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Published evaluation instrument for Virtual Patients and for learning and teaching activities with Virtual Patients

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1. Introduction

The evaluation assumptions made by the eViP project team when finalising the description of work in September 2007 were strongly confirmed by a recent extensive literature review (Cook, 2009) on virtual patients (VPs). Cook states that VPs are likely to play an increasing role in medical education in coming years. He adds that the effective use of VPs requires evidence to guide design and integration, but that an evidence base is currently missing. The evaluation instruments of deliverable 5.2 have the potential to provide valuable information to fill this gap in knowledge.

Also confirmed by Cook is our premise that the major educational potential of VPs is the facilitation of the development of clinical reasoning. The explicit goal of the eViP project was to involve both end-users (students), intermediate users (teachers) and curriculum designers (senior teaching staff), all working with technical developers/learning technologists in the process of repurposing and integrating VPs in medical and healthcare education. By working with these key stakeholders and focussing on the role of VPs in developing clinical reasoning, the eViP team developed the following instruments as part of this deliverable:

- 1) A questionnaire for *students* to evaluate their experiences with VPs applied for clinical reasoning.
- 2) A checklist for *teachers and developers/learning technologists* to identify the constituents and structures of VPs considered important to elicit clinical reasoning. With this instrument each unique VP could be characterised by a 'fingerprint'.
- 3) A questionnaire for *students* to evaluate their experiences with the integration of VPs in the curriculum (e.g. as part of different educational scenarios).
- 4) A checklist for *teachers and developers/ learning technologists* to identify forms of active learning and their sequencing or linking with other teaching activities, considered important to elicit clinical reasoning. With this instrument each unique educational scenario could be characterised by a 'script'.

Literature:

Cook, D., & Triola, M. (2009). Virtual patients: a critical literature review and proposed next steps. *Medical Education*, 43(4), 303-311.

2. The evaluation instruments

Questionnaire for students to evaluate their experiences with VPs

Goal and theoretical underpinning

The questionnaire has been developed to elicit students' experiences in diagnosing virtual patients (VPs), focused on the development of clinical reasoning skills.

Free text questions are included in the questionnaire to gather information about until now unknown factors that foster or inhibit clinical reasoning. The questionnaire contains 14 items clustered in 7 subsets. The eViP project team, led by the University of Maastricht, aimed for brevity and simple questions focused at eliciting students' general impressions. This is because we wanted to create an instrument that could be administered repeatedly to elicit students' experiences immediately following each workup or 'play' of a VP.

We believe that another potential advantage of this design could be that it is feasible for others from the wider community to incorporate the questionnaire in their standard evaluation. As highlighted by Cook, this collection of instruments is currently lacking at present and the adoption of such instruments will go some way to informing the community in years to come.

A number of Likert Scale questions were used in this questionnaire. The Likert Scale statements are based on attitudes and cognitive activities. All of the questions pay importance to clinical reasoning.

Form

See appendix form 1 'Student questionnaire concerning their learning and clinical reasoning experiences with VPs.'

Checklist for teachers and developers/ learning technologists to identify the constituents and structures of VPs

Goal and theoretical underpinning

The checklist has been developed to characterise the design of a virtual patient (VP) in detail (i.e. the development of a 'fingerprint') by a reviewer. It consists of a comprehensive list of constituents that a VP can have, and focuses especially on those constituents that are supposed to foster clinical reasoning.

Free text questions are included in the checklist to reveal, until now unknown factors, which foster or inhibit clinical reasoning. The document includes the name and date of the reviewer, 10 items to specify the case in general, and the checklist itself containing 41 items clustered into 5 subsets. One or two reviewers are recommended to complete one checklist per case.

The checklist is intended to help an independent reviewer to explicitly capture the affordances of a VP. Combined with the student questionnaire this checklist enables us, to verify if a deliberate assembly of constituents in a VP fosters the intended activities of clinical reasoning. In addition it informs us how to improve VP design for clinical reasoning.

Form

See appendix form 2 'Reviewer checklist for virtual patient design'.

Questionnaire for students to evaluate their experiences with the integration of VP

Goal and theoretical underpinning

This questionnaire has been developed to investigate students' experiences in a course which involves virtual patients (VPs). The focus is on successful curricular integration of VPs, with the primary aim of fostering clinical reasoning.

There are 20 questions, clustered in 5 main categories, with 3 open answer questions. The open answer questions attempt to discover new factors which influence successful curricular integration of e-learning, specifically VP-based e-learning.

The three main categories are incorporated from the framework of Garrison & Vaughan (2007):

- Teaching presence includes the design and management of learning sequences, providing subject matter expertise, and facilitating active learning.
- Cognitive presence is defined as the extent to which participants in any particular configuration of a community of inquiry are able to construct meaning through sustained communication.
- Social presence is defined as the ability of learners to project themselves socially and emotionally within a community of inquiry.

