How Perusall Scoring Works

Perusall scoring uses six different metrics of student engagement (called components) to generate a single score. Each component promotes behaviors that research shows predict positive learning outcomes. The components are:

1) Annotation content component
2) Opening assignment component
3) Reading component
4) Active reading time component
5) Getting responses component
6) Upvoting component

Each component has a “target” associated with it. A component’s “target” is the percentage of the total score of an assignment that a student can earn from that component alone. For example: if the Annotation content component target is 60%, then students are able to earn up to 60% of their score from the Annotation content component.

Students’ final scores for assignments are the total credit they’ve earned across all scoring component targets, from 0% to 100%. If the six component’s targets add up to more than 100%, students could earn full credit in different ways. For example, with the Holistic grading default setting (Settings > Scoring), the Annotation content score target is 60%, the Opening assignment target is 20%, the Reading target is 20%, the Active reading target is 10%, the Getting responses target is 20% and the Upvoting target is 20%. A student could earn full credit for an assignment from just the Annotation content score target, Opening assignment target, and Reading target. They could also earn full credit by earning some credit from all six components.

<table>
<thead>
<tr>
<th>Component</th>
<th>Target</th>
</tr>
</thead>
<tbody>
<tr>
<td>Annotation content</td>
<td>60% for this component</td>
</tr>
<tr>
<td>Opening assignment</td>
<td>20% for this component</td>
</tr>
<tr>
<td>Reading</td>
<td>20% for this component</td>
</tr>
<tr>
<td>Active reading</td>
<td>10% for this component</td>
</tr>
<tr>
<td>Getting responses</td>
<td>20% for this component</td>
</tr>
<tr>
<td>Upvoting</td>
<td>20% for this component</td>
</tr>
</tbody>
</table>

Students’ final scores are scaled to reflect your course’s Assignment score range. The Assignment score range is the lowest and highest possible score a student can earn on an assignment. For example, if a student has a final score of 60% for an assignment and the Assignment Score Range is 0 to 1, then the final score is scaled to 0.6.

Assignment score precision is how many decimal places final scores are rounded. For example: If a student has a final score of 64%, your course’s Assignment score range is 0 to 10 and the Assignment score precision is 0, then the student’s final score will be 6. If the Assignment score precision is 1, then the student’s final score will be 6.4.
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Many components also have an “increment”, which is the percentage of the target students earn for performing a task (such as opening an assignment, actively reading, upvoting, or eliciting a response or an upvote). For example: if the **Opening assignment target** is set to 20% and the **Opening assignment increment** is set to 1%, then students would earn the full 20 percent of credit by opening the assignment 100 times.

![Opening assignment component](image)

Suggestion:

Since the goal of Perusall scoring is not to differentiate between students but to motivate student engagement, our default scoring options (**Annotation content only, Holistic**) primarily aim to motivate student engagement. Our defaults strike this balance, so it is not necessary to customize your scoring settings. However, if you choose to use custom scoring settings, we encourage providing students several avenues to reach full credit and erring on the side of leniency. Then, students will fret less about grades and focus more on the text and engaging in meaningful conversation with peers.

**Communicating to students about scoring**

We suggest providing students with general guidelines about scoring, without going into the specifics of the metrics that you have selected. (You can customize a welcome message to students in **Settings > General**.) We firmly believe that defining too precisely how students’ levels of engagement are assessed sends the wrong message to students and encourages them to try to “game” the grading algorithm. This leads to the student perception that the reading assignments are just “busy work”; instead, we want students to be intrinsically motivated to “engage” in Perusall because they see the connection between the readings and their own mastery of the reading material. We view the scoring as a way to invite students to join the conversation, rather than an end in itself.
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**Releasing Scores**

Assignments are scored automatically as students are working and scores automatically appear in the gradebook. However, these scores will not appear to students until you have released them. By default, scores are not released until you manually release them (by clicking the Release grades buttons at the bottom of assignments’ columns in the Gradebook).

