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Publicly available set enriched and standards compliant VPs for different educational scenarios, with published educational guidelines for enriching and implementing VPs for different educational scenario's and different cultures

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1	INTRODUCTION	3
2	BACKGROUND	3
2.1	NOT REPURPOSING FOR THE SAKE OF REPURPOSING	3
2.2	PUBLICLY AVAILABLE SET OF VPS FOR DIFFERENT EDUCATIONAL SCENARIOS.....	4
3	THE SCENARIOS AND THE VPS	5
3.1	INDIVIDUAL SELF-STUDY WITH VP	5
3.2	SMALL GROUP DISCUSSION AFTER VP	6
3.3	PROBLEM BASED LEARNING IN TUTORIAL GROUP WITH VP	8
3.4	SKILLS LABORATORY TRAINING FOLLOWING INSTRUCTION BY A VP.....	10
3.5	ASSESSMENT WITH VP.....	11
4	FOCUS GROUP STUDIES	12
4.1	FOCUS GROUP 1: THE RELATION BETWEEN VIRTUAL PATIENTS AND THE EDUCATIONAL SCENARIOS..	12
4.2	FOCUS GROUP 2: REPURPOSING EXPERIENCES	13
4.3	FOCUS GROUP 3: THE EVIP EVALUATION INSTRUMENTS	15
5	CONCLUSIONS	15
6	APPENDICES	17

1 Introduction

The goal of this document is to describe and discuss the results of evaluations by different stakeholders (students, teachers, developers) of the use of Virtual Patients (VPs) in a healthcare education curriculum. After an inventory of the existing educational scenarios in which VPs were used by the partners in the e-ViP consortium (deliverable D5.1), the partners prioritized five scenarios for which a total of 15 publicly available VPs were to be repurposed. For the evaluation of these scenarios and the corresponding VPs, four evaluation instruments were developed and implemented in a secured database (deliverable D5.2). Via this so-called Evaluation of Virtual Patients Database (EVDB, <http://85.12.18.83/evdb>) different stakeholders have evaluated the scenarios and the VPs (per May 2010: 1270 students evaluated 75 VPs, 375 students evaluated 7 scenarios and 5 educators audited 7 scenarios).

Chapter 3 summarizes the results for the 15 publicly available VPs within the five prioritized scenarios (available via Virtual Patients Referatory on eViP website www.virtualpatients.eu), infers the ‘lessons learned’ during the implementation of these scenarios and finally tries to translate these lessons into advice to teachers and curriculum designers who plan to implement similar scenarios in their curriculum. In an effort to also share the experiences gained by educators and developers in repurposing and integrating VPs in healthcare education, which were rich but could not be captured by the evaluation instruments, we conducted several focus group sessions to discuss the following topics: the relation between VPs and the educational scenario; experiences during the repurposing process; and experiences in using the evaluation instruments that had been developed. The findings of these focus group discussions are summarized in Chapter 4. This report wraps up with some conclusions.

In order to form an evidence based rationale behind the use of the eViP VPs in curricula, it is worth noting that all of the repurposed and enriched VPs evaluated as part of this deliverable will be made openly available via the eViP website along with the respective standardised VP content packages by the end of the project. Information relating to these VPs is already available via the EVDB and it is anticipated that the learning from this comprehensive study will inform the community with educational guidelines on how to enrich and implement VPs for different educational scenarios and different cultures.

2 Background

2.1 *Not repurposing for the sake of repurposing*

Although the essence of the electronic virtual patients project (eViP) is the repurposing of several hundreds of virtual patients, all partners in the eViP consortium realized from the start that repurposing without clearly stated goals carried the risk of ending the project with a huge pile of virtual patients of unknown quality and usability. We therefore decided to redesign and implement virtual patients within the eViP project in a deliberate way.

Because no published instruments were available to evaluate the design and curricular integration of VPs we developed four instruments:

- (i) a checklist enabling reviewers such as teachers and authors to characterise the design of a VP in detail;
- (ii) a questionnaire assessing students’ experiences in using VPs to develop clinical reasoning skills;

- (iii) a checklist enabling reviewers to characterise the curricular integration of VPs in detail, and
- (iv) a questionnaire to assess students' experiences with the curricular integration of VPs.

We made the student questionnaires publicly available in six languages (English, German, Swedish, Polish, Rumanian and Dutch) via the eViP website (<http://www.virtualpatients.eu/resources/evaluation-tool-kit/translated-versions/>) and communicated their existence and use to the larger medical education community via several international conferences (e.g. ICVP 2009, IAMSE 2009, AMEE 2009, ICVP 2010) and publications (Huwendiek, 2010). In addition all eViP partners got secured access to the so-called Evaluation of Virtual Patients Database (EVDB, <http://85.12.18.83/evdb>), in which they can register VPs and VP scenarios, enter reviews, generate student questionnaires and view and download evaluation results.

The English language checklists for VP design and curricular integration in the EVDB were developed for use by developers and educators and intended to serve a twofold purpose: 1) to make developers and educators aware of the objectives of repurposing VPs and the goal of the educational scenarios in which the VPs are to be used; 2) to enable us to verify if learners' experiences with VPs and scenarios match the 'declared' intentions of the developers and educators. Such comparisons will yield data that contribute 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.

2.2 Publicly available set of VPs for different educational scenarios

At the start of the eViP project the partners prioritised 5 different educational scenarios for which a total of 15 enriched and standard compliant VPs would be repurposed and made publicly available (table 1). This set of VPs, repurposed specifically for these scenarios, together with relevant documentation (description of VP and scenario) is intended to give a wider audience an idea of what VPs are and how they can be used for learning. Additional documentation (students' and educators' experiences with the VPs and scenarios, developers' experiences with the repurposing process) can show educators and administrators interested in using this type of VPs and scenarios what it takes to make VPs work in education.

Scenario	Example	Partner	VP	Titles of VPs
1. VP without corresponding teaching event	Individual self-study with VP	JAG	4	<ul style="list-style-type: none"> • Elwira Božko • Jan Myszkowski • Stefan Młynarz • Zofia Nowak
2. VP with corresponding teaching event: afterwards	Small group discussion after VP	UM	2	<ul style="list-style-type: none"> • Abdominal pain • Dyspnoe
3. VP with corresponding teaching event: during session	VP in PBL tutorial group	SGUL	2	<ul style="list-style-type: none"> • Catherine Miller • Anna Lena Olofsson
4. VP with corresponding teaching event: before	VP before skills training	HD	3	<ul style="list-style-type: none"> • Skillslab Lumbalpunktion • Skillslab Blasenpunktion • Skillslab Cardiopulmonary resuscitation
5. VP with corresponding teaching event:	VP for assessment	LMU	4	<ul style="list-style-type: none"> • Moses Schulterschmerzen • Neugeborenes mit gelblichem Hautkolorit

assessment				<ul style="list-style-type: none"> • Schicksal einer Familie • Ängstliche Mutter
5 scenarios			15 VPs	

Table 1 Set of 15 VPs in 5 Scenarios

3 The scenarios and the VPs

3.1 Individual self-study with VP

The Jagiellonian University Medical College has studied the use of VPs as a self-study tool without any attached teaching event. Students were invited to work with VPs in three different settings: a) during a course on a technical, non-medical subject (i.e. Basics of Computer Science Course), b) during an obligatory group session in the university’s computer laboratory, c) using an e-mail invitation or a bulletin board announcement with log-in instruction.

Description of VPs and Scenario

Four VPs were evaluated, two (UJ1 and UJ2) during a technical course, one (UJ3) in an obligatory group session, and one (UJ4) in the e-mail/bulletin invitation. All VPs were repurposed from cases developed in Munich using CASUS. UJ1 is a 71-year-old patient with Subarachnoidal Bleeding. This VP was repurposed from the Munich case evip:vp:1000201. The repurposing process, described in deliverable D4.4 guideline 8, involved translation and adaptation from German to Polish language and culture. This involved among other things changing names and text to Polish, subtitling videos and replacing a picture of a typical German ambulance by that of a recognizable Polish one (figure 1). UJ2, repurposed from vp:evip:298313, involves a 77-year-old patient who is vomiting with blood. This meant repurposing for a different discipline: from medicine to nursing as well as for a different language/culture: German to Polish (see D4.4 guideline 9). UJ3 involves a 40-year-old endocrinology patient, repurposed for culture/language (not described in the guidelines). Finally, UJ4 is a paediatrics case that was adapted to a different level of education: from the level of a fifth or sixth year German medical student to that of a third-year student in Krakow (Poland) (see D4.4 guideline 6).



Figure 1 A German ambulance replaced by a Polish one...

Evaluation of the scenario

The audit of this scenario (appendix 1) tells us that students and teachers communicated face-to-face in contexts a) and b) and only by e-mail in context c). The main motivation of the teachers for using VPs was: “Better resembles real life situations than conventional teaching”. Although clinical reasoning was an intended learning goal of the VPs, the teachers were not involved in fostering students’ clinical reasoning. The teachers pointed to a weakness that is also mentioned in Guidelines 6, 8 and 9 of D4.4: the VPs are not well-integrated in the curriculum. As a main strength of the VPs the teachers mentioned: “Offers new approach to clinical reasoning, independent work in students’ free time with unlimited literature support”.

