Virtual Patient (VP) Simulation: a Comparison of Two Approaches for Capacity Building in Sub-Saharan Africa

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Introduction

- Virtual patient (VP): an interactive computer simulation of real-life clinical scenarios for the purpose of medical training, education, or assessment.

- Main objective: to develop a clinical reasoning and decision-making.

- Developed countries: this activity has progressed these last years although its adoption remains limited.

- Developing countries: only a few experiences are described.
Introduction

- **Objective of the study:** to compare two virtual patient systems in the perspective of their use for capacity building in low-resource settings of Sub-Saharan Africa.
  - Virtual Internet Patient Simulation
  - MedBiquitous Virtual Patient

- **Context:** Réseau en Afrique Francophone pour la Télémédecine (http://raft.hcuge.ch)
Material

- Virtual Internet Patient Simulator (VIPS)
  - Web application, MySQL
  - Main learning activity: medical consultation.
- Database contains:
  - Items (“Questions”)
  - Default answer with neutral value: “Noise” response
  - Answer with positive or negative value: “Signal” response
  - All these are accessible during a clinical scenario

Components of VIPS 2.0
Material

- MedBiquitous Virtual Patient (MVP)
  - Standard for exchange and reuse of virtual patients
  - Architecture consists of 5 structured XML components
Methods

- Reading of the documentation related to each application;
- Data models’ explorations of the two applications
  - The datasets of MVP were taken from the collection of the eViP European project (http://www.virtualpatients.eu/referatory);
- Performing of VP cases through the respective players;
- Interviews of the designers or developers of the respective systems
Results

VIPS concepts
- Single learning activity: Complete medical consultation
- VIPS case: Combination of noise and signal responses
- Pedagogic model: “problem solving” model
  - Unstructured activity in which information is provided only in response to asked question

MVP concepts
- Multiple learning activities
- MVP case: only data (items and answers) destined to a given clinical scenario
- Pedagogic model: “narrative” model
  - Structured activity based on the predefined decision trees
## Results

**VIPS and MVP functioning**

<table>
<thead>
<tr>
<th>Criteria</th>
<th>VIPS</th>
<th>MVP</th>
</tr>
</thead>
<tbody>
<tr>
<td>Application Type</td>
<td>Online, Offline</td>
<td>Online, Offline</td>
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<td>Execution Environments</td>
<td>Stand-alone</td>
<td>Stand-alone, LMS</td>
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<td>Interoperability</td>
<td>Tabular text format (CSV)</td>
<td>XML, Healthcare LOM, SCORM</td>
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<td>Activity Topology</td>
<td>Unique</td>
<td>Multiple</td>
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<td>Player Access to Data</td>
<td>Direct</td>
<td>DAM, AM</td>
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<td>Data Displaying</td>
<td>Focused on Operational Context</td>
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<td>Player Types</td>
<td>Unique</td>
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<td>Interaction’s Users</td>
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<td>Graphic</td>
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<td>Feedback and Evaluation</td>
<td>Short/Long Debriefing, Formative</td>
<td>Debriefing, Formative, Summative</td>
</tr>
</tbody>
</table>
Discussion and conclusion

- A learning activity based on VP system should consider:
  - the educational objectives,
  - the learners’ level,
  - the expected outcomes,
  - the awaited type of interactions
  - the technical environments in which these virtual patients will be played

- This study suggests that:
  - MVP is more suitable for novice learners
  - Whereas VIPS is more suitable for experienced learners
Thank you for your kind attention

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For more information on RAFT:

http://raft.hcuge.ch