In **Settings > General**, you can choose to have Perusall automatically release grades **after the final assignment deadline has passed**, or **immediately as the student submits work**. We tend to advise against the setting **immediately, as the student submits work**, since it can result in students trying to "game" the system or else do only what is required of them. You can also choose not to release grades by selecting **never (hide the gradebook and disable Perusall’s scoring)**. We have the concept of releasing scores so you can review grades before students see them (in case you want to tweak scoring parameters, or manually review or edit scores).

**Grade Sync**

Grades are synced to the Learning Management System [LMS] either manually or automatically (or not at all). By default, Perusall automatically syncs individual assignment scores back to the LMS once you release them. However, you can elect to automatically sync average scores rather than individual assignment scores, manually sync grades, or not sync grades under **Settings > General**. When Manual grade sync is enabled, you sync the grades for an assignment by clicking the **Sync to LMS** button in the gradebook and then selecting the assignment you want to sync. Grades only sync after they are released to students.

**Threshold Scoring**

Threshold scoring allows you to give students either credit or no credit for assignments. Threshold scoring is pass/fail scoring. If a threshold is present in the **Threshold score for credit** field, then all scores in the gradebook will either appear as 1 (meaning meets threshold) or 0 (meaning does not meet threshold). Credit is given for scores at or higher than the threshold. For example, if you keep the default Assignment score range of 0-3 and set a threshold of 2, then students’ scores will show as a 1 if their score would have been a 2 or 3, and will show as a 0 if their score would have been a 0 or 1.
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Scoring components

1) The Annotation content component gives credit based on the average quality of a student’s top annotations submitted on time. You set the number of annotations to be scored. Quality is calculated by a machine learning algorithm that uses linguistic features to predict the score that you would assign manually as an instructor.

Perusall automatically scores students' annotations as low, medium, or high quality. The point values for each quality level are (by default) relative to each other and respectively 0, 1, and 2. You can adjust these values to give more credit or less credit for each quality level and choose whether they are on a relative or absolute scale. For example, given a scale of 3/4/5, a quality score of 3 is 60% of the maximum on an absolute scale and 0% of the maximum on a relative scale. On the same scale, a quality score of 4 is 80% of the maximum on an absolute scale and 50% of the maximum on a relative scale. If you want to ignore annotation quality and give full credit to any annotations, then set all relative quality scores to the same number (for example, 1/1/1 instead of 0/1/2).

You can also set a Post-deadline reply window or a Late annotation period. A Post-deadline reply window extends the deadline for responding to existing threads for full credit. A Late annotation period extends the deadline for both starting and continuing discussion threads, but credit declines linearly relative to how much time is left in the Late annotation period. At the beginning of the Late annotation period, comments posted receive full credit. By the end, comments posted receive no credit. If a Post-deadline reply window and a Late annotation period are both enabled, the Post-deadline reply window is applied to responses first, and the Late annotation period is applied afterwards.

By default, the setting that Students cannot earn more credit (for annotations) after the deadline than they earned before it is enabled in Settings > Scoring. This means that students cannot earn more credit from their annotations created during the Post-deadline reply window or the Late annotation period than they earned before the deadline. For example, if this setting is enabled and a student earns 20% of the assignment credit from annotations before the deadline, then that student could earn at most 20% in additional credit from annotating after the deadline. This encourages students to complete most of the assignment before the deadline.

Instructors can set a distribution penalty for responses that are not evenly distributed throughout the content. For example, if there are 5 annotations required and there are over 5 pages in an assignment, then a student would receive no penalty if the 5 annotations are on different pages, but the maximum penalty if all 5 annotations are on one page.

2) The Opening assignment component gives credit for each time students open an assignment, which encourages students to chunk their work into multiple sessions instead of completing their work in fewer but longer sessions. Research indicates that students who chunk their readings do better on exams than students who read in fewer sessions.
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3) The **Reading component** gives credit to students based on the percentage of the pages or sections they open. For example: if they open 50% of the pages of an assignment, they get 50% credit for the **Reading component**. If the assignment is a web page, video, or podcast, students will receive full credit for the **Reading component** upon opening the assignment (since there are no pages/sections for Perusall to keep track of).