Form

See appendix form 3 'Student questionnaire concerning the integration of virtual patients'.

A checklist for teachers and developers/learning technologists to identify active learning with VPs and their sequencing or linking with other teaching events

Goal and theoretical underpinning

The checklist has been developed to characterise the curricular integration of virtual patients (VPs) in detail (i.e. the 'script') by a reviewer. It consists of a comprehensive list of possible factors influencing VP curricular integration, and focuses especially on those supposed to foster clinical reasoning.

Free text questions are included in the checklist to reveal, until now unknown factors, which foster or inhibit clinical reasoning.

The document includes the name and date of the reviewer, 12 items to specify the curricular integration of VPs in general, and the checklist itself containing 24 items clustered into 5 subsets. One or two reviewers are recommended to complete one checklist per course or specific scenario. The checklist is intended to help an independent reviewer to capture explicitly the affordances of a course

dealing with VP. Combined with the student questionnaire this checklist enables us, to verify if a deliberate assembly of constituents of combining VPs with other teaching activities fosters the intended activities of clinical reasoning. In addition it informs us how to improve VP curricular integration for clinical reasoning.

Similar to the questionnaire for students, the three categories 'Teaching, Cognitive and Social presence' of Garrison & Vaughan were used to structure the checklist.

Form

See appendix form 4 'Reviewer checklist curriculum integration of virtual patients'.

Literature:

Garrison DR & Vaughan ND (2007): Blended Learning in Higher Education: Framework, Principles, and Guidelines, Jossey-Bass.

3. Examples of the evaluation instruments

Virtual Patients (VPs) can be designed and implemented in a lot of different ways. The requirements for specific designs or implementations will vary according to the educational context (Cook 2009). The optimal design and implementation might vary for learners at different training levels or for different kinds of reasoning. So if we want to guide educators in how to develop or adapt VPs for their specific needs, we have to evaluate each unique VP and each unique integration scenario. Generalised and subjective advice on VP design and integration will have limited value.

To address this we implemented the four aforementioned instruments as web-based forms that fill a secured database: the eViP Evaluation Database (EVDB). The online forms are linked with VP designs or integration scenarios that are 'declared' to the EVDB with unique IDs. Both student responses and teacher\author reviews are reported back to authorised persons and will be linked to the VP referatory in the future.

To make an audit of the EVDB by the European Commission possible we created a specific account for the url: <http://85.12.18.83/evdb/>

In the appendix, there will be a 'user guide for the EVDB database' that describes how to declare VP integration scenarios and to link the VP integration scenario IDs to the student questionnaires.

4. Procedure

The procedure for the development of the evaluation instruments was similar for both issues: VPs and integration of VPs. The procedure can be summarised into the following steps:

- Creation of first draft of the instruments based on existing literature and experience of the authors
- Share the draft with consortium partners on the eViP wiki
- Refine the instruments based on the feedback of the consortium partners and tests for validity
- Final review by partner leads and after final changes sign-off by all partner leads.
- Translation of instruments to the 6 languages (Dutch, English, German, Polish, Romanian and Swedish) within the consortium, sign-off of the local language versions by the respective partner leads
- Retranslation of the local language instruments to English
- Dissemination of the four instruments in the 6 language variants on the eViP website.
- Design and realisation of a secured database (EVDB), creation of online versions of the four instruments in the 6 language variants that fill the database.
- Design of a procedure to link the online forms to individual VPs and VP scenarios, realisation instruction for users and making the database available to all consortium partners.

5. Potential use by the wider community

Intention is that all partners will characterise the Virtual Patients (VPs) they repurpose and enrich with a ‘fingerprint’ using the online form ‘reviewer checklist for virtual patient design’. The results of these audits will fill the EVDB-database. In addition the use of these ‘fingerprinted’ VPs will be evaluated by students with the online form ‘Student questionnaire concerning their learning and clinical reasoning experiences with virtual patients’. The responses of the students will also fill the EVDB-database.

The data from both reviewers and students concerning the same VP might enable us to verify if user perceived learning outcomes for specific VPs meet the intended learning outcomes of the ‘fingerprint’ of these VPs. Such research will be a contribution to Cook’s (2009) call upon experts in the field of VPs to transform their experience into published evidence using defensible methods and to share this with the larger medical education community.

Our aim is also to present back the evaluation results on VPs in the final VP referatory, enabling teachers or administrators who search for VPs to make deliberate choices. Because even the best VPs won’t work when they are not well implemented and coordinated with other learning activities in a curriculum, we intend to use the instruments for curricular integration for pilots of VP scenario implementations. Analogous to VP design, we can verify if user perceived learning outcomes for

specific VP scenarios meet the intended learning outcomes of the ‘scripts’ of these scenarios.