The scenario as a whole was not evaluated by students, but each of the VPs (UJ1, UJ2 and UJ4) was evaluated separately (cf. results in EVDB). The results for UJ1 (100 students) are also provided in Guideline 8. The three VPs received quite positive evaluations in general, but UJ2 and UJ4 were judged more positively than UJ1 on all points, while UJ2 and UJ4 were comparable to each other. One striking result was that UJ1 was too difficult for the target group.

3.2 Small group discussion after VP

The Department of Educational Development and Research of the Faculty of Health, Medicine and Life Sciences of Maastricht University, the Netherlands piloted the integration of VPs in clinical reasoning sessions for residents and trainees in the paediatric department of Maxima Medical Centre, Veldhoven. The goal of the application of VPs was to facilitate deliberate practice in small groups of learners trying to solve standardised cases known to be susceptible to cognitive errors.

Description of scenario and VPs

The VPs ‘Abdominal pain’ and ‘Dyspnoe’ were derived from real practice and presented cases that are commonly known to be likely to cause a commonly occurring cognitive error: so-called premature closure. In these VPs minimal information is volunteered; in working-up the case learners can use comprehensive lists of requests; findings are presented in uninterpreted form (figure 3) and during the individual work-up learners receive only natural feedback.

In the first pilot with the ‘Abdominal pain’ VP (Figure 2) the individual work-up of the VP with multiple diagnostic loops was punctuated by several ‘time-outs’ in which the residents discussed their diagnostic reasoning. In the second pilot with the ‘Dyspnoe’ VP with only one detailed diagnostic loop, the residents and trainees discussed their diagnostic reasoning after they had completed the whole case (Figures 4 and 5). In the first pilot 66% of the available time (70 minutes) was allotted for individual work-up of the VP and 34% for group discussion. In the second pilot 80% of the time (60 minutes) was allotted to individual work-up and 20% to group discussion. Training of the moderator of the group discussion involved learning the procedure of the scenario, the specific case, the underlying cognitive error, the use of the feedback tool and how to moderate the discussion.



Figure 2 VP player in which the diagnosis in the differential can be rated



Figure 3 Findings of physical examinations are presented with video

During the individual work-up of the VPs the learners used a form with open-ended questions intended to elicit reflective diagnostic reasoning:

- 1) After completing their investigations and tests the learners were asked to write down the first diagnosis that came to mind and then to go back to the patient record and list the findings that:

- supported their diagnosis;
- disconfirmed their diagnosis;
- were to be expected if the diagnosis was correct but were not encountered.

2) Next, the learners were asked to list alternative diagnoses and answer the same 3 questions for each of these.

3) Finally the learners were asked to rank their diagnoses in order of likelihood based on their analyses (Figure 2)

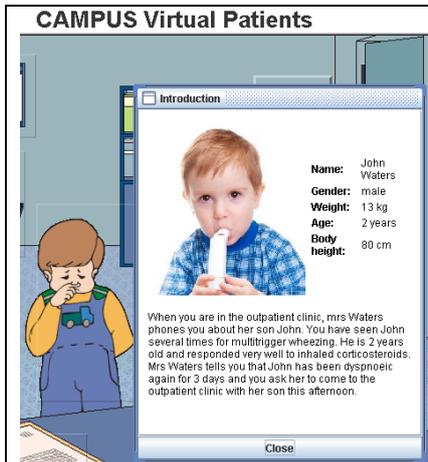


Figure 4 Individual work-up of VP



Figure 5 Group discussion on diagnostic reasoning

Notes written down by the individual learners on the forms for reflective practice and log files of their actions in the VP player were the artifacts generated during the VP work-up. These artifacts were used as input for the group discussion on diagnostic reasoning. The logged individual actions were aggregated and presented to the group with a feedback tool (Figure 6).

feedback tool

SESSION MY SESSIONS LOGOUT

INITIAL STAGE 1 STAGE 2

HISTORY PHYSICAL TECHNICIAL LAB **DIAGNOSE** THERAPY FOLLOW-UP QUESTIONS

none all		<<<	>>>	none all		<<<	>>>
rank	item	aggregate		rank	item	aggregate	
1	Diarrhoea and gastroenteritis of presumed infectious origin	4		1	Viral and other specified intestinal infections	4	
6	Urinary tract infection, site not specified	2		2	Acute appendicitis	4	
1	Acute appendicitis	1		1	Diarrhoea and gastroenteritis of presumed infectious origin	1	
2	Malignant neoplasm: Other sarcomas of liver	1		3	Ulcerative colitis	1	
2	Noninfective gastroenteritis and colitis, unspecified	1		3	Intestinal parasitism, unspecified	1	
2	Diarrhoea and gastroenteritis of presumed infectious origin	1		4	Urinary tract infection, site not specified	1	
2	Intestinal parasitism, unspecified	1					
2	Secondary malignant neoplasm of liver	1					
3	Acute appendicitis	1					

6 records found, showing page 1 of 1.

Figure 6 Feedback tool used as input for group discussion

Audit of scenario

The scenarios of the two pilots were reviewed by a staff member of Maastricht University using the online form in the EVDB (<http://85.12.18.83/evdb>). The reviewer stated (appendix 2) that: the students had a fixed a block of time in their schedule for the VP session, were well informed about how the VPs were integrated in the course, were asked to produce an artefact (notes on a form) during the VP workup, which was used as input for the subsequent discussion. The activities were in alignment with the remainder of the course but they were not subject of summative assessment. The teachers were trained to use the VP and the

feedback tool and learned about the procedure of the scenario, the specific case and the underlying cognitive error. In addition they were instructed on important issues for clinical reasoning, such as critical interpretation of the data and asking open-ended questions to elicit students' thinking and reflective diagnostic reasoning.

Student experiences with the scenario

The experiences of residents and trainees (n=13) with the scenario of small group discussions following individual completion of a VP were evaluated using three eViP questionnaires on curricular integration of VPs. For this the scenario was declared to the EVDB (<http://85.12.18.83/evdb>) with a unique ID and students filled in the online questionnaire. Results: Student ratings of the overall scenario as a worthwhile learning experience were quite high (4.4) as were their ratings of the learning effect (3.9). The learners' ratings of teaching and cognitive and social presence of the scenario were also quite high at 4.3, 4.1 and 4.5, respectively.

Learners' experiences with the VPs

The learners (n=13) also evaluated the 'Abdominal pain' and 'Dyspnoe' VPs using the online questionnaire of the EVDB. They judged both cases to be worthwhile learning experiences giving high ratings on the VPs' authenticity, professional approach, coaching and learning effect.

Interview with the teacher

A structured interview with the clinical supervisor who moderated the small group discussion yielded some interesting remarks:

"The VPs enabled us to design a case to target a specific learning goal: a seemingly 'clear-cut' case, in which findings that deviate slightly from the usual presentation should trigger residents to take a more comprehensive approach."

"The VPs forced all participants to be individually active during the case workup. This stimulated their thinking prior to the discussion of the case and made them eager to talk about what they had done."

"The feedback tool gave a good overview of how diagnostic reasoning evolved in time, it helped the moderator to organise the discussion, but the tool's slow performance impeded the flow of the actions."

"Developing 40 VPs to be used in biweekly 45-minute sessions comprising individual VP work-up by learners followed by a small group discussion of the VP would be a feasible teaching approach in paediatric specialist training."

3.3 Problem based learning in tutorial group with VP

The scenario that was evaluated by St George's, University of London involved the application of VPs in a PBL group setting. In this setting, VPs replace the previously used conventional paper-based patient linear scenarios. The VPs have a branched structure which allows the student tutorial group to decide on options and note the consequences.

Description of scenario and VPs

Two repurposed VPs were involved in this setting: SG1 ("Catherine Miller") and SG2 ("Anna Lena Olofsson"). Both VPs were repurposed from existing CAMPUS cases originating from Heidelberg. In the repurposing process, the cases are transferred from the linear VP system CAMPUS to the branching VP system OpenLabyrinth. This involved translation into English, adaptation of media, but foremost, the addition of decision options and alternative paths to the VPs. In deliverable D4.4, guideline 1, this repurposing process is described in detail. It took about 9 hours per VP to repurpose, mostly due to adding the branching. Next to differences in the English and German healthcare system, the most striking change was the medical practice:

3.4 Skills laboratory training following instruction by a VP

The Medical School of Heidelberg University integrated VPs in the longitudinal skills training programme of their curriculum. The goal of the application of VPs was to enhance students' cognitive preparation for skills training in order to make more efficient use of the available time during the on-site training sessions. The target group consisted of fifth year medical students.

