A Collaborative Approach Enabling the Building of Virtual Patient Cases for Medical Education in Sub-Saharan Africa

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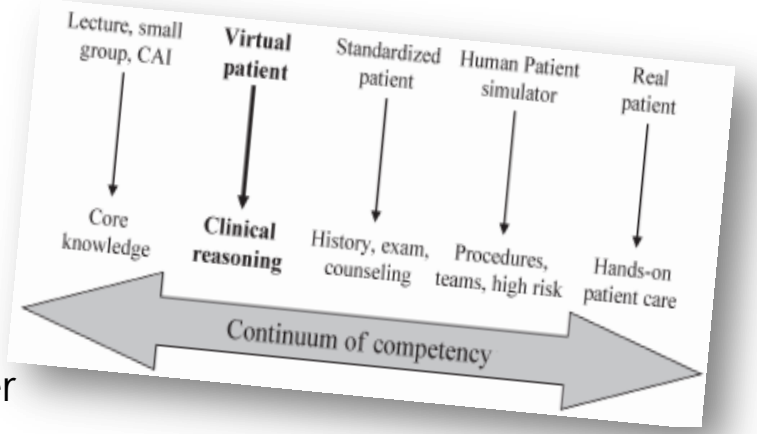
▫ Virtual Patient

- Definition:
  - *"an interactive computer simulation of clinical scenarios in real life for medical education, learning or assessment".*
- Objective:
  - To improve clinical reasoning by competency based learning



- Key elements of virtual patient activity:
  - the role of care providers assigned to the learner
  - the use of information technology
  - the progress of clinical case scenario based on users' inputs
  - The complexity of virtual patient is critical for its adoption
    - Large workload
    - Huge resources

- Developed countries: significant progress of virtual patient
  - The exponential growth in student numbers
  - The limited access to patients
  - The need to structure and standardize medical education

- Developing countries, especially in Africa:
  - Description of some experiences at the experimental stage
  - Demonstration of relevance of the use of virtual patient for training or learning

- Development of a new virtual patient system: **VIPS 2.0**
  - To enable the collaborative production of virtual patient cases
  - To enable to play them even without an Internet connection

- Aim of the study:
  - **To describe the results obtained during the first development step**
  - **To elaborate some perspectives for its optimization**

▫ Material

- Based on Computerized Patient Simulator named *VIPS 1.0*
  - Stand-alone web application
  - Main educational activity: Medical consultation + Feedback + Evaluation
  - Paradigm: "**Blank sheet**", "**Reflective practitioner theory**"
  - Medical ToolBox
    - Contains all sections of a medical consultation
    - Item (questions) response: **Noise** Vs **Signal**

- Technologies used for VIPS 2.0:
  - Editor: PHP 5.3, MySQL, XHTML, Ajax, etc.
  - Player: C library

Methods

- Development of VIPS 2.0 in three stages

  - Design, selection of technologies and construction of the relational database

  - Data migration (CSV) from VIPS 1.0 to VIPS 2.0

  - Development of VIPS 2.0 :

