Personalized feedback to students and lecturers using IGuideME

Erwin van Vliet
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www.feedbackgo.nl
Problem

Personalized feedback is important for the learning process, but it is **time consuming** and particularly **problematic in large-scale courses**. While automated feedback may help, not all forms of feedback are effective. Social comparison can offer powerful feedback, but is often loosely designed.

Solution

We argue that **intertwining feedback with proper peer comparison** using the learning analytics dashboard I Guide My Education (IGuideME) provides a solution.
Learning Analytics Dashboard I Guide My Education - IGuideME

- Students: activate, motivate, personalized feedback

- Lecturers: early warning system, optimize course design/the use of educational tools

Open Source software, easy adjustment to personal needs, embedded in learning management system

Knobbout & Van der Stappen 2020
I Guide My Education - IguideME

- Students: activate, motivate, personalized feedback
- Lecturers: early warning system, optimize course design/the use of educational tools
Faculty of Science

IGuideME: open source software, embedded in Canvas
Student dashboard: Radar view

A peer comparison is made, based on the student's goal grade

Goal Grade
Please indicate the grade you wish to obtain for this course. You can always change your goal at a later stage!

1 2 3 4 5 6 7 8 9 10
Submit

Students set a goal grade themselves at the start of the course

Notifications provide information about progress

- You are outperforming your peers in:
  - Practice Sessions
- You are closing the gap to your peers in:
  - Preparation Time
Student dashboard: Grid view

- **Summative assessments**
  - Course Grades
    - Grades
      - Grade: 8.8
    - Peer Comparison: min. 7.2, avg. 8.34, max. 9.7
  - Learning Outcomes & Predicted Grade
    - Learning Outcomes
      - Grade: 100
    - Predicted Grade
      - Grade: 6.1
- **Formative assessments**
  - Activities
    - Quizzes
      - Grade: 7.83
    - Perusall
      - Grade: 6.8
    - Practice Sessions
      - Grade: 8.13
  - Attendance
    - Grade: 47%
  - Preparation Time
    - Grade: 127.5
  - Sent in questions
    - 2 discussions
Formative assessments

Student dashboard

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<table>
<thead>
<tr>
<th>Perusall</th>
<th>Grade</th>
<th>Peer Comparison</th>
</tr>
</thead>
<tbody>
<tr>
<td>6.8</td>
<td></td>
<td>0 - 7.97 - 10</td>
</tr>
</tbody>
</table>

**Perusall**

### Introductie pathofysiologie

<table>
<thead>
<tr>
<th>Key</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>viewing</td>
<td>0 minutes</td>
</tr>
<tr>
<td>active</td>
<td>0 minutes</td>
</tr>
<tr>
<td>_annot</td>
<td>0</td>
</tr>
<tr>
<td>_com</td>
<td>0</td>
</tr>
<tr>
<td>_quest</td>
<td>0</td>
</tr>
</tbody>
</table>

### Anorexia

<table>
<thead>
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<tr>
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<tr>
<td>active</td>
<td>0 minutes</td>
</tr>
<tr>
<td>_annot</td>
<td>0</td>
</tr>
<tr>
<td>_com</td>
<td>0</td>
</tr>
<tr>
<td>_quest</td>
<td>0</td>
</tr>
</tbody>
</table>

### Obesitas

<table>
<thead>
<tr>
<th>Key</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>viewing</td>
<td>0 minutes</td>
</tr>
<tr>
<td>active</td>
<td>0 minutes</td>
</tr>
<tr>
<td>_annot</td>
<td>0</td>
</tr>
<tr>
<td>_com</td>
<td>0</td>
</tr>
<tr>
<td>_quest</td>
<td>0</td>
</tr>
</tbody>
</table>

### Parkinson

<table>
<thead>
<tr>
<th>Key</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>viewing</td>
<td>0 minutes</td>
</tr>
<tr>
<td>active</td>
<td>37 minutes (58%)</td>
</tr>
<tr>
<td>_annot</td>
<td>9</td>
</tr>
<tr>
<td>_com</td>
<td>0</td>
</tr>
<tr>
<td>_quest</td>
<td>0</td>
</tr>
</tbody>
</table>