Description of scenario and VPs

The VPs 'Skillslab Lumbalpunktion', 'Skillslab Blasenpunktion' and Skillslab Cardiopulmonary resuscitation' covered relevant paediatric procedural skills: a spinal tap, a suprapubic bladder puncture, and cardiopulmonary resuscitation of an infant or a toddler. During training sessions in the Skillslab students are instructed and supervised by trained student-tutors. The VPs were repurposed from existing VP cases. Each scenario presents a typical clinical case for each procedure. Particular emphasis is placed on interactive clarification of the specific procedures using video, static graphics and interactive animations. It was mandatory for students to complete the cases the day before the related skills training session. In this blended scenario 50% of the time is devoted to the online VP and 50% to the corresponding teaching event (face to face skills training). The teachers attended a workshop in which they learned how to use VPs during skill straining and the content of the VPs was assessed in an Objective Structured Clinical Examination (OSCE).



Figure 8 Student working through skills lab VP



Figure 9 Student performing corresponding skill in skills lab

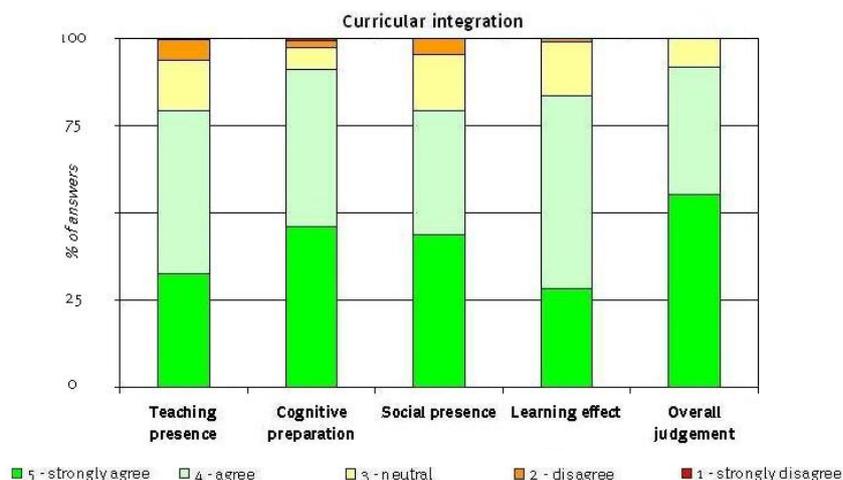
Audit of scenario

The scenario was reviewed by a staff member of Heidelberg University using the online form in the EVDB (<http://85.12.18.83/evdb>). The reviewer stated (appendix 4) that: The students were well informed about the way the VPs were integrated in the course by the opening lecture of the course, handouts and online information in the virtual learning environment. The students were not asked during the VP work-up to produce an artefact (notes, diagrams etc.) which could be used as input for the following skills training session. The learning objectives, instruction and assessment were in good alignment in the course in which the VPs were included. The workshop attended by the teachers did not address important issues related to clinical reasoning, such as critical interpretation of data, summarising the patient problem, asking open-ended questions to reveal students' thinking, and reflective practice.

Student experiences with the scenario

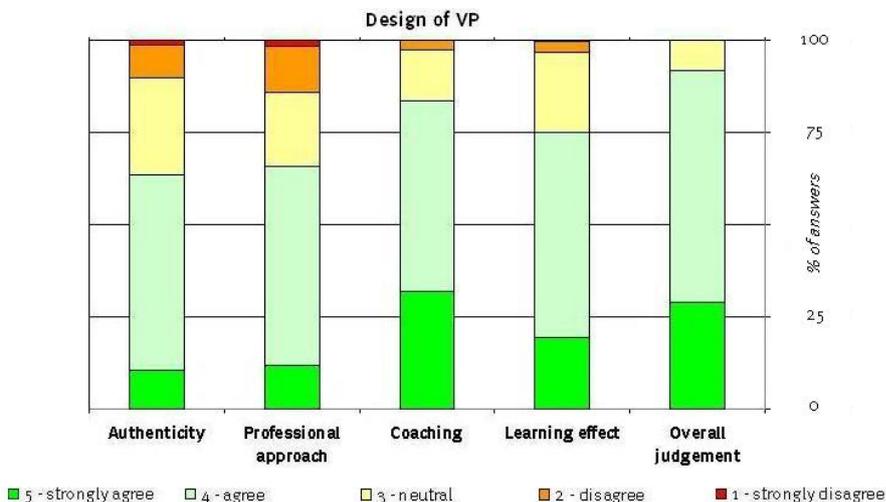
Thirty students completed the questionnaire on the curricular integration of the VPs (<http://www.virtualpatients.eu/resources/evaluation-tool-kit/translated-versions/>). The response rate was 100%. Results: Students rated the blended learning scenario overall as very

successful (4.5 ± 0.6), the teaching presence it offered as high (4.1 ± 0.9) and the cognitive preparation provided by the VP cases as effective (4.4 ± 0.8). The social presence was judged to be high (4.2 ± 0.9) and the scenarios were judged to promote a good learning effect (4.2 ± 0.7). In their comments, students specifically cited the multimedia-based clarification of procedures as very helpful preparation for skill training.



Student experiences with the VPs

Thirty students were surveyed using the questionnaire on learning clinical reasoning with VPs (<http://www.virtualpatients.eu/resources/evaluation-tool-kit/translated-versions/>). The response rate was 100%. Results: Students rated the VPs as authentic (3.6 ± 0.8), judged that the VP demonstrated a professional approach (3.6 ± 0.9), and judged that coaching was good (4.1 ± 0.7). The students rated the learning effect as good (3.9 ± 0.7) and considered the VPs to offer a good learning experience (4.2 ± 0.6).



Interview with tutors

The tutors indicated that the VP-based cases prepared students well for skills lab training and facilitated efficient use of on-site training time.

3.5 Assessment with VP

The last VP scenario that was evaluated involved the use of VPs for assessment. The setting as tested by LMU in Munich consisted of elective courses for third year medical students, each course including 7 VPs. The VPs were obligatory for the students taking the course. The VPs used for that scenario were repurposed VPs from Heidelberg, St. Georges University and Karolinska Institutet.

The audit (appendix 5) reveals that the intended learning outcomes for this scenario focus on clinical reasoning. The VPs contain short multiple choice questions as well as long-menu question for summative assessment.

The students could work in their own time, there was no preset schedule. Students could communicate with teachers during the VP sessions using asynchronous CMC (e.g. email). Students could interact among each other using CMC or face-to-face. Teachers were not trained to deal with VPs, but were trained to create a positive learning environment.

The four VPs were evaluated by 135 students outside EVDB, using a questionnaire that was slightly extended from the one available in the EVDB. The outcome of this survey was that the VPs did not score very high on authenticity and professional approach, but were at the appropriate level of difficulty and fostered diagnostic reasoning. Students felt better prepared for practice and the overall judgement was positive.

4 Focus group studies

In order to report the repurposing experiences of the eViP partners as much as possible focus groups were organized during a meeting of work package 5 in Maastricht on the 15th of January 2010 and during a meeting with all eViP partners in London on the 26th of April 2010. We have chosen to use focus groups because this is a different way of collecting experiences than questionnaires. We hoped to enrich our insights in the experiences of the eViP partners in order to write a better evaluation report.

In this paragraph the set-up and results of the three focus groups are summarized. The full introduction text and summaries of the different focus groups can be found in Appendix 6, 7 and 8.

4.1 Focus group 1: the relation between Virtual Patients and the educational scenarios

Topic of this focus group

In this focus group participants talked about the relation between Virtual Patients and the educational scenarios that they are used in. More specifically, we focussed on what happens when Virtual Patients that have been designed to be used in a specific way in an educational scenario are reused in a different way in another educational scenario. We were interested in this question because it is -in our experience- one of the barriers, one of the reasons that repurposing is not yet widely done.

Procedure of this focus group

There were two parallel groups facilitated by two representatives of Maastricht University. The first group contained representatives of SGUL (London), UJ (Krakow), and UWH (Witten). The second group contained representatives of SGUL (London), UJ (Krakow), KI (Stockholm), MU (Maastricht), and HD (Heidelberg).

At the start of the focus group the introduction text was handed out to participants on paper and the topic of the focus group was discussed. The focus groups lasted around 45 minutes and were recorded.

Conclusions

Both groups explored examples of VPs that were designed for a particular educational scenario and repurposed for another scenario. Sometimes that is easy, other times it creates problems. Two important factors are:

- Students' level of training (pre-clinical versus clinical): influences the complexity level of the case and feedback and possibly also their interest (diagnostic decision making versus knowledge)
- VPs intended for self-study versus VPs for discussion: when VPs are used for self-study elaborate feedback needs to be included, when VP are discussed the tutor/teacher plays a role in giving feedback. Branched VPs may be more suitable to stimulate discussion, but may be confusing during self-study because the student does not receive feedback on the optimal path to take.

These are factors to take into account when selecting VPs for repurposing.

The selection process should be supported. It is difficult to select cases for repurposing, especially for people who are not content experts. Content is not the only matter to be considered: cases also have to fit in the course (e.g. be in alignment with learning objectives and scenario). Close co-operation channels could be helpful: involvement OF WHOM?? in situations where VPs are reused. In the end, however, technical issues may be more important than content issues.

Repurposing is not always more efficient than creating from scratch. Repurposing may, however, also be an easy way to get subject matter experts started and make them aware of what is a good VP in their setting.

