

## How scoring works

### Overview

Perusall's engagement score allows you to combine multiple metrics of student engagement into a single score. Up to six different components can be combined into a single score to encourage students to engage in behaviors that research shows predict positive learning outcomes.

Each of the six components has a **target** that can be set from 0 to 100, and represents the maximum credit that the student can earn from that component. The student's score on each of the six targets is summed; a final score of 100 or above will be translated to the maximum possible assignment score (which you can change in **Settings > Advanced**), and final scores between 0 and 100 will be scaled to the assignment score range.

You can set the targets so that they add to more than 100, which indicates that students can earn full credit in multiple ways. (Setting a target to 0 means that the corresponding component will not be incorporated into the engagement score.) We encourage you to do this so that the bar for full credit is not so high that students put undue focus on the grade -- we would much rather have students focusing on engaging in natural discussion! The goal of the Perusall scoring is not to differentiate between students but rather to motivate students to participate; as a result, we believe erring on the side of being more generous is beneficial.

### Communicating to students about scoring

We suggest that you provide students with general guidelines about what scoring, without going into the specifics of the metrics that you have selected. (You can customize a welcome message to students under **Settings > General**.) We firmly believe that defining too precisely how students' level of engagement is 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 upon itself.

## Releasing scores

Each assignment is graded automatically as students are working. Scores for each assignment will show up in your gradebook, but will not appear to students until you have released the scores. You can release scores in three ways:

- **Manually**, from the gradebook, after you have reviewed the scores for that assignment.
- **Automatically, after the assignment deadline has passed**, so you do not need to manually release scores after each assignment.
- **Automatically, as students are working**. We generally recommend against this option, as it may lead to students attempting to “game” the system rather than participate fully in the discussions.

## Scoring components

### Annotation quality component

Each comment or question in Perusall is automatically scored by the system and rated as below expectations, meets expectations, or exceeds expectations. In your course settings, you decide how many points each of these categories should be worth (by default 0, 1, and 2 points, respectively).

You can also set the following parameters in your course settings:

- How many comments/questions by each student will be taken into account when computing their grade for the assignment (by default, 7). Perusall will score all of the students' comments and questions and use only the average score of their top-scoring annotations when computing their score.
- The maximum penalty for failing to evenly distribute annotations evenly throughout the chapter (by default, 10%).
- The final score scale (by default, 0-3). Students' final scores for each assignment are rescaled to this scale and then rounded to the nearest integer.

If you set a **post-deadline reply window** in your scoring settings, students can respond to existing comments or questions for full credit for a certain amount of time after the deadline. (This is to encourage students to respond to each other's questions and comments even when the initial question or comment is made close to the deadline.) However, note that students cannot earn more credit after the deadline by entering responses than they have already earned from their work before the deadline. (This check exists to prevent students from simply starting

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the assignment after the deadline and earning full credit by simply responding to other students' questions or comments.)

If you set a **late annotation period** in your scoring settings, Perusall will automatically award partial credit for annotations made after the deadline based on when the comment was made. For example, comments made three-quarters through the late annotation period will receive 25% of the credit they would have received if made on time.

## Opening assignment component

To encourage students to chunk their work into multiple sessions (rather than just do all of their reading and commenting in a single session), you can give students credit for opening the assignment multiple times. The **opening assignment increment** setting indicates what fraction of the target is earned for each time the student opens the assignment.

## Reading component

To encourage students to read to the end of the assignment, students will earn a pro-rated percentage of the reading target based on what percentage of the pages or sections they open. (If you assign a single page or a single section of a reflowable book, the student would earn full credit for this component automatically.)

## Active reading time component

To encourage students to devote time to reading, you can give students credit for each minute spent actively reading (i.e., not counting time when Perusall is open but they are not actively interacting with the browser). The **active reading increment** setting indicates what fraction of the target is earned for each minute spent actively reading.

## Getting responses component

To encourage students to pose thoughtful questions and comments that generate good discussion, you can give students credit for the replies that you and other students post on their comments. The **getting responses increment** setting indicates what fraction of the target is earned for each reply posted on their comments.

## Upvoting component

To encourage students to “upvote” each other’s questions and comments (i.e., click the question mark to indicate “I have the same question,” or click the green checkmark to indicate “this answer helped my understanding”), you can give students credit when they upvote others’ annotations, as well as when they write good questions or comments that are upvoted by

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others. The **receiving upvotes increment** setting indicates what fraction of the target is earned when someone else upvotes the student's comment, and the **upvoting increment** setting indicates what fraction of the target is earned when the student upvotes another student's question or comment.

## Example

Below is an example of how a particular assignment might be scored, based on the targets noted below. Note that the target values add up to more than 100%, which just means that the student can earn full credit in multiple ways.

### Annotation quality component (target 60%)

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  $1.25 * (1 - 4/5) * (10\%) = 0.025$ , to 1.225, out of a maximum of 2.

Since the target is 60, the student's score on the annotation quality component is  $(1.225 / 2) * 60 = 36.75$ .

### Opening assignment component (target 20%)

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  $(3 * 5\%) * 20 = 3$ .

### Reading component (target 20%)

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  $(12 / 15) * 20 = 16$ .

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## Active reading time component (target 10%)

Suppose that the spending time actively 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  $(20 * 0.5\%) * 10 = 1$ .

## Getting responses component (target 20%)

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  $(30 * 1\%) * 20 = 6$ .

## Upvoting component (target 20%)

Suppose that the upvoting increment is 1%, and the receiving upvotes increment is 2%. Suppose that of the student's 5 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  $(7 * 2\% + 10 * 1\%) * 20 = 4.8$

## 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  $67.55 / 100 * 3 = 2.0265$ . This is rounded to the nearest integer, so this student would receive a final assignment score of **2**.