6. Expected outcomes

During the second year and part of the third year of the eViP project all the partners of the consortium will use the central EVDB-database and the instruments concerning curricular integration, compiling their mutual experiences with the repurposing of VPs. At the moment simple reporting of student responses and the possibility to download these responses in Excel format is available for the design instruments. In the future more elaborate reporting (e.g. on multiple VPs) can be expected.

To give an impression how the simple reporting of student responses look like, some screenshots of the response of 100 Polish students who used the case ‘71-letnia kobieta z bólami głowy’ (A 71 year old patient with headache) are shown below:

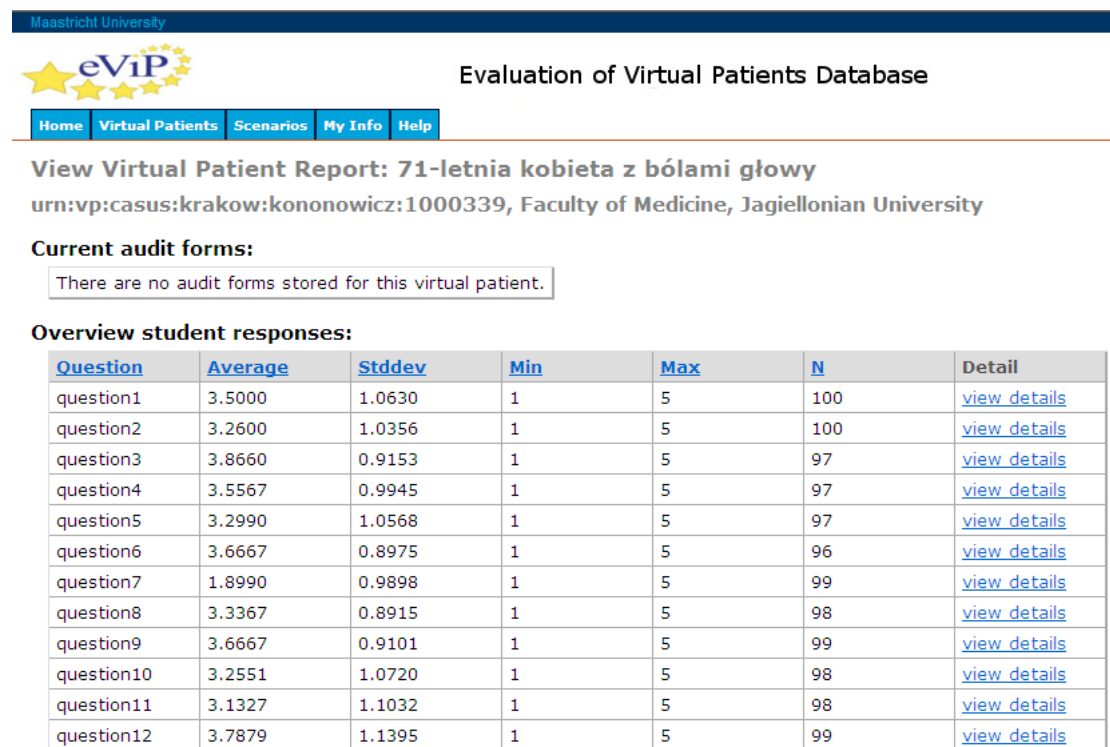


Fig. 1 General overview of all students’ responses evaluating a single VP; the user may select individual questions for a more detailed view (as in Fig. 1 and 2)

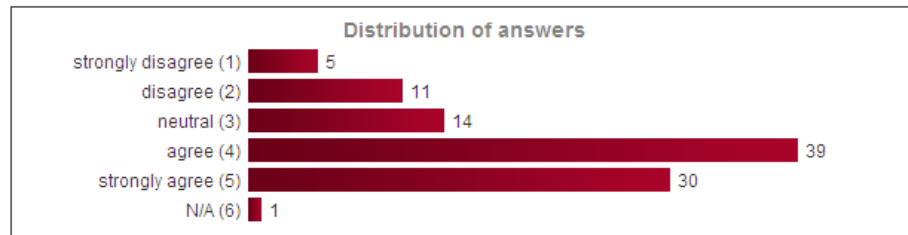
View Virtual Patient Report: 71-letnia kobieta z bólami głowy

urn:vp:casus:krakow:kononowicz:1000339, Faculty of Medicine, Jagiellonian University

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Detail report for question12

"After completing this case I feel better prepared to care for a real life patient with this complaint."



Remarks on this question

No remarks...