4.2 Focus group 2: repurposing experiences

Topic of this focus group

Following suggestions from participants of the previous focus groups, a discussion around the repurposing experiences was planned. The effort sheets were proposed as a basis for this discussion: why is repurposing easy/fast in some cases and difficult/long in others? This discussion was seen as a start for a more general discussion around repurposing: in which circumstances would it be advisable and in which circumstances not?

Procedure of this focus group

There were two parallel groups facilitated by two representatives of Maastricht University. The first group contained representatives of SGUL (London), KI (Stockholm), HD (Heidelberg), LMU (Münich), UWH (Witten) and MU (Maastricht). The second group contained representatives from UJ (Krakow), UMFCLUJ (Cluj), HD (Heidelberg), UWH (Witten) and KI (Stockholm),

At the start of the focus group the introduction text was handed out to participants on paper, and the topic of the focus group was discussed. The focus groups lasted 45 – 60 minutes and were recorded.

Conclusions

One of the groups spent most time on discussing factors that influence the amount of effort required for repurposing. The experience is that repurposing requires relatively little effort when, e.g.:

- The original case is well-structured;
- Repurposing is done by a content expert; or
- Repurposing concerns (only) enhancing the level of difficulty or making the case suitable for students from a different discipline (for example repurposing a VP for medical students for nursing students within the same institute)

Repurposing takes relatively much effort when, e.g.:

- It concerns complex educational goals;

- The VP concerns content that experts do not agree on;
- The VP concerns cases where cultural differences and/or differences in medical procedures are large;
- A linear VP has to be repurposed to a branched system; or
- Repurposing concerns reducing the level of difficulty (for example from clinical to pre-clinical).

An easy tool for creating and repurposing VP is important. It would be helpful to add learning goals as metadata to the VP.

Advantages of repurposing include the fact that you have a starting point and materials that have been collected with the patient's consent. Both groups agree that it is not always more efficient to repurpose. Sometimes a suitable VP is not available, although this problem may be solved over time when more VPs become available for repurposing. More fundamental is the problem that teachers often have very specific ideas about the VP they want or the way that they want to use it. The acceptance of an existing VP can be hampered by the fact that it does not exactly match the teacher's idea, or even by the fact that 'it does not feel like their own case'. There are limits to repurposing caused by the structure of the original VP and the system it was created for. An unexpected experience was that media-files are often not exchangeable between partners, e.g. because medical procedures are slightly different or simply because the conversation between the doctor and the patient is different.

The second group spent most time on discussing future chances and directions for repurposing that are beyond the scope of the eViP project. Six chances were identified:

1. An unexpected side effect that many partners experienced was that repurposing VPs turned out to be a good start for creating new cases. Teachers and content experts are willing to put some effort in, they discover what VP are, which aspects are important and how they function, and then they want to create new VP.
2. Repurpose VP for assessment purposes, because fewer changes are expected to be necessary in that case.
3. Use repurposing to get to a common template, a kind of prestructured 'half-case' that makes creating new VP easier and quicker.
4. Repurpose just the core of VP, i.e. the medical data; this is the part that can be used in different countries, languages and settings.
5. Several partners have good experiences with letting students develop VP: when students are asked to develop VP themselves they can develop cases that fit their own needs (e.g. disease areas that they feel uncertain about). The focus is in this case not on the (quality of the) product, but on the process: what can they learn from creating VP? Can they expose their own reasoning? Can they peer review each others' VP? This set-up suits student-centred, active learning; when students create VP together, or exchange and discuss VP it even becomes a social activity and a collaborative learning experience.
6. Joint development of VP to cover a (part of a) curriculum or set of common guidelines: when partners share a curriculum or, for instance, an agreed set of guidelines within a discipline they can share the task of creating a complete set of VP (that can be –to some extent- repurposed by individual partners to fit their courses or educational ideas). Acceptance of VP is much easier when partners know each other and start from common ground, especially when key people or bodies can be involved from the beginning. The quality of such a set of VP can be guaranteed by (regular) peer review.

The figure in Appendix 7 shows a concept map containing all the factors and relations between them that were discussed in both groups.

4.3 Focus group 3: the eViP evaluation instruments

Topic of this focus group

Focus group 3 concerned a discussion around the eViP evaluation instruments: what are the experiences with the use of the evaluation instruments? What are the ideas about evaluation of Virtual Patients and used scenarios now? Are there any unexpected or important results of the evaluations that should be discussed?

Procedure of this focus group

This focus group took place during the eViP meeting in London on the 26th of April 2010, immediately after focus group 2. The procedure and the groups were the same. This focus group lasted around 30 minutes.

Partners agree that the evaluation instruments are suitable for their purpose: the quality insurance and further improvement of the Virtual Patients and their integration in the curriculum. Especially information from open questions seems to be useful. Students often skip open questions, but they will comment when a Virtual Patient and/or educational scenario is either very good or very poor. The evaluation results are informative for others who might want to repurpose these Virtual Patients, but the actual reuse of Virtual Patients will depend far more on the learning goals and objectives they cover.

Questionnaires used by some partners, but not by all. Reasons include:

- Questionnaires are quite long; this is difficult especially in settings where students and teachers have to fill in other questionnaires as well (e.g. regular course evaluations)
- Questionnaire is designed for a specific purpose: to evaluate the design of the (repurposed) Virtual Patients and the integration of their use in the curriculum. Some partners were interested in other research questions to which these instruments are not tailored.
- There were some issues around the translation of terms and the applicability of the questions in other cultures and course settings (i.e. Nursing and Dentistry).

To improve the usability of the evaluation instruments and the response rate, the questionnaires should be reduced in size. It might help to give students insight in what is done with their feedback.

A major advantage of the eViP evaluation approach is that it is a joint approach with shared instruments. In principle, this enables the execution of multi-centre studies. Many partners are interested to continue in this direction, either to describe and evaluate a set of good practices concerning the use of Virtual Patients or to do research on more specific research questions. It might be a good idea to develop a group of shared evaluation instruments.

The figure in Appendix 8 shows the concept map of the discussion in the two groups.

5 Conclusions

The five prioritized educational scenarios and the corresponding VPs helped the partners in the e-ViP project to deliberately explore new ways of repurposing and integrating VPs with other learning activities in their healthcare education programmes. We hope that these example scenarios will enable the wider healthcare education community to envision what an educational scenario entails and what it takes to secure teaching, cognitive and social presence in such a scenario.

The reviewer checklists (audit VP design or VP scenario) were not extensively used because they were often considered too long and not always applicable to the simple local practice of VP development and usage. However, the comprehensive lists of potential constituents of VPs and factors that could potentially influence curricular integration of VPs made the developers and educationalists aware of the many ways in which VPs can be designed and the many different ways in which VPs can be implemented in a curriculum. This awareness was a trigger for the reviewers to pay more attention to deliberate repurposing and the linking of VP use to more mainstream learning activities in their curriculum. Unfortunately, the absence of structured and complete information about the design of VPs and their integration in a course precludes verification whether deliberate assembly of constituents in a VP or deliberately combining VPs with other teaching activities actually fosters the intended activities to enhance clinical reasoning skills.

The student questionnaires (experiences with VP or VP scenario) were used more often. Developers and educationalists acknowledged that these questionnaires provided valuable information on how to improve the quality and integration of the VPs. Drawbacks of these instruments are that they were designed for a single evaluation purpose (repurposing) and specifically tailored to medical education. This reduced their applicability to local evaluation needs and other healthcare education settings.

The time allotted to the VP and the so-called corresponding teaching event (CTE) in an educational scenario covered the whole range of possible combinations, from predominantly working with VPs (e.g. 100% VP use in a PBL tutorial group) via equal use of both ingredients (e.g. 50% VP use and 50% CTE for skills training) to predominantly working without a VP (e.g. 30% VP and 70% CTE in assessment with VPs). In both scenarios in which the VP preceded the CTE (small group discussion on diagnostic reasoning, skills training) VPs made the precious contact moment with clinical staff more effective and efficient by enhancing students' cognitive preparation.

Artifacts can be a powerful tool to exploit the potential of VPs for enhancing the CTE. Only the scenario of small group discussions on diagnostic reasoning used artifacts generated during the VP work-up, and this approach proved very successful. We would therefore advise developers to pay more attention to the 'linking' capabilities of artefacts in their educational scenarios.

A second factor that is important for the enhancement of the CTE is preparation and instruction for teachers. Although most of the scenarios that were described included teacher training, several of these training sessions failed to address the possibilities for discussing clinical reasoning. In the scenario with VPs in PBL tutorial groups the tutors were trained in facilitating discussions on clinical reasoning based on the branched structure of the VPs. This enabled them to enhance students' use of the possibilities to explore clinical choices and experience the consequences of these choices. In the scenario of VPs with small group discussions teacher training included explanation of the underlying cognitive error in the VP and issues like critical interpretation of data and ways to elicit reflective diagnostic reasoning. In both scenarios teacher training achieved good results and we would therefore recommend consideration of more comprehensive teacher training which include theories on clinical reasoning and methods to support reflection and discussion on clinical reasoning.

