Implementing an online Android Development Course using 4C/ID

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Outline

• Facts about the course
• Applied steps
• The learning environment
• Discussion
Facts about the course

- Part of the minor Mobile Development
- Course consists of 4 credits
- 2 hours lecture and 3 hours practical each week (7 weeks in total)
- Course runs each semester in part-time and full-time education
- About 100 students each semester
- Different levels of students
  - different streams
  - different years
  - international students
- Incrementally and iteratively applying the 4C/ID principles

Learning Tasks

- In each task the students build a complete Android app (whole task).
- Tasks are ideas from the students (authentic).
- The apps are build with a real development tool (Android Studio).
Task Support

- **Given state:** requirements of the Android app including designs
- **Goal state:** an Android app with runs without errors and complies with required functionality
- **Solution:** a sequence of steps from the given to the goal state

Figure 1. Task support and guidance (van Merriënboer & Kirschner, 2013, p. 59)

Design learning Tasks

## Task Support: completion strategy

<table>
<thead>
<tr>
<th></th>
<th>Given state</th>
<th>Goal state</th>
<th>Solution</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Case study</strong></td>
<td>+</td>
<td>+</td>
<td>+</td>
</tr>
<tr>
<td><strong>Completion</strong></td>
<td>+</td>
<td>+</td>
<td>Complete</td>
</tr>
<tr>
<td><strong>Conventional</strong></td>
<td>+</td>
<td>+</td>
<td>Find</td>
</tr>
</tbody>
</table>

Figure 2. completion strategy (van Merriënboer & Kirschner, 2013, p. 63)

Design learning Tasks
Variability of practice

Varying in UI widgets:
- Buttons
- Imageview
- Dialog
- ...

Varying in Domain:
- Games
- Learning
- Health
- ....

Design learning Tasks

Skill Hierarchy

Develop Assessment instruments
### Simplifying Conditions

<table>
<thead>
<tr>
<th>Task Class</th>
<th>1 Novice</th>
<th>2 Novice</th>
<th>3 Novice</th>
<th>4 Novice</th>
<th>5 Professional</th>
<th>6 expert</th>
</tr>
</thead>
<tbody>
<tr>
<td>User interface</td>
<td>Simple UI</td>
<td>+ Gridview</td>
<td>+ Card view</td>
<td>+ Master detail</td>
<td>Viewpager</td>
<td>+ Tab layout</td>
</tr>
<tr>
<td>Activity</td>
<td>1 Activity</td>
<td>&gt;1 Activity</td>
<td>Fragment</td>
<td>Google maps</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Data-layer</td>
<td>Model data in PoJo class</td>
<td>SQLite</td>
<td>+ Content provider</td>
<td>Loader</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Adapter</td>
<td>ArrayAdapter</td>
<td>Recycler view adapter</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

Sequence learning tasks

### Supportive information

- Lecture
  - Modeling example
  - Presentation of mental models during lecture
- Cognitive feedback from lecturer during practical
- Online knowledge supported by Lynda.com
Procedural information

- Code comments in the code
- Corrective feedback by Android Studio

Examination

- Assignment
  - Idea provided by school or own idea
  - Pass or fail
  - At least novice level
- Oral assessment
  - 15 min for each student
  - two assessors
Android Development Course

www.mobile-development.org

Experiences

• The learning environment with the tasks is helpful for the students to learn.

• Feedback received from lecturers and students corresponds with the 4C/ID model.
Discussion

• How to deal with the end solutions (source code) of the app?

• How to apply good cognitive feedback with a large number of students?

• How to reduce the amount of time for developing and maintaining the tasks?

Reference list

Thank you for your attention