Fig. 2 Distribution of answers to individual questions is presented graphically in the detailed view of the EVDB-tool. Free text comments to the questions are presented below the charts (Fig.3)

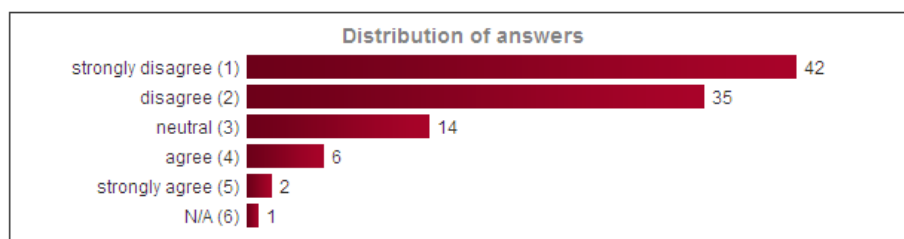
View Virtual Patient Report: 71-letnia kobieta z bólami głowy

urn:vp:casus:krakow:kononowicz:1000339, Faculty of Medicine, Jagiellonian University

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Detail report for question7

"I felt that the case was at the appropriate level of difficulty for my level of training."



Remarks on this question

"Pierwszy raz miałem do czynienia z większością sytuacji"

"przypadek był za trudny :("

Fig. 3 Despite the overall positive opinion of students regarding the VP (e.g. Fig.2), the evaluation tool indicates problems with the correct alignment of this case into the curriculum.

7. Conclusion

The eViP project team have felt the need to establish an Assessment and Evaluation Group (AEG) as part of this work carried out in Work Package 5. This group led by

the University of Maastricht and supported by the University of Heidelberg, consists of research leads from all the eViP partners and will work towards the uptake, maintenance, refinement, publication and promotion of the evaluation instruments.

We envisage that the successful use and adoption of these instruments will not only lead to invaluable research data to inform our future work within eViP but also to inform the wider community (not just medicine and healthcare) with approaches to creating instruments that can be applied to other e-content curricular implementation for any educational institution in the EU and across the world.

Appendix

Form 1 'Student questionnaire concerning their learning and clinical reasoning experiences with virtual patients'.

Form 2 'Reviewer checklist for virtual patient design'.

Form 3 'Student questionnaire concerning the integration of virtual patients'.

Form 4 'Reviewer checklist curriculum integration of virtual patients'.

User guide EVDB-database

Form 1: Student questionnaire concerning their learning and clinical reasoning experiences with virtual patients:

Please respond using the following 5-point scale: 1) strongly disagree, 2) disagree, 3) neutral, 4) agree and 5) strongly agree, 6) not applicable). Please indicate briefly the reason(s) for your response for each question (optional).

Example:

While working on this case, I felt as if I were the doctor caring for this patient.

Strongly disagree ----- strongly agree, not applicable

1 2 3 4 5 6

Why (if you agree):

Why not (if you disagree):

Authenticity of patient encounter and the consultation

1. While working on this case, I felt I had to make the same decisions a doctor would make in real life.
2. While working on this case, I felt I were the doctor caring for this patient.

Professional approach in the consultation

3. While working through this case, I was actively engaged in gathering the information (e.g. history questions, physical exams, lab tests) I needed, to characterize the patient's problem.
4. While working through this case, I was actively engaged in revising my initial image of the patient's problem as new information became available.
5. While working through this case, I was actively engaged in creating a short summary of the patient's problem using medical terms.
6. While working through this case, I was actively engaged in thinking about which findings supported or refuted each diagnosis in my differential diagnosis.

Coaching during consultation

7. I felt that the case was at the appropriate level of difficulty for my level of training.

8. The questions I was asked while working through this case were helpful in enhancing my diagnostic reasoning in this case.

9. The feedback I received was helpful in enhancing my diagnostic reasoning in this case.

Learning effect of consultation

10. After completing this case, I feel better prepared to confirm a diagnosis and exclude differential diagnoses in a real life patient with this complaint.

11. After completing this case I feel better prepared to care for a real life patient with this complaint.

Overall judgment of case workup

12. Overall, working through this case was a worthwhile learning experience.

Open-ended questions

13. Special strengths of the case:

14. Special weaknesses of the case:

15. Any additional comments:

Form 2: Reviewer checklist for virtual patient design:

1. Name of reviewer:
2. Date of review:

I. Specifics of the case:

3. eVIP ID:	<i>On the right side will be boxes with choices to click, where appropriate</i>
4. VP system:	CASUS
	CAMPUS classic
	CAMPUS card
	Labyrinth
	WebSP
5. Name of VP:	
6. Main learning objective (e.g. clinical reasoning, communication)	
7. Predominant question type:	Multiple choice questions
	Long menu
	Free text
	Other:
8. Feedback:	Right/wrong
	Comparison with expert
	Additional comments why something is right
	Additional comments why something is wrong
9. Prompts:	Navigation instruction
	Basic sciences questions
	Clinical reasoning questions
	Other:

10. Media use:	Text
	Images
	Audio
	Video
11. Pathway:	Linear unrestricted
	Linear restricted
	Branched
	Other
12. Scenario used in:	Self-study
	Wrap-up
	In-session VP
	Other:

II. Clinical reasoning checklist:

Answering format: Likert Scale (1-5: Do not agree at all- totally agree; not applicable). And a comment field to accompany each question.