Good teacher training was also indirectly recommended in one of the focus groups in which the repurposing of VPs designed for self-study to scenarios in which VPs are used for face-to-face collaborative learning was discussed. It was suggested that the feedback built into the VPs should be removed and the teacher should be able to moderate the discussion and give feedback on the content.

6 Appendices

APPENDIX 1

[back to report](#)

Review for: Individual selfstudy

Scenario id: **urn:vpscenario:krakow:selfstudy:1:0**

Organisation: **Faculty of Medicine, Jagiellonian University**

Review entered by: **andrzej**

Review entered on: **2010-05-06**

1. Course Design

The following types of VP session and corresponding teaching event scenarios are involved

A VP session without a corresponding teaching event

Total number of VPs:	4
Type of VP session:	Individual study Seminar
Communication between student and instructor during VP session:	Asynchronous CMC
Communication between students during VP session:	Face to face
Comments:	None (empty)

2. Co-ordination of content

- a** Did the corresponding teaching event(s) inspire the creation of artefacts for the VP session(s)? **No**
If so, what kind of artefact? (e.g. Notes, Charts/graphs) (empty)
- b** Did the VP session(s) inspire the creation of artefacts for the corresponding teaching event(s)? **No**
If so, what kind of artefact? (e.g. Notes, Charts/graphs) (empty)

c Time allocation. Time spent in VP sessions: 100 %

3. Education of staff

a	Was training offered for CTE Teachers:	NA
b	Was training offered for CMC Teachers:	No
c	Was training offered for VP-session Teachers:	(empty)
4. Accessibility / Flexibility		
	Student access to VPs:	
	Location:	From any computer on campus
	Time:	24 hour access
5. Summative assessment of VP content		
	Kind of assessment:	(none)
6. Summative assessment of VP content by VPs		
	Kind of VP assessment questions:	MCQ Short menu questions
7. Target group		
a	Intended target group:	Medical student in year: 3 Other: 3 year nursing
b	Main learning objective (e.g. clinical reasoning, communication):	clinical reasoning
8. Scenario description		
Description of scenario(s) in your own words (if needed): a) inclusion in technical subject class (telemedicine) b) mail broadcast self study c) extra curricular (additional) teaching course		

VP-Curricular- Integration-Checklist

A. Teaching presence

1	Students receive sufficient information about the way VPs are integrated into the course. How are the students informed?	strongly agree (5)
	e-mail communication with written instructions	
2	Students are informed about which VP sessions correspond to which teaching events.	N/A (6)
3	Students are informed about the possibility of discussing with other students and teachers via an online discussion forum, online chat, or email.	neutral (3)
4	Students had fixed blocks of time in their schedule for the VP sessions.	neutral (3)

Variant a) 5 Variant b) 3 Variant c) 1

5 When CTE is after VP session:
The CTE is effective for refining students' clinical reasoning of topics addressed in the VP session. Why? N/A (6)

6 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. N/A (6)

7 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. N/A (6)

8 When VP session alone:
The VP session is effective in refining students' clinical reasoning skills regarding topics addressed in the VP. Why? agree (4)

Better resembles real life situations than conventional teaching

9 The content and structure of VPs and "corresponding teaching events" were coordinated and implemented in a way to create the most meaningful use of time. Explain why if you agree. agree (4)

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

strongly agree (5)

workshop

11 Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills during face to face sessions. If Yes: How? strongly disagree (1)

12 Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills online. N/A (6)

13 Teachers are taught to encourage students to create a short summary of the patient's problem using medical terms. N/A (6)

14 Teachers are taught to encourage students to interpret the data presented critically. strongly agree (5)

15 Teachers are taught to encourage useful reading habits (e.g. students should read comparatively about at least two diagnostic hypotheses of a VP). N/A (6)

16 Teachers are taught to use special questioning strategies (e.g. open-ended questions) to reveal the developmental level N/A (6)

of the student concerning clinical reasoning skills.

B. Cognitive presence

17 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.

N/A (6)

18 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. N/A (6)

19 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.

N/A (6)

20 The mix of VP-sessions and corresponding teaching events is well suited to stimulate discussions on clinical reasoning. N/A (6)

C. Social presence

21 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)

N/A (6)

D. Learning effect

22 Overall, the combination of VP sessions and corresponding teaching events is very well suited to foster clinical reasoning in the target group. N/A (6)

N/A (6)

23 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. N/A (6)

N/A (6)

E. Overall judgement

24 Overall, the combination of VPs sessions and corresponding teaching events is very well suited to enhance learning in the target group. N/A (6)

N/A (6)

F. Open-ended questions

25 Special weakness of the of the overall VP integration:

Difficulties with proper placement of VP-based activities within the curriculum

26 Special strengths of the of the overall VP integration:

Offers new approach to clinical reasoning study, independent work in students free time with non limited literature support

27 Other comments:

(empty)

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APPENDIX 2

[back to report](#)

Review for: Clinical reasoning veldhoven 100323

Scenario id: **urn:vpscenario:veldhoven:deleng:residentpediatrics:2.0**

Organisation: **Maastricht University**

Review entered by: **b.deleng**

Review entered on: **2010-05-06**

1. Course Design

The following types of VP session and corresponding teaching event scenarios are involved

C VP session before a teaching event

Number of VPs in each session:	1
Type of VP session:	Individual study
Type of Corresponding teaching event:	Small group
Communication between student and instructor during VP session:	None
Communication between students during VP session:	None
Communication between student and instructor during corresponding teaching event:	Face to face
Communication between students during corresponding teaching event:	Face to face
Comments:	The VP concerned an on the first sight straightforward case in which a treatment directly followed the initial diagnosis. One loop with a more detailed inquiry was available to discover the potential cognitive error.

2. Co-ordination of content

- | | | |
|----------|--|---------|
| a | Did the corresponding teaching event(s) inspire the creation of artefacts for the VP session(s)? | NA |
| | If so, what kind of artefact? (e.g. Notes, Charts/graphs) | (empty) |
| b | Did the VP session(s) inspire the creation of artefacts for the corresponding teaching event(s)? | Yes |

Notes and logged actions

c	Time allocation. Time spent in VP sessions:	80 %
	Time spent in CTEs:	20 %

3. Education of staff

a	Was training offered for CTE Teachers:	Yes
	What kind of training?	
	Content of training:	specific case and underlying cognitive error, feedback tool and moderation of discussion

b	Was training offered for CMC Teachers:	NA
c	Was training offered for VP-session Teachers:	(empty)

4. Accessibility / Flexibility

Student access to VPs:	
Location:	Only from certain computers
Time:	Access only during VP session

5. Summative assessment of VP content

Kind of assessment:	(none)
---------------------	--------

6. Summative assessment of VP content by VPs

Kind of VP assessment questions:	(none)
----------------------------------	--------

7. Target group

a	Intended target group:	Residency training
b	Main learning objective (e.g. clinical reasoning, communication):	diagnostic reasoning

8. Scenario description

Description of scenario(s) in your own words (if needed): After the residents finished the individual workup of the case they gathered for a small group discussion on their diagnostic actions and clinical reasoning. The discussion was moderated by a supervisor and based on the notes and logged actions.

VP-Curricular- Integration-Checklist

A. Teaching presence

1	Students receive sufficient information about the way VPs are integrated into the course. How are the students informed?	strongly agree (5)
2	Students are informed about which VP sessions correspond to which teaching events.	N/A (6)
3	Students are informed about the possibility of discussing with other students and teachers via an online discussion	N/A (6)

	forum, online chat, or email.		
	strongly agree (5)	4	Students had fixed blocks of time in their schedule for the VP sessions.
5	When CTE is after VP session: The CTE is effective for refining students' clinical reasoning of topics addressed in the VP session. Why?		strongly agree (5)
6	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.		strongly agree (5)
7	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.		N/A (6)
8	When VP session alone: The VP session is effective in refining students' clinical reasoning skills regarding topics addressed in the VP. Why?		N/A (6)
9	The content and structure of VPs and "corresponding teaching events" were coordinated and implemented in a way to create the most meaningful use of time. Explain why if you agree.		strongly agree (5)
		10	Virtual patient learning objectives, instruction and assessment are well aligned, in terms of content and methods. (Concept of constructive alignment, Biggs 1996).
			N/A (6)
11	Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills during face to face sessions. If Yes: How?		strongly agree (5)
12	Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills online.		N/A (6)
13	Teachers are taught to encourage students to create a short summary of the patient's problem using medical terms.		disagree (2)
14	Teachers are taught to encourage students to interpret the data presented critically.		strongly agree (5)
	students used a procedure to induce reflective diagnostic reasoning described by Mamede and Schmidt (2008)		
15	Teachers are taught to encourage useful reading habits (e.g. students should read comparatively about at least two diagnostic hypotheses of a VP).		strongly disagree (1)
16	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.		agree (4)

B. Cognitive presence

17 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. strongly agree (5)

strongly agree (5)

18 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.

