Validation of Game Scenarios for the Assessment of Professional Competence: Development of a Serious Game for System Managers in Training

Hans Hummel, Rob Nadolski, Desirée Joosten, and Liesbeth Baartman
Introduction (1)

• *High* potential of serious games for acquisition of complex problem solving skills in professional practice
• *Low* empirical evidence on learning effects of serious educational games, results have remained rather scarce
• Therefore such games have hardly been adopted for assessment purposes …

"Serious games will only grow as an industry if the learning experience is definable, quantifiable and measurable“ (Corti, 2011)
Introduction (2)

• Need for .... validation method that makes us understand better *what* a learner is learning from playing the game, to *what degree*, and in *which contexts*

• Need for .... validation method that achieves ‘seamless assessment’ (formative assessment during game play should be (as) unobtrusive (as possible) to the player)

• Will present ....method to validate game scenarios for the assessment of professional competence
Validation methods

• Validation methods evaluate whether assessment achieves its purposes, i.e. the fitness for purpose (Van der Vleuten, 2012)

• Interpretative (analysis of performance indicators and activities) and argumentative (evaluate plausibility of interpretations by evaluating to which extend performance indicators are covered by activities and procedures) arguments (Kane, 2006)

• Take into account new demands of competence-based assessment (like acceptability, authenticity, meaningfulness, cognitive complexity, etc.) (Baartman, 2008)
(Validation) Method

- Performance Indicators in Qualification Dossiers
- Game Scenario
- Mapping
- Assessment Procedures, Instructions and Forms
Competences information managers (step 1)

• Competence based education: “Qualification Dossier” for information managers (secondary vocational)

• Core Task: (1) Develop (parts of) information- or mediasystems;

• Work Processes: (1.1) Analyse the needs of the contractor; (1.2) Make a functional design; (1.3) Make a technical design; (1.4) Develop (parts of) the information- or mediasystem; and (1.5) Realise a test environment.

• Each Work Process is illustrated with some Wanted Outcomes and Performance Indicators.
EMERGO method  
(step 2)

- EMERGO approach and toolkit (e.g., Nadolski et al., 2008) is dedicated towards scenario-based games, and has been used for the development of the scenario and game under study.
- The design phase of this approach results in a detailed scenario document via the intermediate framework scenario and ingredients scenario, with each step providing more detail and completeness.
The Galema game (1)

http://emergo.ou.nl/emergo/skins/spl/run.zul?cacId=1400&tagId=1&runstatus=previewreadonly&rgalId=2707&rutId=&lang_lang=

Hans Hummel

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The Galema game (2)

Activities after introduction (30 min):

1. Carry out a needs-analysis by interviewing experts and studying documents, analyse current IT problems and possible solutions.
2. Write a needs-analysis as output of this activity (3 hours).
3. Use the needs-analysis to distill a functional and technical design of the new system, which are discussed with the teacher in a face-to-face setting (5 hours).
4. Draw up a plan for developing the new system for projectmanagement (2 hours)
5. Tests a first version, and writes a test report about his (all students so far were male) findings (6 hours)

(Total study load of about two days)
# Validation Table (step 3)

<table>
<thead>
<tr>
<th>Performance indicators</th>
<th>Content validation (place in scenario / activity student)</th>
<th>Assessment Information contained in system</th>
<th>Assessment Information contained in documents or by Jonkman</th>
</tr>
</thead>
<tbody>
<tr>
<td>(P1) Collect sufficient information by both interviewing and document analysis.</td>
<td>Virtual talks with employees Galema: Mrs. Galema, Mr. Boekhorst, Mrs. Vos, F2F talk with Mr. Jonkman. Must prepare questions.</td>
<td></td>
<td>F2F talk with Mr. Jonkman: Does student pose relevant and sufficient question?</td>
</tr>
<tr>
<td>(P2) Ask for the ideas and needs of employees to get a good overview of the information need within the organisation</td>
<td>Virtual talks with employees Galema, F2F talk with Mr. Jonkman. Must prepare questions.</td>
<td></td>
<td>F2F talk with Mr. Jonkman: Does student pose questions about opinions, ideas and needs?</td>
</tr>
<tr>
<td>(P3) Consider the wishes of the client in realton with the possibilities when determining the information needs</td>
<td>Make a needs-analysis</td>
<td></td>
<td>Needs-analysis: Does student weigh the wishes and possibilities?</td>
</tr>
<tr>
<td>(P4) Show plan to relevant others and adjust them when appropriate</td>
<td>Send report talk with Mr. Boekhorst to him, Send reports of all talks to coach, F2F-talk with Mr. Jonkman: discuss ideas and adjust analysis, Send needs-analysis to</td>
<td>Report talk with Boekhorst been send to him?</td>
<td>Has needs-analysis been send to Jonkman, coach?</td>
</tr>
<tr>
<td></td>
<td></td>
<td>All reports sent to coach?</td>
<td>F2F-talk with Mr. Jonkman: Does student respond adequately to comments?</td>
</tr>
</tbody>
</table>
Results

• Most performance indicators could be mapped on activities in the game scenario
• Some Work Processes could only be partly mapped on the scenario
• Some Performance Indicators could better be assessed beyond the computer program (but still part of the game) by means of a F2F talk with the teacher.
• This validation appeared more transparent, better documented, and could be more effectively compared and organised
• Both students and teachers find this more dynamic way of assessment more motivating and effective
Future research

• Still unclear why students and teachers like this way of assessment and how they exactly develop skills and monitor success?
• How to sufficiently warrant towards fraud on the long run, when larger numbers study the same cases.
• How to prevent that positive effects will be snowed under when the remainder of the curriculum is still classically tested?
• How to generalize results within the domain of system management towards other domains and educational levels?
Questions?