Authenticity of patient encounter and the consultation

(Categories incl.: Patient characteristics, context, realism, action):

13. This case is relevant for real medical practice.
14. This case gives a typical presentation of a patient with this disease.
15. The media (pictures, audio files, videos...) support the realism in this case.
16. The narrative of the patient in this case is stated in the patient's voice.
17. The prompts to the user and the questions are stated in the medical supervisor's (e.g. consultant's) voice.
18. The cognitive tasks students complete during the case-work up correspond to real-life physician tasks.
19. The numbers of decisions students make in this case corresponds to real life decisions.
20. The chunks of information presented in this case reflect the quantity of information the user will be confronted with in real practice.
21. The case triggers the user to actively gather information necessary for diagnosis and therapy (e.g. history questions to ask, physical exams to perform, labs and diagnostic tests to order).
22. During the work-up of the case, the user is confronted with time constraints.

Professional approach in the consultation

(Categories incl.: Problem representation, information gathering, evaluation, interactivity):

23. The case triggers the user (by e.g. prompts and feedback) to summarize the clinical problem in professional medical terms shortly.
24. The case triggers the user (by e.g. prompts and/or reference material) to interpret the data presented critically.
25. The case triggers the users (by e.g. prompts and feedback) to iteratively re-evaluate the suspected diagnoses in light of newly gained information.
26. The case triggers the user (by e.g. prompts and feedback) to infer consequences of the findings for diagnosis and therapy.
27. The case triggers the user (by e.g. prompts and feedback) to differentiate between important and less important information.
28. The case triggers the users (by e.g. prompts and feedback) to differentiate features as either “discriminating” or “confining” for differential diagnoses.
29. The case triggers the user (by e.g. prompts) to generate hypothesis early in the diagnostic process.

Coaching during consultation

(Categories incl.: prior knowledge, instruction):

30. The case triggers the user (by e.g. prompts, advance organizers) to link the case with their prior knowledge.
31. The degree of difficulty of the case is appropriate for the target group.
32. Media (pictures, video, audio, diagrams, graphics) are used, whenever superior to verbal explanations.
33. The case helps the user to interpret pathological data in an authentic format, by offering a normal finding as reference (e.g. pathologic and normal x-ray, sounds etc.).
34. The case triggers the user at the end of the case (by e.g. prompts) to recapitulate the key learning points.
35. The amount of information presented simultaneously (the so called cognitive load) is appropriate.
36. The case uses attributes (e.g. highlighting via bold or colour, pointers) to point out the most important information.
37. The presentation of the case is adaptable to the learning style of the user.
38. The case gives users feedback on all decisions they take.
39. The feedback in the case is elaborated by explaining why something is right.
40. The feedback in the case is elaborated by explaining why something is wrong.
41. The feedback in the case is well timed.
42. Students are offered a summarized (e.g. statistical) feedback concerning their performance in different parts of the case work up at the end of the case (e.g. concerning history taking, physical examination, diagnoses, lab & technical investigations, therapeutic decisions).
43. The case offers possibilities for self-assessment.
44. The case offers remedial activities to practice clinical reasoning.
45. Scaffolding and help in the case can be faded.
46. The case triggers the user (by e.g. prompts, feedback) to evaluate their actions of their inquiry.

47. The case triggers the user (by e.g. prompts, feedback) to evaluate their diagnostic reasoning.
48. The case triggers the user (by e.g. prompts and feedback) to improve their strategies in clinical reasoning.
49. The case triggers the user to create some artefact (e.g. take personal notes) during the case work up.

Overall judgment of the case

50. Overall, this case is very well suited to enhance learning in the target group.
51. Overall, this case is very well suited to foster clinical reasoning in the target group.

Open-ended questions

52. Special weaknesses of this case (inhibition of clinical reasoning):
53. Special strengths of this case (fostering clinical reasoning):

Form 3: Student questionnaire concerning the integration of virtual patients

Dear Students,

We want to know how well virtual patients are integrated and aligned with corresponding teaching events such as lectures, small group work, online discussions etc. related to virtual patient topics.

Please respond using the following 5-point scale: 1) strongly disagree, 2) disagree, 3) neutral, 4) agree and 5) strongly agree, 6) not applicable). Please indicate briefly the reason(s) for your response for each question (optional).