19 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. N/A (6)

This is same question as Q18

20 The mix of VP-sessions and corresponding teaching events is well suited to stimulate discussions on clinical reasoning. strongly agree (5)

C. Social presence

21 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) agree (4)

D. Learning effect

22 Overall, the combination of VP sessions and corresponding teaching events is very well suited to foster clinical reasoning in the target group. strongly agree (5)

23 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. agree (4)

E. Overall judgement

24 Overall, the combination of VPs sessions and corresponding teaching events is very well suited to enhance learning in the target group. strongly agree (5)

F. Open-ended questions

25 Special weakness of the of the overall VP integration:

It is time consuming: 1 VP workup wiht discussion costs 60 minutes. Session is depedent on performance of technology.

26 Special strengths of the of the overall VP integration:

Deliberate practice within a small group

27 Other comments:

A heterogenous group of 6th year students, foundation trainies, residents and nurse practisioner worked well

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APPENDIX 3

[back to report](#)

Review for: Anna-Lena Olofsson (PBL)

Scenario id: **evip:vp:1000524:vpscenario:sgul:cbalashub:pbl:1.0**

Organisation: **St. George's, University of London**

Review entered by: **chara**

Review entered on: **2010-05-07**

1. Course Design

The following types of VP session and corresponding teaching event scenarios are involved

E Other use of VPs

Total number of VPs used:

1

Type of VP session:

Other: [Interactive PBL](#)

Type of Corresponding teaching event:

Other: [Interactive PBL](#)

Communication **between student and instructor** during VP session:

Face to face

Communication **between students** during VP session:

Face to face

Communication **between student and instructor** during corresponding teaching event:

Face to face

Communication **between students** during corresponding teaching event

Face to face

Comments:

The immediate outcomes included: * Interactive VP that offers clinical choices and consequences, providing opportunities to develop clinical reasoning, and for safe practice. * The integration of the learning resources with the VP resources enabled learning possibilities within the context of the scenario, just-in-time learning. * The different tracks taken through the case personalises the learning experience for the collaborative PBL group, and for the individual learner in reflective or revision study

2. Co-ordination of content

a Did the corresponding teaching event(s) inspire the creation of artefacts for the VP session(s)?

Yes

If so, what kind of artefact? (e.g. Notes, Charts/graphs)

[wiki log of learning issues and objectives](#)

If so, what kind of artefact? (e.g. Notes, Charts/graphs)

b Did the VP session(s) inspire the creation of artefacts for the corresponding teaching event(s)? [Yes](#)
[wiki log of learning issues and objectives](#)

c Time allocation. Time spent in VP sessions: 100 %
 Time spent in CTEs: (empty) %

3. Education of staff

a Was training offered for CTE Teachers: [Yes](#)
 What kind of training? [Workshop](#)
 Content of training: [Interactive PBL tutor training](#)

b Was training offered for CMC Teachers: [Yes](#)
 What kind of training? [Workshop](#)
 Content of training: [Interactive PBL tutor training](#)

c Was training offered for VP-session Teachers: (empty)

4. Accessibility / Flexibility

Student access to VPs:

Location:

[From any computer on campus](#)

Time:

[24 hour access](#)

5. Summative assessment of VP content

Kind of assessment:

[MCQ](#)

6. Summative assessment of VP content by VPs

Kind of VP assessment questions:

[MCQ](#)

7. Target group

a Intended target group:

[Medical student in year: 3](#)

b Main learning objective (e.g. clinical reasoning, communication):

[clinical reasoning, PBL learning objectives](#)

Description of scenario(s) in your own words (if needed): (empty)

8. Scenario description

VP-Curricular- Integration-Checklist

A. Teaching presence

1 Students receive sufficient information about the way VPs are integrated into the course. How are the students informed? [strongly agree \(5\)](#)

2 Students are informed about which VP sessions correspond [strongly agree \(5\)](#)

to which teaching events.

3 Students are informed about the possibility of discussing with other students and teachers via an online discussion forum, online chat, or email. strongly agree (5)

4 Students had fixed blocks of time in their schedule for the VP sessions. strongly agree (5)

5 When CTE is after VP session:
The CTE is effective for refining students' clinical reasoning of topics addressed in the VP session. Why? strongly agree (5)

6 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. strongly agree (5)

7 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. strongly agree (5)

8 When VP session alone:
The VP session is effective in refining students' clinical reasoning skills regarding topics addressed in the VP. Why? strongly agree (5)

They get an opportunity to discuss in groups using branched options and consequences, rather than linear didactic approach.

9 The content and structure of VPs and "corresponding teaching events" were coordinated and implemented in a way to create the most meaningful use of time. Explain why if you agree. strongly agree (5)

Designed in such a way to satisfy a learning week.

10 Virtual patient learning objectives, instruction and assessment are well aligned, in terms of content and methods. (Concept of constructive alignment, Biggs 1996). strongly agree (5)

11 Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills during face to face sessions. If Yes: How? strongly agree (5)

Through interactive PBL tutor notes

12 Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills online. strongly agree (5)

13 Teachers are taught to encourage students to create a short summary of the patient's problem using medical terms. strongly agree (5)

14 Teachers are taught to encourage students to interpret the data presented critically. strongly agree (5)

15 Teachers are taught to encourage useful reading habits (e.g. students should read comparatively about at least two diagnostic hypotheses of a VP). strongly agree (5)

16 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. strongly agree (5)

B. Cognitive presence

17 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. strongly agree (5)

18 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.

strongly agree (5)

19 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. strongly agree (5)

20 The mix of VP-sessions and corresponding teaching events is well suited to stimulate discussions on clinical reasoning. strongly agree (5)

C. Social presence

21 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) strongly agree (5)

D. Learning effect

22 Overall, the combination of VP sessions and corresponding teaching events is very well suited to foster clinical reasoning in the target group. strongly agree (5)

23 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. strongly agree (5)

E. Overall judgement

24 Overall, the combination of VPs sessions and corresponding teaching events is very well suited to enhance learning in the target group. strongly agree (5)

F. Open-ended questions

25 Special weakness of the of the overall VP integration:

(empty)

26 Special strengths of the of the overall VP integration:

This model is for medical students to engage in collaborative learning activities that more directly mimic the competencies of experienced medical practitioners. The model integrates learning resources and technologies around a core interactive case based technology - the virtual patient (VP) - and will seamlessly blend online and face-to-face learning.

27 Other comments:

(empty)

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APPENDIX 4

[Home](#) [Users](#) [Organisations](#) [Virtual Patients](#) [Scenarios](#) [My Info](#) [Help](#)

[back to report](#)

Review for: SkillsLab

Scenario id: **urn:vpscenario:heidelberg:huwendiek:skillslab:1.0**

Organisation: **University of Heidelberg**

Review entered by: **benjamin**

Review entered on: **2010-04-30**

1. Course Design

The following types of VP session and corresponding teaching event scenarios are involved

C VP session before a teaching event

Number of VPs in each session:

4

Type of VP session:

Individual study

Type of Corresponding teaching event:

Small group

Other: [SkillsLab Training](#)

Communication **between student and instructor** during VP session:

None

Communication **between students** during VP session:

None

Communication **between student and instructor** during corresponding teaching event:

Face to face

Communication **between students** during corresponding teaching event

Face to face

Comments:

[VP session at home/ anywhere where students prefer it to be.](#)

2. Co-ordination of content

a Did the corresponding teaching event(s) inspire the creation of artefacts for the VP session(s)? **No**

If so, what kind of artefact? (e.g. Notes, Charts/graphs) **(empty)**

b Did the VP session(s) inspire the creation of artefacts for the corresponding teaching event(s)? **Yes**

- | | | |
|----------|---|------|
| c | Time allocation. Time spent in VP sessions: | 50 % |
| | Time spent in CTEs: | 50 % |

3. Education of staff

- | | | |
|---|--|------------------------------------|
| a | Was training offered for CTE Teachers:
What kind of training?
Content of training: | Yes
Workshop
(empty) |
| b | Was training offered for CMC Teachers: | NA |
| c | Was training offered for VP-session Teachers: | (empty) |
| 4. Accessibility / Flexibility | | |
| | Student access to VPs: | |
| | Location: | From remote computers |
| | Time: | 24 hour access |
| 5. Summative assessment of VP content | | |
| | Kind of assessment: | OSCE |
| 6. Summative assessment of VP content by VPs | | |
| | Kind of VP assessment questions: | Other: (empty) |
| 7. Target group | | |
| a | Intended target group: | Medical student in year: 5 |
| b | Main learning objective (e.g. clinical reasoning,
communication): | Preparation for SkillsLab Training |
| | Description of scenario(s) in your own words (if needed): | (empty) |
| 8. Scenario description | | |

VP-Curricular- Integration-Checklist

A. Teaching presence

- | | | |
|----------|--|--------------------|
| 1 | Students receive sufficient information about the way VPs are integrated into the course. How are the students informed? | strongly agree (5) |
|----------|--|--------------------|

In Opening Lectures, via handout and online learning platform.

