Mobile Support For Self-regulation With Learning Analytics

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Welten Institute Conference
Eindhoven, The Netherlands, November 6th, 2014
Background

Ubiquitous support for lifelong learning

Support lifelong learners to improve meta-cognitive skills

“Lifelong learning is like a never ending personal revolution”

@BryanMcGill, Voice of Reason
Problem

1. Having an account on how much time...
   • is invested by students on learning
   • fluctuates the time invested on different learning tasks
2. Identify tasks that require more / less time than scheduled.
3. Identify potential dropout
   • Students
   • Moments/Assignments

Teacher’s perspective
Problem

Teacher’s perspective: Angelique Lansu. Open Universiteit
Problem

Student’s perspective

Provide an APP where they can monitor how much time (minutes) is estimated (scheduled) to invest in the course by week or by task.
Provide them with a tool that accounts how much time do they invest per week/task on learning activities (two input modes a) b)).
Provide them with an APP that lets them monitor visualizations about their progress during the course.
Provide students with an interface where...
Existing solutions

Analytics from Learning Management Systems

• Login time / logout time
  - Duration
  - Number of logins

• Blog entries
  - Length, number
  - Ranking, gamification

• Track navigation within tasks
• Track Learning Objects visualized
• Track downloads
Studielast

Nieuwe OnderwijsModel (NOM) Open Universiteit

3 Groups. University Students
- Psychology. Klinische I
- Geographical Information Systems
  - Open Universiteit
  - Radboud University

Potential groups. Invitation
Studielast

Login: Geographical Information Systems

Backend
- Google AppEngine
- Preloaded
  - users
  - yardstick
Yardstick: Geographical Information Systems

<table>
<thead>
<tr>
<th>Course name</th>
<th>Geographical Information Systems</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Course ID</strong></td>
<td>N35231</td>
</tr>
<tr>
<td><strong>Block / Task / Module</strong></td>
<td></td>
</tr>
<tr>
<td>1.1 Knowing GIS</td>
<td>Monday, 17 November 2014, 5 hours</td>
</tr>
<tr>
<td>2.1 Abstraction and perception</td>
<td>Thursday, 20 November 2014, 3 hours</td>
</tr>
<tr>
<td>2.2 Geometry</td>
<td>Saturday, 22 November 2014, 2 hours</td>
</tr>
<tr>
<td>2.3 Getting to know ArcGIS / Georeferencing</td>
<td>Monday, 24 November 2014, 5 hours</td>
</tr>
<tr>
<td>2.4 Representation and implementation</td>
<td>Thursday, 27 November 2014, 5 hours</td>
</tr>
<tr>
<td>2.5 Examples of GIS implementations</td>
<td>Monday, 01 December 2014, 2 hours</td>
</tr>
<tr>
<td>3.1 Data input and editing</td>
<td>Wednesday, 03 December 2014, 2 hours</td>
</tr>
<tr>
<td>3.2 Remote sensing</td>
<td>Friday, 05 December 2014, 2 hours</td>
</tr>
<tr>
<td>3.3 Digital image classification</td>
<td>Saturday, 06 December 2014, 2 hours</td>
</tr>
<tr>
<td>3.4 Data errors</td>
<td>Sunday, 07 December 2014, 2 hours</td>
</tr>
<tr>
<td>3.5 Manual digitalizing</td>
<td>Monday, 08 December 2014, 4 hours</td>
</tr>
<tr>
<td>3.6 Working with digital sensor images</td>
<td>Thursday, 11 December 2014, 5 hours</td>
</tr>
<tr>
<td>3.7 Clearinghouses and metadata</td>
<td>Monday, 15 December 2014, 2 hours</td>
</tr>
<tr>
<td>4.1 Data querying</td>
<td>Thursday, 18 December 2014, 4 hours</td>
</tr>
<tr>
<td>4.2 Data transformation and reclassification</td>
<td>Saturday, 20 December 2014, 4 hours</td>
</tr>
<tr>
<td>4.3 Processing by attributes</td>
<td>Monday, 22 December 2014, 4 hours</td>
</tr>
<tr>
<td>4.4 Processing by neighbourhood</td>
<td>Thursday, 01 January 2015, 4 hours</td>
</tr>
<tr>
<td>4.5 Spatial interpolation</td>
<td>Saturday, 03 January 2015, 6 hours</td>
</tr>
<tr>
<td>4.6 Processing by overlay</td>
<td>Thursday, 08 January 2015, 6 hours</td>
</tr>
<tr>
<td>4.7 DEM analysis</td>
<td>Saturday, 10 January 2015, 2 hours</td>
</tr>
<tr>
<td>4.8 Data action modelling</td>
<td>Monday, 12 January 2015, 2 hours</td>
</tr>
<tr>
<td>5.1 Data output</td>
<td>Thursday, 15 January 2015, 8 hours</td>
</tr>
<tr>
<td>Exam</td>
<td>Wednesday, 21 January 2015, 6 hours</td>
</tr>
<tr>
<td>Final assignment</td>
<td>Monday, 26 January 2015, 14 hours</td>
</tr>
</tbody>
</table>