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Click on tile: more info
## Learning outcomes

### Student dashboard

<table>
<thead>
<tr>
<th>Goal</th>
<th>Description</th>
<th>Completed Status</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Goal 0</strong></td>
<td>de kernbegrippen uit de farmacokinetiek (halfwaardetijd, verdelingsvolume e.d.) onderscheiden en toepassen</td>
<td>Completed</td>
</tr>
<tr>
<td></td>
<td>Deeltot 1 ≥ 5.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>de kernbegrippen uit de farmacodynamiek (receptoraffiniteit, agonisme, antagonisme, concentratie-responsrelatie e.d.) onderscheiden en toepassen</td>
<td>Completed</td>
</tr>
<tr>
<td></td>
<td>Deeltot 1 ≥ 5.5</td>
<td></td>
</tr>
<tr>
<td><strong>Goal 2</strong></td>
<td>farmacokinetische en farmacodynamische eigenschappen van neurofarmaca evalueren om zo te interpreteren hoe deze van belang zijn voor de farmacotherapeutische toepasbaarheid en effectiviteit van deze (potentiële) geneesmiddelen</td>
<td>Completed</td>
</tr>
<tr>
<td></td>
<td>Deeltot 1 ≥ 5.5</td>
<td></td>
</tr>
<tr>
<td><strong>Goal 3</strong></td>
<td>uitleggen (in een presentatie) welke (biologische) processen leiden tot de klinische verschijnselen van hersenaandoeningen</td>
<td>Not completed</td>
</tr>
<tr>
<td></td>
<td>Perusal 5.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Presentatie ≥ 5.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deeltot 3 ≥ 5.5</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Deeltot 2 ≥ 5.5</td>
<td></td>
</tr>
</tbody>
</table>
I Guide My Education - IguideME

- Students: activate, motivate, personalized feedback
- Lecturers: early warning system, optimize course design/the use of educational tools
Lecturer dashboard

Design

Early Warning System

Grade analysis

Interaction
Early warning system

Lecturer dashboard

<table>
<thead>
<tr>
<th>Student</th>
<th>Quiz 1: Anatomy (termen van promotie)</th>
<th>Quiz 2: Macro Anatomy</th>
<th>Quiz 3: Neurotransmitter systems</th>
<th>Quiz 4: Microanatomy</th>
<th>Assignment 1</th>
<th>Assignment 2</th>
<th>Assignment 3</th>
<th>Attendance</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adena Spraggen</td>
<td>6.89</td>
<td>…</td>
<td>…</td>
<td>7.0</td>
<td>8.3</td>
<td>8.0</td>
<td>75</td>
<td>90%</td>
</tr>
<tr>
<td>Adia Laven</td>
<td>6.89</td>
<td>7.14</td>
<td>6.71</td>
<td>4.28</td>
<td>4.28</td>
<td>10.0</td>
<td>75</td>
<td>90%</td>
</tr>
<tr>
<td>Aiyon Dukary</td>
<td>5.83</td>
<td>7.43</td>
<td>4.5</td>
<td>3.16</td>
<td>8.8</td>
<td>9.3</td>
<td>8.7</td>
<td>80%</td>
</tr>
<tr>
<td>Ana Denaye</td>
<td>5.83</td>
<td>7.1</td>
<td>4.29</td>
<td>4.45</td>
<td>7.6</td>
<td>8.2</td>
<td>9.5</td>
<td>80%</td>
</tr>
<tr>
<td>Anitra Gerligh</td>
<td>7.33</td>
<td>8.65</td>
<td>5.86</td>
<td>3.95</td>
<td>9.2</td>
<td>7.2</td>
<td>8.5</td>
<td>90%</td>
</tr>
<tr>
<td>Austin Schlief</td>
<td>5.25</td>
<td>8.15</td>
<td>6.14</td>
<td>6.08</td>
<td>9.4</td>
<td>10.0</td>
<td>7.6</td>
<td>90%</td>
</tr>
</tbody>
</table>

