Learning and Knowledge Growth

Learning Models & Adaptive Tools

by: Astrid Schmied & Sarah Kleine, 03/22/16

Overview

1. Key aspects for learning and knowledge growth in online education
    - Activity 1: What We Are Learning From Online Education (Koller, 2012)
    - Activity 2: The 2 Sigma Problem: The Search For Methods Of Group Instruction As Effective As One-To-One Tutoring (Bloom, 1982)
2. Open Learner Models: Concepts & uses to inform on learning & knowledge growth
3. Adaptive learning: Concepts & applications
    - Activity 3: Adaptive Learning (Kerr, 2016)
4. Adaptive Learning Tools
    - Activity 4: Tool Review, Comparison, & Discussion

Key aspects for learning and knowledge growth in online education

Activity 1: What We Are Learning From Online Education, Koller (2012)

Activity 1: What We Are Learning From Online Education, Koller (2012)

Activity 1: What We Are Learning From Online Education, Daphne Koller

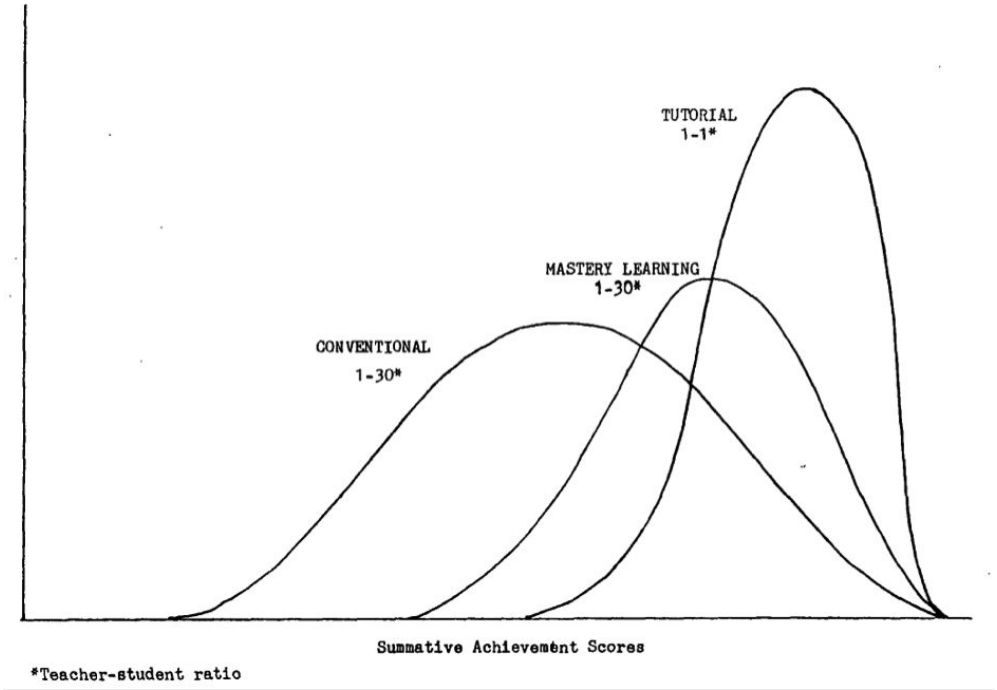
1. Why is online education important or relevant for enhancing learning and knowledge growth?

2. When trying to promote learning and knowledge growth using online tool, what aspect should you consider in order to make your tool successful?

3. What analytics need to be included and/or would be helpful in tracking and encouraging learning and knowledge growth?

Activity 2: The 2 Sigma Problem, Bloom (1982)

Activity 2: The 2 Sigma Problem: The Search For Methods Of Group Instruction As Effective As One-To-One Tutoring, Bloom (1982)



Activity 2: The 2 Sigma Problem: The Search For Methods Of Group Instruction As Effective As One-To-One Tutoring, Benjamin Bloom

1. How important would tutoring be when thinking about creating an online tools for promoting learning and knowledge growth?

2. How would you achieve tutoring if you were asked to create an online tool for promoting learning and knowledge growth?

Summary Activity 1 and 2

- Why is online education important or relevant for enhancing learning and knowledge growth?
  Access to education - Reach more people - Global communities

- When trying to promote learning and knowledge growth using online tools, what aspect should you consider in order to make your tool successful?
  Personalization - Retrieval practice - Tutoring- Igniting minds - Interaction with materials - Self grading - Peer revision - Peer grading - Immediate feedback

- What analytics need to be included and/or would be helpful in tracking and encouraging learning and knowledge growth?
  Dashboards - Tree of Knowledge

- How important would tutoring be when thinking about creating an online tools for promoting learning and knowledge growth?
  Very important

- How would you achieve tutoring if you were asked to create an online tool for promoting learning and knowledge growth?
  Brainstorming

Open Learner Models

Learner (or Student) Model

It is a model constructed from observation of interaction between a learner and a learning system or instructional environment.