Characteristics of respondents:

Your age (in years):

Your gender:

(male/female)

A Teaching presence

Categories: Organization (Information, time allocation and sequencing, co-ordination of content, assessment, accessibility/flexibility) and facilitation

Information:

1. I felt well informed about how the virtual patients were integrated into this course.

Time allocation and sequencing:

2. The chronological order of the virtual patient work and the corresponding teaching events was well thought out.
3. The time spent on the virtual patients was well balanced with the time spent on the corresponding teaching events.

Co-ordination of content:

4. The content of virtual patients and the corresponding teaching events complemented each other well.
5. The corresponding teaching events gave me an insightful learning experience, which I would not have had from the virtual patients alone.

Assessment:

6. I think that learning with the virtual patients is important in order to do well in the final exam for this course.

Accessibility/flexibility:

7. I had easy access to the virtual patients at my convenience.

Facilitation:

8. The teachers helped me to assess my learning during the corresponding teaching events
9. The teachers facilitated the further development of my clinical reasoning skills during the corresponding teaching events.
10. The teachers were well prepared for the corresponding teaching events (incl. familiarity with the virtual patients).

B Cognitive presence

11. I was actively involved in critically weighing pro's and cons for explanations given by other students during the corresponding teaching events.
12. I was actively involved in applying my newly gained insights in clinical reasoning, during the corresponding teaching events
13. I was actively involved in refining my clinical reasoning skills during the corresponding teaching events.
14. The quality of discussion during the corresponding teaching events was good.

C Social presence

15. I felt secure enough to openly discuss even my shortcomings (e.g. my mistakes while working with virtual patients) during the corresponding teaching events.
16. I felt a positive climate for learning during the corresponding teaching events.
17. I felt like part of a 'community' during the corresponding teaching events.

D Learning effect

18. The combination of virtual patients and corresponding teaching events enhanced my clinical reasoning skills.
19. The combination of virtual patients and corresponding teaching events made me feel better prepared to care for a real life patient with this complaint.

E Overall judgement of the course

20. Overall, the combination of virtual patients and corresponding teaching events was a worthwhile learning experience.

F Open-ended questions

21. Special weaknesses of the overall virtual patient integration into this course:
22. Special strengths of the overall virtual patient integration into this course:
23. Please describe how an ideal integration of VPs would look like in this context, from your point of view:
24. Any additional comments:

Thank you very much!

Form 4: Reviewer Checklist Curriculum Integration of Virtual Patients

Name of reviewer:

Institution:

Date:

Definition of VP-session:

Teaching session in which students **work through virtual patients (VPs)**.

(Could be self-study, seminars, small group sessions...)

Definition of Corresponding Teaching Event (CTE):

Teaching event which corresponds to a VP session, **without directly working with a VP case**.

(Could be a lecture, seminar, group study, bedside- teaching, high fidelity simulation...)

I. Course Design

1. VP Session & Corresponding Teaching Event Scenarios:

A	VP session without a corresponding teaching event <ul style="list-style-type: none"> - Total number of VPs available: - Comments:
B	VP session after a corresponding teaching event <ul style="list-style-type: none"> - Number of VPs used in each session: - Comments:
C	VP session before a teaching event <ul style="list-style-type: none"> - Number of VPs used in each session: - Comments:
D	VP work as summative assessment <ul style="list-style-type: none"> - Total number of VPs used: - Type of assessment: - Comments:
E	Other use of VPs: <ul style="list-style-type: none"> - Total number of VP's used: - Comments:

2. Co-ordination of Content	<p>Did the corresponding teaching event inspire the creation of artefacts for the VP session?</p> <p>If so, what kind of artefact?</p> <p style="padding-left: 40px;">e.g. Notes:</p> <p style="padding-left: 80px;">Charts/graphs:</p>					
	<p>Did the VP session inspire the creation of artefacts for the corresponding teaching event?</p> <p>If so, what kind of artefact:</p> <p style="padding-left: 40px;">e.g Notes:</p> <p style="padding-left: 80px;">Charts/graphs:</p>					
	<p>Time allocation:</p> <p style="padding-left: 40px;">What _____ % was spent in VP sessions?</p> <p style="padding-left: 40px;">What _____ % was spent in a CTEs?</p>					
3. Type of VP Session		Individual Study	Pair Study	Small Group	Seminar	Other
	A					
	B					
	C					
	D					
	E					

4. Type of Corresponding Teaching Event		Lecture	Seminar	Small Group	Bedside	Other
	A					
	B					
	C					
	D					
	E					

5. Communication: During the VP session:	Instructor – student:				
		CMC Synchronous	CMC Asynchronous	Face to Face	None
	A				
	B				
	C				
	D				
E					
CMC = Computer Mediated Communication					

	Student – student:				
		CMC Synchronous	CMC Asynchronous	Face to Face	None
	A				
	B				
	C				
	D				
E					