    - VIPS Editor 2.0: production of virtual patient cases

    - VIPS Player 2.0: execution of virtual patient cases

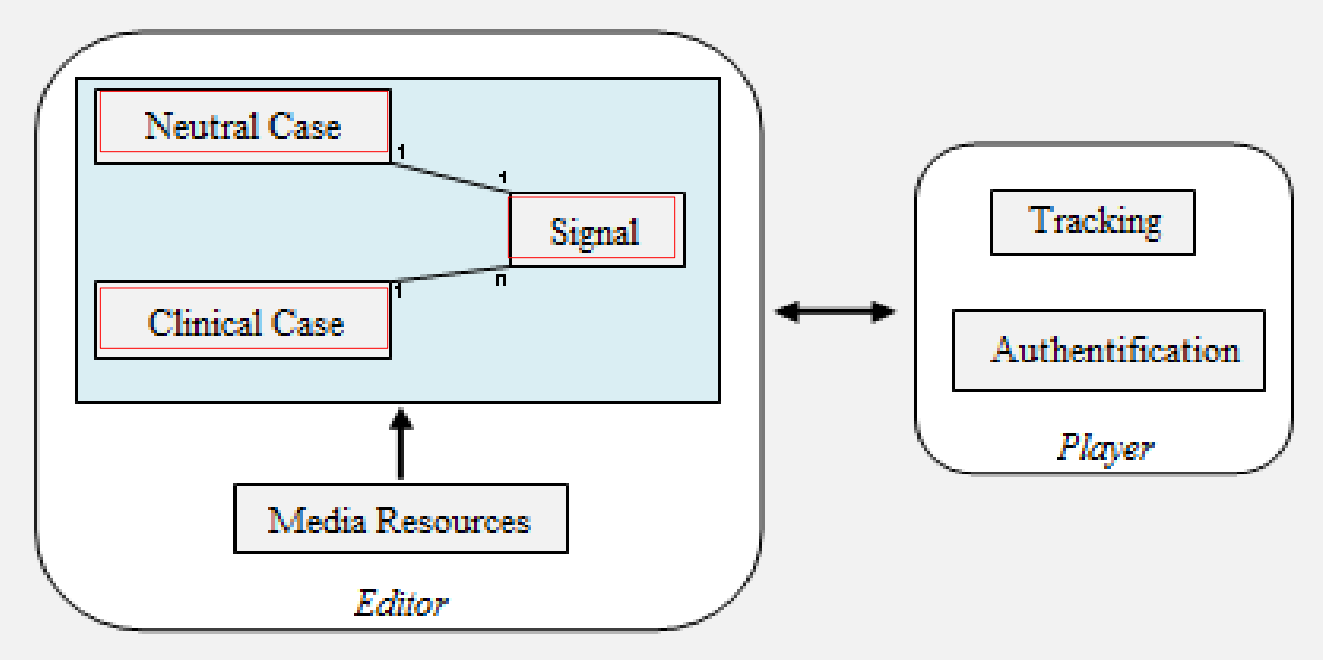
Data Model of VIPS 2.0

-Item list
-Noise Responses
- Category (ICPC-2)
-Constraints (age, Gender)
-Delay, etc.

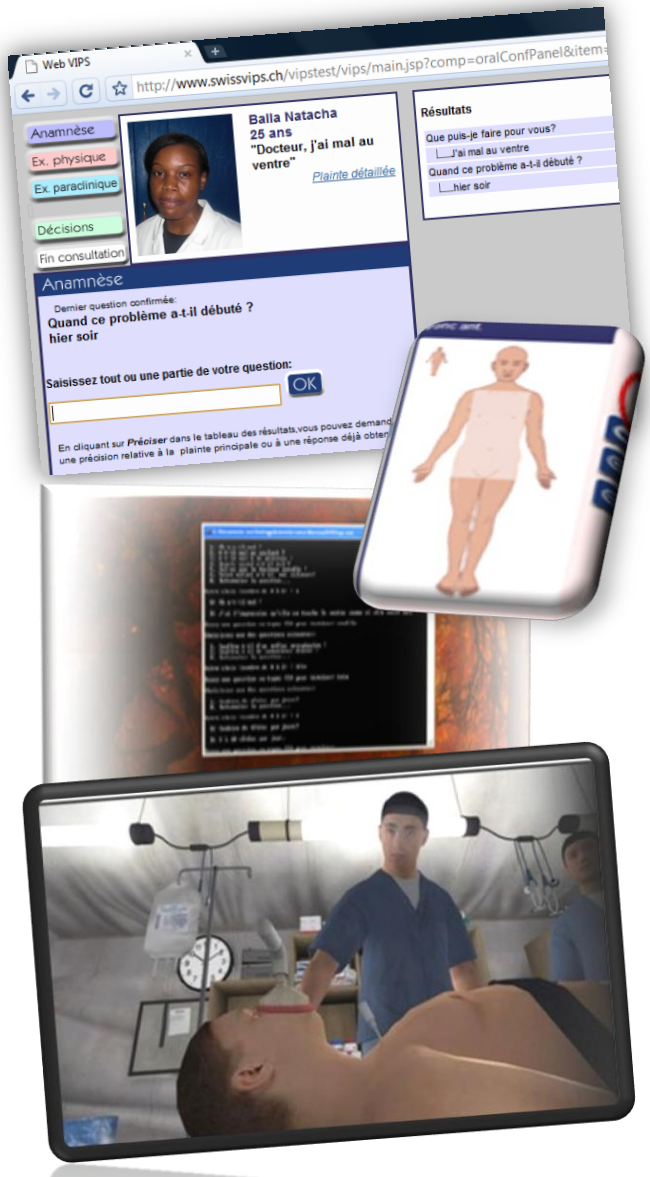
-Signal Responses
- Scores
-Improvement, etc.

-Demographic data (name, age, sex)
-Narrative Data (complaint, diagnosis, feedback)

VIPS Editor 2.0
- Web application
- Interactions with the DataBase: SQL Queries
- Management of Virtual Patients cases: edit, modify, delete, export