- | | | |
|----------|--|--------------------|
| 2 | Students are informed about which VP sessions correspond to which teaching events. | strongly agree (5) |
|----------|--|--------------------|

	3 Students are informed about the possibility of discussing with other students and teachers via an online discussion forum, online chat, or email.	N/A (6)
4	Students had fixed blocks of time in their schedule for the VP sessions.	N/A (6)
5	When CTE is after VP session: The CTE is effective for refining students' clinical reasoning of topics addressed in the VP session. Why?.	agree (4)
6	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.	strongly disagree (1)
7	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.	N/A (6)
8	When VP session alone: The VP session is effective in refining students' clinical reasoning skills regarding topics addressed in the VP. Why?	N/A (6)
9	The content and structure of VPs and "corresponding teaching events" were coordinated and implemented in a way to create the most meaningful use of time. Explain why if you agree.	strongly agree (5)
	<div style="border: 1px solid black; padding: 5px;"> <p>VP as preparation for SkillsLab Training. While working through the VP, the students learn all the theory for SkillsLab Training, so during the training they can focus on the practicing. Completing all of the VP for SkillsLab Training is mandatory for participation in SkillsLab Training.</p> </div>	
10	Virtual patient learning objectives, instruction and assessment are well aligned, in terms of content and methods. (Concept of constructive alignment, Biggs 1996).	strongly agree (5)
11	Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills during face to face sessions. If Yes: How?	strongly agree (5)
	<div style="border: 1px solid black; padding: 5px;"> <p>Workshop</p> </div>	
12	Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills online.	strongly disagree (1)
13	Teachers are taught to encourage students to create a short summary of the patient's problem using medical terms.	strongly disagree (1)
14	Teachers are taught to encourage students to interpret the data presented critically.	strongly disagree (1)

15 Teachers are taught to encourage useful reading habits (e.g. strongly disagree (1) students should read comparatively about at least two diagnostic hypotheses of a VP).

16 Teachers are taught to use special questioning strategies (e. strongly disagree (1) g. open-ended questions) to reveal the developmental level of the student concerning clinical reasoning skills.

B. Cognitive presence

17 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. strongly disagree (1)

18 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.

strongly disagree (1)

19 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. strongly disagree (1)

20 The mix of VP-sessions and corresponding teaching events is well suited to stimulate discussions on clinical reasoning. strongly disagree (1)

C. Social presence

21 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) strongly disagree (1)

D. Learning effect

22 Overall, the combination of VP sessions and corresponding teaching events is very well suited to foster clinical reasoning in the target group. neutral (3)

23 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. strongly agree (5)

E. Overall judgement

24 Overall, the combination of VPs sessions and corresponding teaching events is very well suited to enhance learning in the target group. strongly agree (5)

F. Open-ended questions

25 Special weakness of the of the overall VP integration:

(empty)

26 Special strengths of the of the overall VP integration:

The students are forced to be prepared for the training of procedures, so they can focus on practicing, which is more efficient. Using the procedure is embedded in a clinical scenario in the VP.

27 Other comments:

(empty)

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APPENDIX 5

[back to report](#)

Review for: self-directed learning

Scenario id: **urn:vpscenario:lmu:internal med:1.0**

Organisation: **Medizinische Fakultät der LMU München**

Review entered by: **inga**

Review entered on: **2009-10-05**

1. Course Design

The following types of VP session and corresponding teaching event scenarios are involved

C VP session before a teaching event

Number of VPs in each session:

1

Type of VP session:

Individual study

Type of Corresponding teaching event:

Seminar

Communication **between student and instructor** during VP session:

Asynchronous CMC

Communication **between students** during VP session:

Synchronous CMC
Asynchronous CMC

Face to face

None

Communication **between student and instructor** during corresponding teaching event:

Face to face

Communication **between students** during corresponding teaching event

Face to face

Comments:

(empty)

2. Co-ordination of content

a Did the corresponding teaching event(s) inspire the creation of artefacts for the VP session(s)?

No

If so, what kind of artefact? (e.g. Notes, Charts/graphs)

(empty)

If so, what kind of artefact? (e.g. Notes, Charts/graphs)

b Did the VP session(s) inspire the creation of artefacts for the No
corresponding teaching event(s)?

(empty)

c Time allocation. Time spent in VP sessions: 30 %
Time spent in CTEs: 70 %

3. Education of staff

a Was training offered for CTE Teachers: No
b Was training offered for CMC Teachers: No
c Was training offered for VP-session Teachers: (empty)

4. Accessibility / Flexibility

Student access to VPs:

Location:

From remote computers

Time:

24 hour access

5. Summative assessment of VP content

Kind of assessment:

(none)

6. Summative assessment of VP content by VPs

Kind of VP assessment questions:

MCQ
Short menu questions
Long menu questions
Other: (empty)

7. Target group

a Intended target group:

Medical student in year: 3

b Main learning objective (e.g. clinical reasoning,
communication):

clinical reasoning

Description of scenario(s) in your own words (if needed): (empty)

8. Scenario description

VP-Curricular- Integration-Checklist

A. Teaching presence

1 Students receive sufficient information about the way VPs are integrated into the course. How are the students informed? strongly agree (5)

SingleSignOn from LMS moodle

2 Students are informed about which VP sessions correspond to which teaching events. strongly agree (5)

3	Students are informed about the possibility of discussing with other students and teachers via an online discussion forum, online chat, or email.	strongly agree (5)
4	Students had fixed blocks of time in their schedule for the VP sessions. <div style="border: 1px solid black; padding: 2px; margin-top: 5px;">They could do the VP whenever they wanted.</div>	strongly disagree (1)
5	When CTE is after VP session: The CTE is effective for refining students' clinical reasoning of topics addressed in the VP session. Why?	N/A (6)
6	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.	N/A (6)
7	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.	strongly agree (5)
8	When VP session alone: The VP session is effective in refining students' clinical reasoning skills regarding topics addressed in the VP. Why?	N/A (6)
9	The content and structure of VPs and "corresponding teaching events" were coordinated and implemented in a way to create the most meaningful use of time. Explain why if you agree.	agree (4)
		10 Virtual patient learning objectives, instruction and assessment are well aligned, in terms of content and methods. (Concept of constructive alignment, Biggs 1996).
		agree (4)
11	Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills during face to face sessions. If Yes: How?	N/A (6)
12	Teachers are taught how to provide elaborated feedback on students' clinical reasoning skills online.	N/A (6)
13	Teachers are taught to encourage students to create a short summary of the patient's problem using medical terms.	strongly disagree (1)
14	Teachers are taught to encourage students to interpret the data presented critically.	N/A (6)
15	Teachers are taught to encourage useful reading habits (e.g. students should read comparatively about at least two diagnostic hypotheses of a VP).	N/A (6)
16	Teachers are taught to use special questioning strategies (e.g. open-ended questions) to reveal the developmental level	N/A (6)

of the student concerning clinical reasoning skills.

B. Cognitive presence

17 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.

N/A (6)

18 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. N/A (6)

19 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.

neutral (3)

20 The mix of VP-sessions and corresponding teaching events is well suited to stimulate discussions on clinical reasoning. agree (4)

C. Social presence

21 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)

strongly agree (5)

D. Learning effect

22 Overall, the combination of VP sessions and corresponding teaching events is very well suited to foster clinical reasoning in the target group.

strongly agree (5)

23 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.

strongly agree (5)

E. Overall judgement

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

strongly agree (5)

F. Open-ended questions

25 Special weakness of the of the overall VP integration:

(empty)

26 Special strengths of the of the overall VP integration:

(empty)

27 Other comments:

(empty)

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APPENDIX 6

Appendix 6: Focus group on the relation between Virtual Patients and the educational scenarios

Introduction text for the focus group

In this focus group we would like to talk with you about the relation between Virtual Patients and the educational scenarios that they are used in. More specifically, we would like to focus on what happens when Virtual Patients that have been designed to be used in a specific way in an educational scenario are reused in a different way in another educational scenario. We are interested in this question because it is -in our experience- one of the barriers, one of the reasons that repurposing is not yet widely done. We have chosen to use focus groups because this is a different way of collecting experiences than questionnaires. We hope to enrich our insights in your experiences in order to write a better evaluation report.

We would like to focus during this session on educational factors, like: the place of Virtual Patients in the curriculum, the amount and kind of instruction, the kind of feedback, individual use for self-study versus use in a group setting, and the use for learning versus the use for assessment. We realize that other factors are also important, but we would like to keep them out of the current discussion. This means that we will not go into details regarding the content of the cases, the specific learning goals, or more technical issues regarding the implementation or the software/player that is used.

Questions:

1. In which educational scenario did you use the Virtual Patients? (original or repurposed) Please take a specific example of the use of Virtual Patients in mind. If you have more examples, then please take the two most important or relevant examples (in your own view). Aspects (to be used as refinements if they are relevant and have not been addressed in the answer to the more general question):

- Specify the goal: why were Virtual Patients used? what were students supposed to learn?
- Specify the learning activity (home/university, alone/together, how many, what did students do exactly?)
- What was the role of the teacher during this learning activity?
- How was feedback provided?
- Specify the place of this learning activity in the course and/or curriculum: how was it related to other learning activities?