During the corresponding teaching event:	Instructor - student:				
		Face to Face	CMC Synchronous	CMC Asynchronous	Other
	A				
	B				
	C				
	D				
	E				
	Student-student				
		Face To Face	CMC Synchronous	CMC Asynchronous	Other
	A				
	B				
	C				
	D				
	E				
6. Education of staff	Was training offered for CTE Teachers: Yes / No				
What kind?					
- Workshop					
- Written material					
- Other:					
Content of training?					
	Was training offered for CMC Teachers: Yes / No				
What kind?					
- Workshop					
- Written material					
- Other:					
Content of training?					
	Was training offered for VP-Session Teachers: Yes / No				

	<p>What kind?</p> <ul style="list-style-type: none"> - Workshop - Written material - Other: <p>Content of training?</p>
<p>7. Accessibility/ Flexibility</p>	<p>Student access to VPs:</p> <p>Location:</p> <p style="padding-left: 40px;">From any computer on campus?</p> <p style="padding-left: 40px;">Only from certain computers?</p> <p style="padding-left: 40px;">From remote computers?</p> <p>Time:</p> <p style="padding-left: 40px;">24 hour access</p> <p style="padding-left: 40px;">Access during specified hours</p> <p style="padding-left: 40px;">Access only during VP session</p>
<p>8. Summative assessment of VP content:</p>	<p>What kind of assessment:</p> <p style="padding-left: 40px;">MCQ:</p> <p style="padding-left: 40px;">Short Menu questions:</p> <p style="padding-left: 40px;">Long menu questions:</p> <p style="padding-left: 40px;">OSCE:</p> <p style="padding-left: 40px;">Other:</p>
<p>9. Summative assessment of VP content by VPs</p>	<p>What kind of VP assessment questions:</p> <p style="padding-left: 40px;">MCQ:</p> <p style="padding-left: 40px;">Short Menu:</p> <p style="padding-left: 40px;">Long menu:</p> <p style="padding-left: 40px;">Other:</p> <p>Please describe how VPs are used for assessment:</p>

10. Intended target group:	Medical student in the ____th year Resident's training: Continuing medical education: Other:
11. Main learning objective (e.g. clinical reasoning, communication):	
12. Description of scenario(s) in own words (if needed):	

II. VP-Curricular- Integration-Checklist

Please respond using the following 5-point scale:

- 1) strongly disagree, 2) disagree, 3) neutral, 4) agree and 5) strongly agree,
 6) not applicable/do not know.

Please use the comment field whenever you feel unsure concerning the question's meaning or for additional feedback.

Example:

The content of the VP is relevant for the exam.

Do not agree at all ----- totally agree, not applicable

1 2 3 4 5 6

Comment:

A. Teaching presence

(Categories include: Information, Time allocation and sequencing, assessment, accessibility/flexibility, facilitation)

Information

13. Students receive sufficient information about the way VPs are integrated into the course. How are the students informed? [free text]
14. Students are informed about which VP sessions correspond to which teaching events.
15. Students are informed about the possibility of discussing with other students and teachers via an online discussion forum, online chat, or email.

Time allocation and sequencing

16. Students had fixed blocks of time in their schedule for the VP sessions.

Co-ordination of content (Applicability of these questions depends on questions 3 and 4.)

17. When CTE is after VP session:

The CTE is effective for refining students' clinical reasoning of topics addressed in the VP session. Why? [free text].

18. When CTE is after VP session:

Students are asked to make an artefact during the VP session which can be used or discussed in the following CTE.

19. When CTE is before VP session:

Students are asked to make an artefact (e.g taking notes) during the CTE which they can use during the VP session.

20. When VP session alone:

The VP session is effective in refining students' clinical reasoning skills regarding topics addressed in the VP. Why? [free text]

21. The content and structure of VPs and "corresponding teaching events" were co-ordinated and implemented in a way to create the most meaningful use of time. Explain why if you agree:

Assessment

22. Virtual patient learning objectives, instruction and assessment are well aligned, in terms of content and methods.
(Concept of constructive alignment, Biggs 1996).

Facilitation

23. Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills during face to face sessions. If Yes: How?
24. Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills online.

25. Teachers are taught to encourage students to create a short summary of the patient's problem using medical terms.
26. Teachers are taught to encourage students to interpret the data presented critically.
27. Teachers are taught to encourage useful reading habits (e.g. students should read comparatively about at least two diagnostic hypotheses of a VP).
28. Teachers are taught to use special questioning strategies (e.g. open-ended questions) to reveal the developmental level of the student concerning clinical reasoning skills.