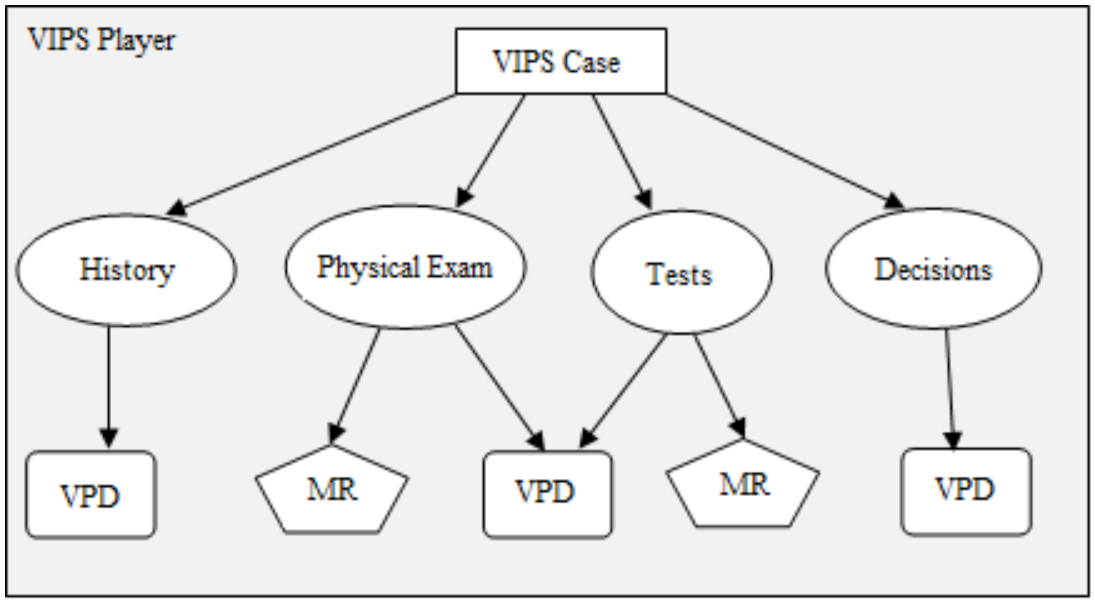


Components of VIPS 2.0



VIPS Player 2.0

- Stand alone, online or offline application
- Conversational Interactions (natural language) + GUI
- Topology of data access: branched
- Authentification and Tracking of users' performances



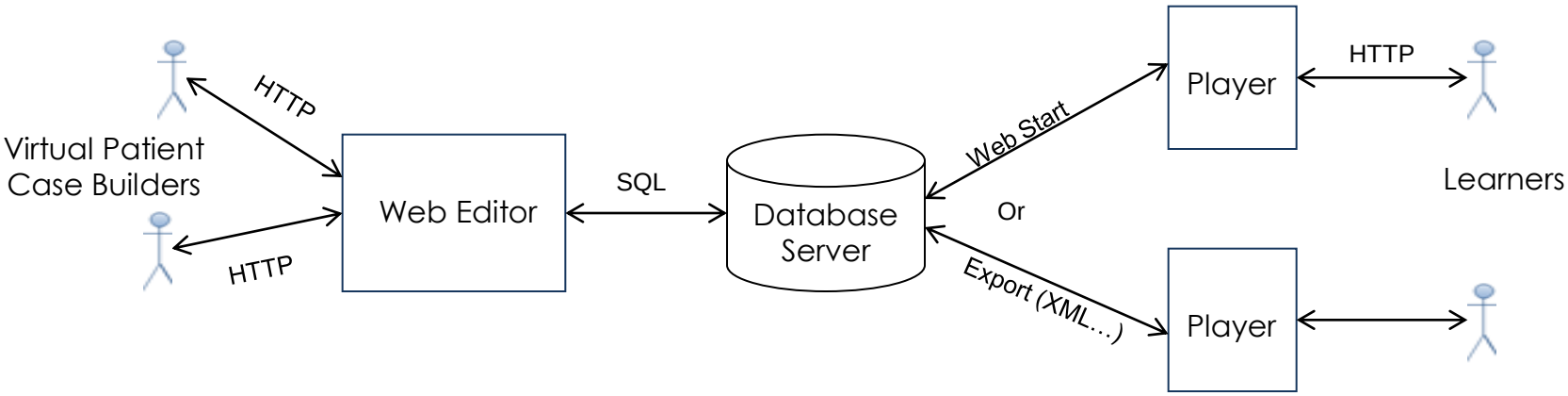
Topology of the activity on VIPS Player 2.0
(VPD: Virtual Patient Data; MR: Media Resources)

- Main technical challenges of VIPS 2.0
  - Database and Editor
    - Integrity of the database items
    - Coherence between the available data (during the consultation) and the clinical scenario
    - Possibility to enrich VIPS system with new information
    - Collaborative production
  - Player
    - Not dependence from the Internet
    - Interoperability of VIPS cases with other Virtual Patient Systems

- Some technical solutions are already implemented
  - Integrity rules: unique identifier, additional constraints (age, gender)
  - Use of precision rules
  - Web application
  - Export functionality

Collaborative management of virtual patients cases

- For adoption of Virtual Patient in resources-limited countries
- For a large-scale production of Virtual Patient cases
- For the improvement of the quality of produced Virtual Patient cases
- For updating these cases in accordance with the knowledge evolution



Key conditions for collaborative management of virtual patients cases

- **Technical aspects**
  - Development of tools for shared and distant production of virtual patient cases
  - Monitoring of the activities
    - Tracking and checking of the editing processes
    - Alert systems
    - Tools for the maintainance and the evolution of knowledge base
  - Improvement of interoperability: SCORM Standard?
- **Human aspects**
  - Practice community in the field of virtual patient
  - Basic training on virtual patient: concept, use and tools
  - Establishment of recommendations
  - Committee of validation: reviewing and validation of virtual patient cases

- VIPS 2.0 is a functional solution
  - Some technical functions are already implemented
  - Others still need to be implemented
- Adoption of the virtual patient as a component of medical education in Africa remains a challenge.
- Implementation of a collaborative approach according to technical and human aspects seems to be a key element in which the future developments should be focused.

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Thank you for your kind attention