4) The **Active reading time component** gives credit for each minute the student spends actively engaging with the assignment. This is determined by some sort of mouse movement or keypress at least once every 2 minutes.

Please note that students must access their assignments from the **Assignments** tab (or an assignment-specific link in your Learning Management System) rather than the **Library** tab of Perusall to receive credit for the **Active reading time component** and **Opening assignment component**. If students do not complete their reading and annotations within the assignment itself but rather in the library, then Perusall cannot track their **Active reading time component** and **Opening assignment component**. For this reason, we recommend making it explicit to students that they will not receive full credit for their work unless they access and complete their assignments from the **Assignments** tab (or an assignment-specific link in your LMS). Consider disabling any generic Perusall links, to ensure that students always access Perusall through assignment-specific links.

5) The **Settings responses component** gives credit for writing comments and questions that elicit responses from other students. This rewards students for starting threads that generate discussion among the class.

6) The **Upvoting component** gives credit for either writing comments and questions that are upvoted by other students, or for upvoting other students' comments, or both. This encourages students to provide informal feedback by upvoting each others’ comments.

You can determine scoring settings for these components at the account-level by clicking **Settings > Scoring**. You can override these settings at the assignment-level when creating or editing an assignment.

**Example**

The next page is an example of how a particular assignment might be scored, based on the targets noted below.
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<table>
<thead>
<tr>
<th>COMPONENT</th>
<th>DESCRIPTION</th>
<th>TARGET</th>
<th>SCORE EARNED</th>
</tr>
</thead>
</table>
| Annotation quality component  | Suppose a particular assignment requires 4 annotations for full credit, and a student submits 5 comments, with scores of 0, 0, 1, 2, and 2. Perusall will consider only the 4 best annotations, so only the scores 0, 1, 2, and 2 will be used for computing the score. The average quality score is \((0 + 1 + 2 + 2) / 4 = 1.25\).  

Now the distribution penalty is applied. Suppose that the student's distribution score was 4/5, and the maximum possible distribution penalty is 10% (the Perusall default). This means that the average quality score of 1.25 will be reduced by \(1.25 \times (1 - 4/5) \times (10\%) = 0.025\), to 1.225, out of a maximum of 2.

Since the target is 60, the student's score on the annotation quality component is \((1.225 / 2) \times 60 = 36.75\). | 60%   | 36.75%        |
| Opening assignment component  | Suppose the **Opening assignment increment** is 5%, and the student has opened the assignment 3 times. This means that the student’s score on the **Opening assignment component** is \((3 \times 5\%) \times 20 = 3\). | 20%   | 3%            |
| Reading component             | Suppose that the assignment is 15 pages and the student has read 12 of them. This means that the student’s score on the reading the material component is \((12 / 15) \times 20 = 16\). | 20%   | 16%           |
| Active reading time component | Suppose that the **Active reading increment** is 0.5%, and the student has actively read for 20 minutes. This means that the student’s score on the reading the material component is \((20 \times 0.5\%) \times 10 = 1\). | 10%   | 1%            |
| Getting responses component   | Suppose that the **Getting responses increment** is 1%, and the student has written questions and comments that have elicited a total of 30 responses. This means that the student’s score on the **Getting responses component** is \((30 \times 1\%) \times 20 = 6\). | 20%   | 6%            |
| Upvoting component            | Suppose that the **Upvoting increment** is 1%, and the **Receiving upvotes increment** is 2%. Suppose that of the student’s five posted annotations, three received no upvotes, one received 4 upvotes, and one received 3 upvotes. And suppose that the student upvoted 10 other comments. This means that the student’s score on the **Upvoting component** is \((7 \times 2\% + 10 \times 1\%) \times 20 = 4.8\) | 20%   | 4.8%          |

## Final Calculation

Adding up the scores for each of the six components gives \(36.75 + 3 + 16 + 1 + 6 + 4.8 = 67.55\) out of a possible 100. This is rescaled to the final assignment score scale of 0-3 through the calculation \(67.55 / 100 \times 3 = 2.0265\). This is rounded to the nearest integer, so this student would receive a final assignment score of 2.