

Differential Improvement and the notion of Differential Education

Differential improvement focuses on how a particular user (student) improves from ignorance to mastery relative to any concept (indicator). "Differential" relates to the measured slope (mastery over time) for any given indicator over time as shown in Figure 5 below.

Mastery is determined by aligned assessment. Assessment items can also be refined by psychometric analysis (see Section on "Metrics").

Mastery of a concept varies from user to user. The ability of SAI to discretely track mastery of concepts for every user is implicit in the platform.

Retention of a concept varies by individual over time. Owing to the automatic (as well as assignable) assessment scheduling concepts can be re-tested to validate or insure continued mastery.

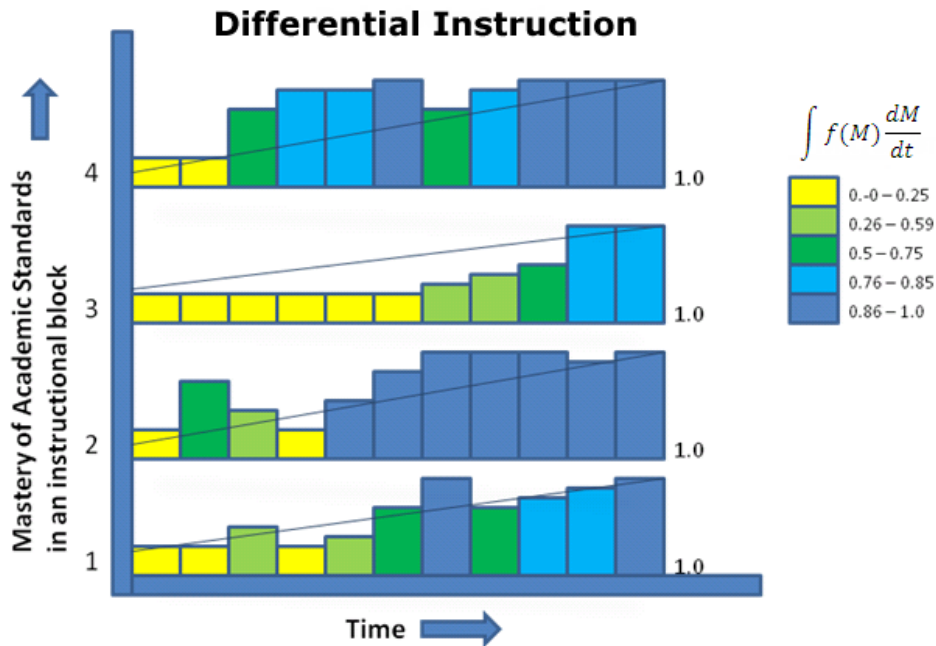


Figure 1: Differential Improvement mapped against 4 indicators

Determining true "mastery" of a concept over time requires persistent review. Some users will be slower than others to learn a concept, whereas others may retain the information less readily. SAI has a number of assessment features that continually assess – as well as review – concepts as the user progresses through a "learning track" (indicators applicable to a given discipline for a given grade over a given school term). Some of the internal

assessment options are outlined in the figure below. These options are exemplary only and represent only several of the dozens of assessment options contained in the SAI Platform.

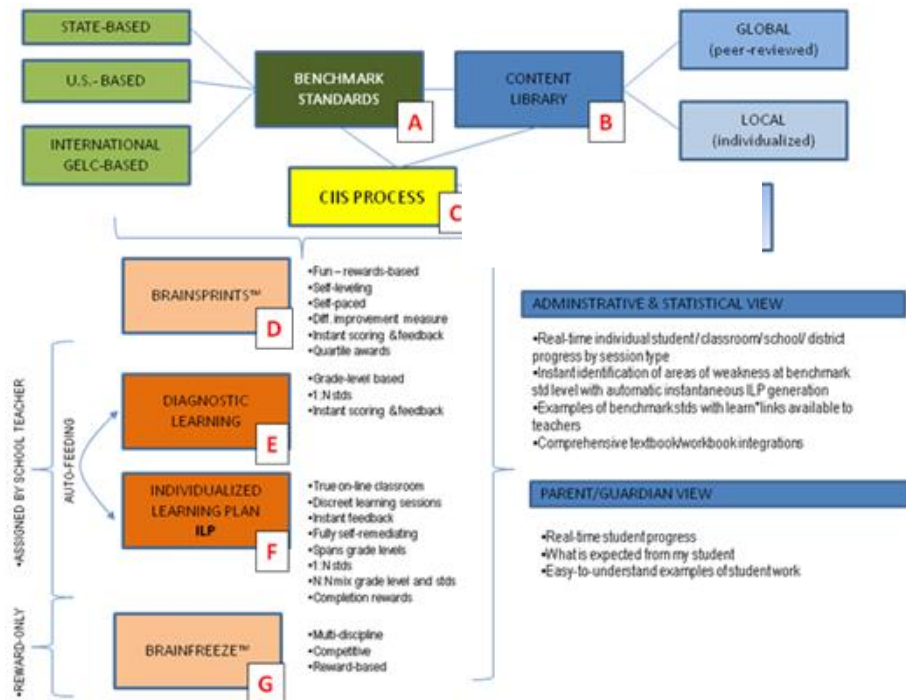


Figure 2: Differential Improvement Correlation within SAI (GS implementation)

An Example of Differential Improvement

Take the example of 2 students:

Student #1 takes 4 aligned assessments covering an indicator and scores the following:

- Pre-assessment 1 - 25%
- In-process assessment 2 - 30%
- In-process assessment 3 - 40%
- Post Assessment 4 - 50% -- weighted twice
- The simple average (unweighted) is 39.05%, a failing grade.
- Student #1 has a DI score of 25 points. ($50-25=25 \times 1.0=25$)

Student #2 takes the same 4 aligned assessments covering the same indicator and scores the following:

- Pre-Test 1 - 90%
- In-process Test 2 - 95%
- In-process Test 3 - 92%
- Post Test 4 - 89% -- weighted twice
- The simple average is 91.5%, a strong grade.
- Student #2 has a DI score of 4 points ($89-90=|-1| \times 4.0=4.0$)

Which student showed the greatest achievement?

Obviously Student #2 receives the benefit of a good grade, whereas Student #1 fails to pass the indicator. It can be argued that Student #1 actually demonstrated less learning achievement than Student #2. Even taking into account the exponential multiplier value for the higher achieving student, Student #1 appears to have made greater strides in raw academic improvement.