“The learner model is a model of the knowledge, difficulties and misconceptions of the individual. As a student learns the target material, the data in the learner model about their understanding is updated to reflect their current beliefs”

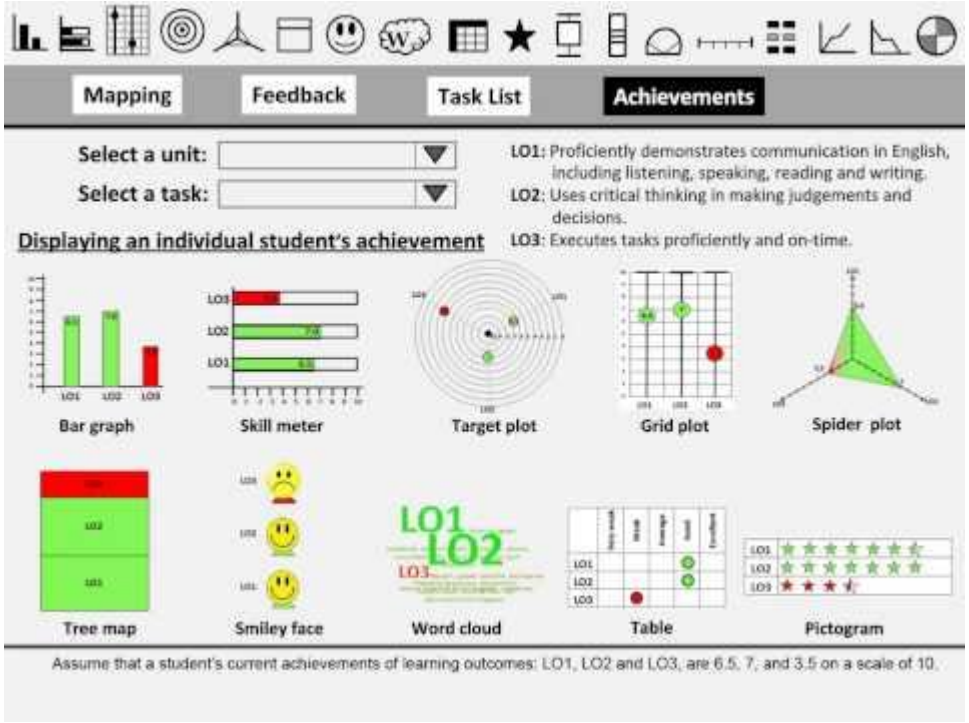
Bull, S., Kay, J.: Student Models that Invite the Learner In: The SMILI Open Learner Modelling Framework. International Journal of Artificial Intelligence in Education 17(2), 89-120 (2007)

Open Learner Model

Open learner models are learner models that can be viewed or accessed in some way by the learner, or by other users (e.g. teachers, peers, parents).

Susan Bull and Judy Kay. (2010). Chapter 15. Open Learner Models. Electronic, Electrical and Computer Engineering, University of Birmingham,. B15 2TT, UK.

Open Learner Model Tool, an example



Adaptive Learning

The Fitbit of Education?

Intelligent Tutoring Systems (ITS's)

ITS's vs. Adaptive Learning

Activity 3: Adaptive Learning, Kerr (2016)

Definitions

Individualization	Differentiation	Personalization
Learning goals are the same for all students, but students can progress through the material at different speeds.	Learning goals are the same for all students, but the method or approach of instruction varies according to the preferences of each student or what research has found works best for students like them.	The learning objectives and content as well as the method and pace may all vary.

Kerr, P. (2016). Adaptive learning. *ELT Journal*, *70*(1), 88–93. http://doi.org/10.1093/elt/ccv055

Types of Adaptive Learning

Facilitator Driven

vs.

Assessment Driven

Types of Models

Content Models

Learner Models

Instructional Models

Great...so how does this all go together?

Adaptive Learning: Knewton

What if you don’t have an explicit content model to work from?