B. Cognitive presence

29. Teachers are taught to ask students explicitly about which findings support or refute each diagnosis in the differential diagnosis during the corresponding teaching events or VP sessions.
30. Teachers are taught to ask students to discuss clinical reasoning concerning the VPs with other students and/or a teacher during the during CTE or VP sessions.
31. Teachers are taught to ask students explicitly, to discuss clinical reasoning concerning the VPs with other students and/or a teacher during CTE or VP sessions.
32. The mix of VP-sessions and corresponding teaching events is well suited to stimulate discussions on clinical reasoning.

C. Social presence

33. Teachers are taught how to create a good climate for learning.

(e.g. eye contact, relaxed body posture, using gestures, smiling, humour, addressing students by name, praising students work, Rourke et al. 2001)

D. Learning effect

(Category included: Learning success)

34. Overall, the combination of VP sessions and corresponding teaching events is very well suited to foster clinical reasoning in the target group.
35. Overall, the combination of VP sessions and corresponding teaching events is very well suited to prepare a student of the target group to care for a real life patient with this complaint.

E. Overall judgement

36. Overall, the combination of VPs sessions and corresponding teaching events is very well suited to enhance learning in the target group.

F. Open-ended questions

37. Special weakness of the of the overall VP integration:

38. Special strengths of the of the overall VP integration:

39. Other comments:

User guide EVDB-database

How to use the tool for evaluating VPs

Step 1: Log in

Log in on the EVDB: <http://85.12.18.83/evdb> .

Step 2: Declare a VP

You have to declare a VP before it can be evaluated. Declaring means providing a unique ID and a name for the VP. At this stage of the project and as a pilot, we propose to use a URN scheme for identifying VPs (this may be subject to change as the project progresses):

```
urn:vp:[system]:[location]:[author]:[name]:[version]
```

for example:

```
urn:vp:campus:maastricht:deleng:vomitingchild:1.0
```

Step 3: fill in audit form

At least two different persons have to fill in an audit form per VP. Just click on “audit” in the VP overview to start filling out the form.

Step 4: create hyperlink for a student

In your local VP player or ELO/VLE, create a hyperlink to the student inquiry form:

```
http://85.12.18.83/evdb/htdocs/inquiry.php?lang=LL&userid=XXX&vpid=YYY&url=ZZZ
```

In this url: LL stands for language code:

- en for English
- sv for Swedish
- pl for Polish
- nl for Dutch
- de for German
- ro for Romanian

XXX stands for the userid. The ids are stored in the database in a hashed form (MD5 algorithm) to ensure anonymity of the students’ responses. This should be a unique id per student, so you might include some institution code in this id. If you are not able to generate a student id, you can (as a second choice) use the preset id “iptime”. EVDB will then generate an internal id on the basis of the remote IP address and the current time. If you use the preset id “test”, the form is shown, but nothing is stored.

YYY stands for the VP id. This should be the same as the id you declared in step 2.

ZZZ stands for a optional url. This url will be presented to the students when they are finished with the inquiry (this can be used for e.g. a link to the standard evaluation form of your institution).

step 5: view results

When you log in to the EVDB, you can view a general report of the results. Only if the VP is defined by someone in your organization, you can also view detailed results and download the data.

How to use the tool for evaluating Integration scenarios

Step 1: Declare a Scenario

You have to declare a VP Scenario before it can be evaluated. Declaring means providing a unique ID and a name for the scenario. We propose to use a URN scheme for identifying Scenarios, similar to those for VPs:

```
urn:vpscenario:[location]:[author]:[name]:[version]
```

for example:

```
urn:vpscenario:maastricht:deleng:firstyearmedicine:1.0
```

Step 2: fill in audit form

At least two different persons have to fill in an audit form per scenario. Just click on “audit” in the Scenario overview to start filling out the form.

Step 3: create hyperlink for a student

In your local VP player or ELO/VLE, create a hyperlink to the student inquiry form:

```
http://85.12.18.83/evdb/htdocs/scinquiry.php?lang=LL&userid=XXX&scid=YYY  
&url=ZZZ
```

In this url: LL stands for language code:

- en for English
- sv for Swedish
- pl for Polish
- nl for Dutch
- de for German
- ro for Romanian

XXX stands for the userid. This should be a unique id per student, so you might include some institution code in this id. If you are not able to generate a student id, you can (as a second choice) use the preset id “iptime”. EVDB will then generate an internal id on the basis of the remote IP address and the current time. If you use the preset id “test”, the form is shown, but nothing is stored.

YYY stands for the Scenario id. This should be the same as the id you declared in step 1.

ZZZ stands for a optional url. This url will be presented to the students when they are finished with the inquiry (this can be used for e.g. a link to the standard evaluation form of your institution).

step 4: view results

When you log in to the EVDB, you can view a general report of the results. Only if the Scenario is defined by someone in your organization, you can also view detailed results and download the data.