Early Warning System to quickly identify students who may drop out
Optimize course design: graded vs non-graded Perusall assignments

Average of all assignments is 2% of the final course grade

Grade is not shown to students, only to researchers

Recommendation: grade the Perusall assignments!
Optimize course design: IGuideME group shows better performance for graded as well as non-graded Perusall assignments

Higher annotation content score, while opening assignments, (active) reading time, getting responses or upvotes was not different between groups

Average of all assignments is 2% of the final course grade

Grade is not shown to students, only to researchers

Recommendation: grade the Perusall assignments!
Effects of IGuideME

- The Motivated Strategies for Learning Questionnaire (MSLQ) - validated questionnaire to measure the types of learning strategies and academic motivation (Pintrich 1991)
- Achievement Goal Model (AGM) – validated questionnaire to measure goal achievement (Elliot 2011)
- Grades
- Student evaluation
MSLQ: IGuideME group shows more self-regulation and peer learning

Start course

End course

Cognitive and Metacognitive Strategies: Metacognitive Self-Regulation

Metacognition refers to the awareness, knowledge, and control of cognition. We have focused on the control and self-regulation aspects of metacognition on the MSLQ, not the knowledge aspect. There are three general processes that make up metacognitive self-regulatory activities: planning, monitoring, and regulating. Planning activities such as goal setting and task analysis help to activate, or prime, relevant aspects of prior knowledge that make organizing and comprehending the material easier. Monitoring activities include tracking of one's attention as one reads, and self-testing and questioning; these assist the learner in understanding the material and integrating it with prior knowledge. Regulating refers to the fine-tuning and continuous adjustment of one's cognitive activities. Regulating activities are assumed to improve performance by assisting learners in checking and correcting their behavior as they proceed on a task.

Collaborating with one's peers has been found to have positive effects on achievement. Dialogue with peers can help a learner clarify course material and reach insights one may not have attained on one's own.

Pintrich 1991
AGM: IGuideME group is more motivated to do better than others

Elliot 2011

“do better than others”
IGuideME groups scores better on higher Bloom level exam questions

- No differences between groups for partial exams, final grade, % failure
- However…
- IGuideME group scores better on higher Bloom level exam questions
Students’ evaluation

In anonymous student evaluations, the following answers were given by students to the question: “What is your opinion about IguideME?”:

I liked the peer comparison (n=12)  
Has helped me with studying (n=9)  
Increased my motivation (n=8)  
Provided insight into my study progress (n=7)  
Was not that interesting for me (n=3)  
Was demotivating for me (n=1)
Conclusion

Peer-comparison feedback using the learning analytics dashboard IGuideME can be used to improve students’ self-regulated learning, motivation and academic achievements as well as to detect potential dropouts and improve the course design.

Future plans
Scale up the project within UvA, set-up at VU and RUG, make it sustainable
Demo version, manual (+open brochures) and workshops for lecturers
Reflective journal for lecturers
Collaborations (ROC, HvA, UU, etc)
Project team Feedback GO

- Erwin van Vliet (Project leader and UvA team leader)
- Natasa Brouwer (UvA senior teaching consultant)
- Gerrit Oomens (UvA ICT)
- Miguel Pieters and Max Marshall (UvA Developers)
- Bert Bredeweg and Damien Fleur (UvA/HvA, Researchers)
- Alice Doek and Harrie van der Meer (UvA library)
- UvA legal department
- Koos Winnips (RUG team leader)
- Angelo Konstantinidis (RUG educational advisor)
- Sylvia Moes (VU team leader)
- Steering committee: Hans Breeuwer, Sylvia Witteveen (UvA), Hans Beldhuis, Jan Riezebos (RUG), Hilde van Wijngaarden (VU)
Seminar: Learning Analytics in het onderwijs – hoe pak je dat aan?

Learning analytics is een complexe uitdaging binnen het onderwijs. Hoe pakken andere onderwijsinstellingen het aan? Heb jij behoefte om inspiratie op te doen en ervaring uit te wisselen over learning analytics? Kom dan op 20 juni naar het seminar learning analytics in het onderwijs van de SIG Learning Analytics.