Machine Learning

FIT—Learning Feedback in Intelligent Tutoring

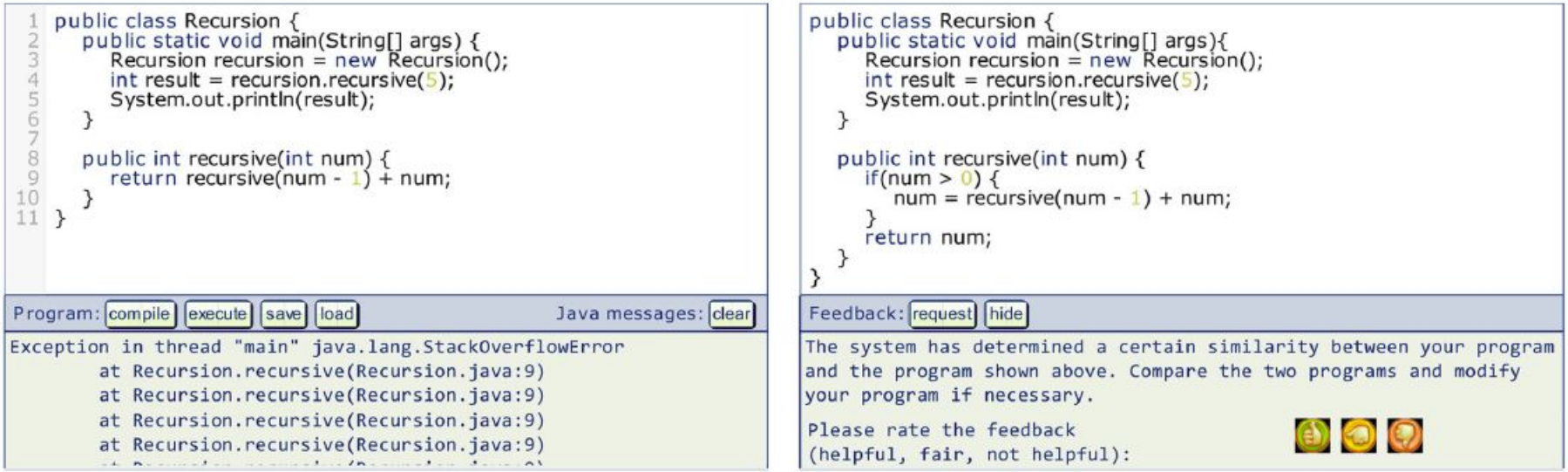


Fig. 1 Application of feedback principles (1) and (3) in the domain of Java programming. A student is prompted to reflect her solution attempt (illustrated on the *left*) and to compare it to the next step of a correct example (illustrated on the *right*)

Gross, S., Mokbel, B., Hammer, B., & Pinkwart, N. (2015). Learning Feedback in Intelligent Tutoring Systems. KI - Künstliche Intelligenz, 1-6.

Risks/Criticisms of Adaptive Learning

- Assumes learning is linear and cumulative
- Conflicting pedagogical models
- May increase student disengagement
- “Adaptive Learning Is An Infinite iPod That Only Plays Neil Diamond” (Meyer, 2014)

Summary Activity 3

- Intelligent Tutoring Systems | Adaptive Learning Systems
- Individualization | Differentiation | Personalization
- Content Models | Learner Models | Instructional Models
- Facilitator Driven | Assessment Driven

Activity 4: Tool Review, Comparison, & Discussion

Tool Demo: Knewton Adaptive Learning Platform

Live Demo

Activity 4: Learning & Knowledge Growth Tools

- 20 min Break + Tool Investigation Activity
- Locate this paper online: *Learning to Adapt: Understanding the Adaptive Learning Supplier Landscape (Tyton Partners)* http://tytonpartners.com/tyton-wp/wp-content/uploads/2015/01/Learning-to-Adapt_Supplier-Landscape.pdf
- Choose one of the adaptive learning tools that interest you. Review that section of the paper and explore the tool online. Play around with it, watch instructional videos, review online resources, and use your critical lens to assess it.
- Post your notes to the KF and be ready to share your findings with the class.

Adaptive Learning Tools

Tools:

- Cerego Global https://cerego.com/
- CogBooks https://www.cogbooks.com/
- Jones & Bartlett Learning (Navigate 2) http://www.jblnavigate.com/
- LoudCloud http://loudcloudsystems.com/
- McGraw-Hill Education (LearnSmart/Connect) http://connect.mheducation.com/
- Open Learning Initiative http://oli.cmu.edu/
- Smart Sparrow https://www.smartsparrow.com/
- Adapt Courseware http://www.the-fulcrum.com/
- *I have more if needed...*

Questions:

- What are your overall thoughts about the tool?
- Who is the intended audience?
- What does the tool intend to solve/help?
- What is an advantage of this tool?
- What is a disadvantage of this tool?
- What do you like most about the tool?
- What type of content model is used?
- What type of assessments are used?
- Does the tool include any individualization, differentiation, or personalization?

Learning to Adapt: Understanding the Adaptive Learning Supplier Landscape (Tyton Partners)

Wrap-up

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Thank you!