effective transitions?
  • Are paragraphs well developed with topic sentences and supporting information?
  • Are sentences well structured? Concise and not verbose? |
| **Mechanics of Writing, or speaking, etc** | Is the spelling, grammar and punctuation correct?
  • Can the speaker be heard easily from the back of the room?
  • Is the footage clear and can it be watched without feeling motion-sick? |