Grading (and Feedback) in the Sciences

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Saturday November 10th, 2018
Learning Objectives

At the end of this session, you will be able to:

1. Explain the rules of academic integrity
2. Discuss the necessity and importance of grading in higher education
At the end of this session, you will be able to:

1. **Explain** the rules of academic integrity
2. **Discuss** the necessity and importance of grading in higher education
3. **Determine** reasons for developing criteria and standards for grading
4. **Use** a rubric to grade students’ responses
5. **Deliver** constructive feedback
Overview

Part 1
Theory & Academic Integrity

Part 2
Grading

Part 3
Feedback

Assessment
Theory

Why do we do work?

Are grades even necessary?

Why do we grade?

What do grades mean?
Why do we do work? Do we want direction?

Why do we grade? Are grades even necessary?

What do grades mean? What is an “A”?

Who am I to judge your work?
Theory

Why do we do work?

Checkmark, sticker or smiley face?

Do we want direction?

Why do we do work?

Are grades even necessary?

Do we grade?

What do grades mean?

Who am I to judge your work?

Do we want help?
McGill Students

Common “Types”

Deep

Strategic

Surface
Power of Assessment

Assessment shapes the way our students approach learning. It can influence how they do their homework, how they study, and how they collaborate.
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We can use feedback & grading to improve the learning experience & performance of students!
1. McGill Policy: **do not accuse the student.**
   “If you are a teaching assistant, you should report the incident to the course instructor, who should report it to [a] disciplinary officer.”

2. Prevention is possible
   - Be vocal about how plagiarism hinders learning.
   - Establish dialogue with course supervisor.
   - Reduce their stress

3. Resources:
   - Dean of students: 
     [http://www.mcgill.ca/students/srr/honest/staff/student](http://www.mcgill.ca/students/srr/honest/staff/student)
Grading

TA concerns

time, rubric, red, life, pass, incomplete, coffee, much, okay, scholarship, busy, boring, stress, bell, hours, late, curve, fail, more, errors, request, worries, points, scheme, awards,grading, happy, meh, critic, grants, ugh, overdue, tired, deadlines, feedback, marks, overwhelmed, grades, work, extension, confused, easy, criticism, office
What are your **concerns** about grading?

**Team A:** Answer the question from an undergraduate student’s perspective.

**Team B:** Answer the question from a TA’s perspective.
Grading methods & tips

Methods

1. Grade all of the first questions first
2. Grade each paper starting from the last question
Methods

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2. Grade each paper starting from the last question
3. Do the assignment yourself and use that as a guide
4. Use a student’s work as an answer key
Grading methods & tips

**Methods**
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**Tips**
1. Grade in the morning
2. Grade with music (not Netflix!)
Grading

Methods
1. Grade all of the first questions first
2. Grade each paper starting from the last question
3. Do the assignment yourself and use that as a guide
4. Use a student’s work as an answer key

Tips
1. Grade in the morning
2. Grade with music (not Netflix!)
3. Don’t look at the student’s name/ID number
4. Don’t grade when you’re hungry
5 minutes

Individually, read the short answer response and grade the response out of 10.

Share grades with your table.
Explain how a solar eclipse occurs and its impact on the world. You may use a diagram.

Source: https://www.exploratorium.edu/sites/default/files/SolarEclipse.jpg
A solar eclipse is when the sun and moon interact and the amount of light received by the earth is reduced. The moon blocks some or all of the sun’s light onto Earth. When a solar eclipse occurs it is dangerous to look directly at the sun even though there is less light being emitted. A solar eclipse is not a common occurrence, but one could be seen in North America in August.
Individually, read the second short answer response and grade the response out of 10.

Share grades with your table.
A solar eclipse is a phenomenon that occurs when the moon orbits between the sun and earth. Not all of the earth will experience a solar eclipse at the same time. During this time, the moon can partially or fully block the sun and the amount of light reaching the Earth is reduced. The day gets darker, and thankfully it only lasts up to 3 hours so plants and animals are not severely affected. In comparison, a lunar eclipse is when the moon passes behind earth.
After reading the second student’s work, would you change the grade of the first response? Why or why not?
A rubric is:

“A guide listing specific criteria for grading or scoring academic papers, projects, or tests”
(Merriam Webster, 2017)
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“A guide listing specific criteria for grading or scoring academic papers, projects, or tests”
(Merriam Webster, 2017)

Rubrics are helpful because they:
1. Organize the way marks are distributed
2. Promote fair grading
3. Are instructions for students and TAs
## Grading