**OVERALL**

| Load per week | 10 |

1. 1.1 Knowing GIS
   Block 1
   Begin: Mon, 17/11/2014
2. 2.1 Abstraction and perception
   Block 2
   Begin: Thu, 20/11/2014
3. 2.2 Geometry
   Block 2
   Begin: Sat, 22/11/2014
4. 2.3 Getting to know ArcGIS / Georeferencing
   Block 2
   Begin: Mon, 24/11/2014
5. 2.4 Representation and implementation
   Block 2
   Begin: Thu, 27/11/2014
6. 2.5 Examples of GIS implementations
   Block 2
   Begin: Mon, 01/12/2014
7. 3.1 Data input and editing
   Block 3
   Begin: Wed, 03/12/2014
8. 3.2 Remote sensing
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Record time: Geographical Information Systems
Control group
Record Time

Treatment 1
OUNL Scheduled Time
VS
My Time

Treatment 2
Colleagues AVG Time
VS
My Time
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Learning Analytics: Non Android Users
StudiELast

Learning Analytics: via SMS Notifications

"Hfdst 2" is the chapter in which you and your colleagues reported to invest less time so far. Please record your learning time via [link].

Mondays & Wednesdays are the preferred days to learn Klinische. [time] and [time] are the preferred times of the day. Please record your learning time via [link].

Hi Bernardo, [Tip1: Plan Ahead. Schedule it and it will happen!]. Determine how long your tasks will take. Record your learning time using the LearnTracker APP [link].

Hi Bernardo, [Tip4: Practice not answering e-mails just because they show up. Disconnect instant messaging while studying]. Please record your learning time via [link].
Previous Research

Using mobile devices for learning in daily spaces

<table>
<thead>
<tr>
<th>In the living room</th>
<th>Listen</th>
<th>Watch</th>
<th>Write</th>
<th>Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>Having breakfast</td>
<td>12,24</td>
<td>8,16</td>
<td>8,84</td>
<td>29,24</td>
</tr>
<tr>
<td>Cleaning</td>
<td>37,4</td>
<td>1,36</td>
<td>0,68</td>
<td>2,04</td>
</tr>
<tr>
<td>Sitting in the sofa</td>
<td>34,01</td>
<td>44,89</td>
<td>50,34</td>
<td>62,58</td>
</tr>
<tr>
<td>Having lunch</td>
<td>11,56</td>
<td>10,88</td>
<td>8,84</td>
<td>20,4</td>
</tr>
<tr>
<td>During coffee/time</td>
<td>19,72</td>
<td>11,56</td>
<td>27,2</td>
<td>38,77</td>
</tr>
<tr>
<td>Watching TV, during advertisement time</td>
<td>12,92</td>
<td>15,64</td>
<td>32,64</td>
<td>47,61</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>In my room</th>
<th>Listen</th>
<th>Watch</th>
<th>Write</th>
<th>Read</th>
</tr>
</thead>
<tbody>
<tr>
<td>Waking up in the morning in bed</td>
<td>18,36</td>
<td>2,72</td>
<td>7,48</td>
<td>25,84</td>
</tr>
<tr>
<td>Getting dressed</td>
<td>19,72</td>
<td>0,68</td>
<td>1,36</td>
<td>2,04</td>
</tr>
<tr>
<td>Sitting at my desk</td>
<td>37,41</td>
<td>29,92</td>
<td>51,69</td>
<td>54,42</td>
</tr>
<tr>
<td>Lying on bed anytime</td>
<td>34,69</td>
<td>34,01</td>
<td>33,32</td>
<td>50,33</td>
</tr>
</tbody>
</table>

Figure 4. Learning activities in context with mobile devices. Percentage of individuals.

Background

Literature Review on NFC for learning

- **Zero Clicks / Natural Interaction**
- **Near Field Communication**
- **Evolution** (1st RFID enabled phone (2007) to iPhone 6 (2014))
- **Distributing materials, Enriching printed materials, P2P between devices, Integration social networks, Control lab materials, Exams ID cards, activity recognition, wearables, logistics …**

Measure learning time

Tabuenca, B., Kalz, M., Specht, M. (2014), Seamless support for lifelong learners with mobile and sensor technology, In Journal of Immersive Education (Accepted) November 2014
NFC LearnTracker

Goal definition

Tabuenca, B., Kalz, M., Specht, M. (2014b)
NFC LearnTracker

Perform Learning Activity

A. Write two paragraphs for a journal article taking the first coffee
B. Reading scientific literature during waiting times
C. Listening English podcasts commuting to work, college, gym...
D. Watch top presenters’ videos during commercial breaks

Tabuenca, B., Kalz, M., Specht, M. (2014b)
NFC LearnTracker

Monitor learning analytics

A. Quantity of time invested in learning goals (Percentage or overall time and number of minutes)

B. Distribution of learning moments along the day in the last 7 days

C. Foreseen learning time (orange) versus effective time invested (in purple) on Academic Writing in the week
Feedback via ambient learning displays

Feedback Cube
Feedback via ambient learning displays
Thanks!

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References

Mobile learning analytics towards self-regulation: teachers VS students perspective

Bernardo Tabuenca, Dirk Börner
Learning Analytics via Visualizations
Learning Analytics

Via Notifications

Content & Scheduling
Group Activity

Teachers Summit

Students Summit
Stage 4. Present group solutions