### Rubric examples

<table>
<thead>
<tr>
<th>Category</th>
<th>Exceeds Standard</th>
<th>Meets Standard</th>
<th>Nearly Meets Standard</th>
<th>Does Not Meet Standard</th>
<th>No Evidence</th>
<th>Score</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Title Page</strong></td>
<td>Title: Your Name, Teacher’s Name, Course Period, Date. Neatly finished-no errors.</td>
<td>Evidence of four</td>
<td>Evidence of 3</td>
<td>Evidence of 2 or less</td>
<td>Absent</td>
<td></td>
</tr>
<tr>
<td><strong>Thesis Statement</strong></td>
<td>Clearly and concisely states the paper’s purpose in a single sentence, which is engaging, and thought provoking.</td>
<td>Clearly states the paper’s purpose in a single sentence.</td>
<td>States the paper’s purpose in a single sentence.</td>
<td>Incomplete and/or unfocused.</td>
<td>Absent, no evidence</td>
<td></td>
</tr>
<tr>
<td><strong>Introduction</strong></td>
<td>The introduction is engaging, states the main topic and previews the structure of the paper.</td>
<td>The introduction states the main topic and previews the structure of the paper.</td>
<td>The introduction states the main topic but does not adequately preview the structure of the paper.</td>
<td>There is no clear introduction or main topic and the structure of the paper is missing.</td>
<td>Absent, no evidence</td>
<td></td>
</tr>
</tbody>
</table>

### Sub-criteria

<table>
<thead>
<tr>
<th>Sub-criteria</th>
<th>Excellent (90-100%)</th>
<th>Good (70-90%)</th>
<th>Average (50-70)</th>
<th>Unacceptable (0-50%)</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>2.5 Citation format</strong> (2.5%)</td>
<td>All citations are formatted consistently with the style chosen and contain no errors.</td>
<td>Minor mistakes in the formatting of the citations. All elements included.</td>
<td>A few elements are missing or errors are present in more than one citation.</td>
<td>Many elements are missing and errors are present in the citations.</td>
</tr>
</tbody>
</table>
Rubrics are helpful, but always remember to ...

1. Check that your colleagues are using it the same way

2. Modify (maybe) the rubric after reviewing a few answers

<table>
<thead>
<tr>
<th>Grades (%)</th>
<th>Grader 1</th>
<th>Grader 2</th>
<th>Grader 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Citation format</td>
<td>Student 1</td>
<td>54</td>
<td>76</td>
</tr>
<tr>
<td></td>
<td>Student 2</td>
<td>68</td>
<td>84</td>
</tr>
</tbody>
</table>
5 minutes

Use the rubric to regrade the two student responses.

Interpret the rubric as you see fit.

What grade did you give them?
## Grading

### Solar eclipse short answer rubric

<table>
<thead>
<tr>
<th>Category (marks)</th>
<th>10 %</th>
<th>50 %</th>
<th>100%</th>
</tr>
</thead>
<tbody>
<tr>
<td>Science explanation (6) e.g. eclipse, partial, total, orbit, corona</td>
<td>Did not answer the question</td>
<td>Response has some missing information.</td>
<td>Response is scientifically sound</td>
</tr>
<tr>
<td>Terms (2) e.g. eclipse, partial, total, orbit, corona</td>
<td>Did not use key terms correctly</td>
<td>Used some key terms correctly</td>
<td>Used the appropriate amount of key terms correctly</td>
</tr>
<tr>
<td>Provide examples e.g. partial and total solar and lunar eclipse (1)</td>
<td>Did not provide examples</td>
<td>Have mentioned one examples</td>
<td>Have provided more than one example</td>
</tr>
<tr>
<td>Impact(s) of solar eclipse on Earth/animals (1)</td>
<td>Did not provide any impact of solar eclipse</td>
<td>Provide one impact</td>
<td>Explained one or more impacts</td>
</tr>
</tbody>
</table>
Discuss with your group the rubric and your interpretation.

- Where does your grade differ?
- Argue for your viewpoint!
- Where would you make changes?
NOT SURE IF MY JOKE IS GENUINELY FUNNY

OR THEY'RE LAUGHING BECAUSE I HAVEN'T YET FINISHED MARKING ASSIGNMENTS...
😊 Good job
Most info is helpful
Is this feedback positive?

Yes- Hands up!
No-

😊 Good job
Most info is helpful
Feedback

Workshop feedback so far

Is this feedback **effective**?

Yes- **Hands up**!
No-
Feedback

Workshop feedback so far

Is this feedback constructive?

Yes- Hands up!
No-

😊 Good job
Most info is helpful
Positive vs. Constructive vs. Effective
Positive vs. Constructive vs. Effective

Productive!
When giving **productive feedback:**

1. You want to avoid empty praise: be specific

2. You can be **corrective**, **directive**, or **facilitative** with your feedback

3. You want to **motivate** us to improve

Adapted from Shute (2008), Nicol & MacFarlane-Dick (2004), and Doran (1981)
Feedback
Types of Feedback

Corrective:
Tells the student what to do

Directive:
Tells the student how to fix a problem

Facilitative:
Guides the student to their own solution
2. What is the molecular formula of glucose? C₆H₁₂O₆
2. What is the molecular formula of glucose?

\[ C_6H_{12}O_6 \]
2. What is the molecular formula of glucose?

\[ \text{C}_6\text{H}_{12}\text{O}_6 \]
Feedback

Types of Feedback

Corrective:

The number of Cs and Os are equal. Hs fill the remaining bonds.

Directive:

C₆H₁₂O₆

Facilitative:

It’s a 6C cyclic sugar. Try drawing it to help write the formula.

2. What is the molecular formula of glucose?

C₆H₁₂O₆
Feedback

Delivery methods

- Time
- Quality

Effective Feedback
Feedback

What to consider before I give feedback:

- 0%
- 25%
- 50%
- 75%
- 100%
Feedback

Feedback is a teaching tool

Devote your time to...

• Develop 2-3 important skills

• Foster situations in which students can take some *concrete action* to improve before final evaluation

• Promote situations in which you can increase *motivation* or *confidence*
Feedback burger

Light and fluffy opening comment
Feedback burger

- Light and fluffy opening
- Comment
- Some minor things to work on
Feedback burger

Light and fluffy opening comment

Some minor things to work on

One major skill

Feedback

One major skill

Some minor things to work on

Light and fluffy opening comment
Feedback

Feedback burger

- Light and fluffy opening comment
- Some minor things to work on
- One major skill
- Light closing
<table>
<thead>
<tr>
<th>Light and Fluffy start</th>
<th>Some minor things to work on</th>
<th>One major skill to work on</th>
<th>Light closing</th>
</tr>
</thead>
<tbody>
<tr>
<td>Excellent job on writing a thorough introduction</td>
<td>There are spelling mistakes</td>
<td>The methods section of the lab report are not clear as the processes are not scientifically sound or safe</td>
<td>Keep working hard</td>
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</tr>
<tr>
<td>Good job on your presentation</td>
<td>There reference list is missing on the last slide</td>
<td>The presentation was over the time limit. Prior practice on the presentation can help to manage the time</td>
<td>Great use of figures</td>
</tr>
</tbody>
</table>
What is feedback?

Feedback is an approach used to provide information on how to improve a specific learning process. Usually, feedback is used after an exam, presentation, and assignment. The feedback should be clear and very detailed. Additionally, it should identify the only the strengths. Finally, feedback should be S.M.A.R.T.
What is feedback?

Feedback is an approach used to provide information on how to improve a specific learning process. Usually, feedback is used after an exam, presentation, and assignment. The feedback should be clear and very detailed. Additionally, it should identify the only strengths. Finally, feedback should be S.M.A.R.T. What does S.M.A.R.T. stand for?

Feedback should look like

Good introductory explanation. However, FB has to happen during all the learning process.

Just after?

Recheck whether FB should be detailed or not.

?????? Recheck whether FB should be detailed or not.
Productive feedback is **SMART:**

- **S**pecific
- **M**easurable
- **A**chievable
- **R**elated
- **T**imely

Adapted from Shute (2008), Nicol & MacFarlane-Dick (2004), and Doran (1981)
Productive feedback is SMART:

Specific
Measurable
Actionable
Relevant
Timely

Adapted from Shute (2008), Nicol & MacFarlane-Dick (2004), and Doran (1981)
Provide feedback to one of the student responses.

Think S.M.A.R.T.!
Review your feedback.
If your feedback was a food, would it be a...

...
Assessment

In the media

Source: https://www.youtube.com/watch?v=0fn_vAhu_Lw
Assessment
1. **Prevent** plagiarism by talking about it often with students and showing them how to properly reference resources.
Assessment Summary

1. **Prevent** plagiarism by talking about it often with students and showing them how to properly reference resources.
2. **Plan** a feedback and grading strategy that best uses your time and effort before you start working.
3. **Set** clear criteria and standards for your grading.
Assessment Summary

1. **Prevent** plagiarism by talking about it often with students and showing them how to properly reference resources.
2. **Plan** a feedback and grading strategy that best uses your time and effort before you start working.
3. **Set** clear criteria and standards for your grading.
4. **Use** grading rubrics as a starting point for consistency across time and across many graders.
5. **Provide** feedback to students regularly & ask them for feedback too!
Questions?
Comments?
Feedback 😊
Assessment

Source: https://www.phdcomics.com/comics/archive.php?comicid=4
WOW. THERE ISN'T A SINGLE MISTAKE ON THIS PAPER.

SOMEBODY ACTUALLY GOT IT RIGHT!
FINALLY! I CAN'T BELIEVE...

THIS IS THE ANSWER KEY. I MADE THIS.