2. Were the repurposed Virtual Patients suitable to be used in your (different) educational scenario? (for the repurposing partner) Would you expect your Virtual Patients to be suitable for the other educational scenario? (for the original author-partner)

- Why? Why not?
- What are the important differences between the scenarios? (educational level, learning theory, role of the teacher, etc.)
- What changes were made during repurposing?

3. In which educational scenarios would these Virtual Patients be suitable? In which scenarios would they not be suitable? In other words: what are the boundaries?

4. Do you have plans or ideas to use Virtual Patients in other educational scenarios?

Summary of the first group

Inventory / repurposing relations

Krakow: use CASUS system.

- repurposed mainly from Munich
- repurposed some from St. George's
- authored new cases that were repurposed by Munich & St. Georges

Educational scenarios:

- Voluntary, extra-curricular. Teachers in clinical subjects are encouraged to recommend cases to students who are in the clinic.
- One case (created from scratch in Krakow) used more systematically by Gynaecology: case introduced on Monday, students were invited to view the VP, and then it was discussed on Friday.
- In a course in a third year course in Telemedicine students do one random case so that we are sure that they are able to work with CASUS (individually or in pairs). The cases are still a bit difficult for them.
- Emergency and Life support course in 1st year using their own new cases: 3 lectures at the beginning and then 7 classes. Lecturer recommends the use of VP's. For each class students are advised to study one VP (voluntary), and then in the class they discuss a scenario that is similar to the scenario in the case.

London:

- repurposed some cases from Krakow; unclear whether these are new cases created by Krakow or cases that Krakow had already repurposed from Munich.
- repurposed cases from CAMPUS (Heidelberg)
- repurposed cases from CASUS (Munich) for assessment purposes
- authored cases that were repurposed

Educational scenarios:

- Core: VP as cases in PBL. These are normal branched cases; they contain no feedback about optimal path because they are discussed in tutorial group
 - Formative assessment: 2 VP per week are recommended to students, to ensure that all relevant learning objectives are covered. Some of the learning goals that students have posed themselves may be covered in the formative-assessment VP's, but these cases are not discussed in the PBL tutorial sessions. These VP's have a scoring system so that students can see how they have done at the end.
 - In-session by teachers in lecture: some teachers are exploring this. They teach theory around problem, then prompt a VP. Students use clickers to decide how to progress through the VP.
 - Self-directed learning.
- Scenario 2 & 4 are regarded as the same by students (both not obligatory)

Munich:

- repurposed cases to other settings (staying in CASUS)
- repurposed from other VP systems (Labyrinth, WEB-SP and a bit from CAMPUS)

Educational scenario's in Munich:

- some VP's voluntary

- one set included in the curriculum: VP as preparation for a weekly seminar, where tutors were supposed to pick up content from VP and start from there. Since not all tutors did so, and many students did not use the VP to prepare themselves, this is no longer obligatory (but still recommended).

Witten

- Trying to repurpose medical cases to nursing sciences.
- Updated cases from Munich (CASUS) and repurposed them into Open Labyrinth; no change in educational scenario (formative assessment). Tried to go from linear to branched at first, but then decided not to.
- Authored cases that were repurposed by Krakow.

Example #1: Munich > Krakow

Content: Internal medicine, Cardiology cases

Original scenario: VP were originally designed as obligatory preparation for a weekly seminar. These cases were designed for self-study but to be further discussed during the seminars. They are still used, but no longer obligatory.

Repurposed scenario: self-directed, voluntary in 5th year (clinical setting). This is a one week Cardiology course where students have lectures and see cardiology patients in the wards (in groups). VP's are offered as an optional extra, most probably not further discussed by students or staff. The impression is that not many students use the VP (probably less than 10%).

In this scenario students work through the VP by themselves. This means that all feedback needs to be in the VP. In the VP from Munich the texts were already quite elaborate. VP had to be adapted

for local differences in guidelines, medical devices, etc. In some cases the guidelines were so different that it was almost like creating a new case, maybe even more labour-intensive because you were trying to reuse the original VP. It was difficult to predict which case would be easy to repurpose and which case would be difficult.

Feedback was a real issue with branched cases from St. George's. These seem to be very suitable for discussions or in PBL groups, but for individual study the explanations were too short. Repurposing is more work then.

Example #2: Krakow > London

Content: Cardiology? unclear, it's in the evip referatory

Original scenario: optional self-directed learning during clinical years. Although the subject matter experts have not designed cases for a particular educational scenario (more as a presentation of a case and a description of the best way to handle it) it is likely that they were thinking of the type of students that they usually meet: students in clinical years (fifth or sixth year)

Repurposed scenario: formative assessment alongside PBL tutorials, lectures and self-study. Two VP per week are recommended. They concern the learning objectives of that week, but are not discussed in tutorial groups. Although this could still be seen as self-study, it is a far more structured scenario. Using these VP was not obligatory this first year, and It is not clear how many students have used them. Next year students will be notified that content from these VP may be included in the exam.

Because of the difference in educational scenario repurposing concerns adapting the level (from clinical years to preclinical years) and the type (from linear to branched, including scoring system). This might explain why repurposing took so much time (upto 20 hours maybe).

Other experiences

London: found in a study that pre-clinical students in PBL prefer branched VP for discussion and elaboration in tutorial groups. Students in clinical years who use VP for self-study preferred linear VP with questions. A reason may be that being on the ward they have seen how people make decisions and are now more interested in testing their knowledge.

Krakow: for repurposing the experience of the SME is important. Repurposing the first few VP takes a lot longer.

The general impression is that not many students are motivated to do VP's when cases are voluntary, unless you advertise that something covered by VP's might be included in the exam. This is what was done in Munich and will be done in London next year.

London: in some cases repurposing might not have been a great success. In our case one of the reasons is probably that we are the only partner using branched VP in PBL. Repurposing from linear cases is a lot of work.

London: impression that the subject matter experts would now probably prefer to start from scratch, but they needed the process of trying to repurpose to become aware of all the issues involved (level of students, type of feedback, etc.). So repurposing might be a good introduction to creating VP.

Krakow: we have experienced that our subject matter experts say they start from scratch but when you look closer you see that they have taken many ideas from VP that they have seen.

Summary of the second group

JD: In which Educational scenario did you use (repurposed) virtual patients?

TP: VPs replace the entire curriculum now. This way an interactive instead of a linear PBL is obtained. It has a major impact on tutors since it requires a new way of working. It is the easiest for medical experts but difficult for non-experts (without medical background). Our VP's are being reused in other institutions.

PK: A VP must fit into a course, which is difficult when reusing a VP. There are very few VPs in the database that are suitable for our courses. The content of the VPs needs to be upgraded in order to be in line with our local guidelines. Another barrier is that our teachers are not used to VPs. They are used to bed-side teaching. The best options seems to develop new VPs for a course.

SH: Our VPs are designed originally for self-study. We repurposed them for tutor-led discussion meetings. The effort for reuse depends on the content, on whether the learning objectives differ from the originally intended, and how different the learning scenario's are.

SK & SH: Sometimes reuse of VPs saves time, often it costs more time to repurpose a VP than to develop one from scratch.

PK: It also depends on the medical content and whether it is suitable for first year or fifth year medical students.

BL: We encountered the following issues when repurposing VPs in the CAMPUS system: (a) lab forms have to be adapted to the local situation, (b) annotated pictures had to be translated to Dutch, which meant that original image sources had to be available or reproduced, (c) the feedback functionality of CAMPUS had to be adjusted to the local learning scenario.

A difference between the Heidelberg setting and one of the Maastricht settings is that in Heidelberg VPs sessions are followed by a discussion while in the Maastricht setting, group discussions happen during the VP session.

SE: We apply VPs in a rheumatology course. Pairs of students work together on 4 VPs. This is a kind of self-directed learning as a pair. It is followed-up by teacher-led sessions or with peers (it differs among our 4 hospitals). As a feedback we use self-evaluation by comparing the own actions and decisions with what the real experts did. Some students appreciate follow-up, other do not need it since they already “got the solution”. However, the follow-up offers additional information.

JD: What about repurposing?

TP: Case writers didn't want to repurpose. It is better and quicker to write new VPs. Curricula of universities differ although competences to be acquired are the same. The reason for selecting a VP for repurposing is based on the content. We repurpose our own VPs for different goals, e.g. assessment. Searching for suitable cases and persuading a case writer to rewrite an existing case also costs a lot of time.

PK: Bringing into contact the right persons of different institutions, makes repurposing VPs easier, saving time.

SH: ...Talking to each other what you are looking for.

JD: Do VP's influence the educational approach of the teacher? - no answer.

SH: VPs were also used in blended learning sessions that were concluded by a tutor-led session. The quality of these sessions depend on the tutor. They stimulate elaboration and promote transfer. These VPs are being repurposed for skills-training: students must have studied the VP before going into the skills-lab.

SE: I have no personal experience with repurposing, other staff was responsible for this work. My personal experience concerns the use of VP in a clinical setting in rheumatology and the 4-hospital clinical diagnostic course (e.g. internal medicine cases) followed up with teacher-led sessions.

SH: Exchange lists of plans for VPs to be written.

APPENDIX 7a

Appendix 7: Focus group on repurposing experiences

Introduction text for the focus group

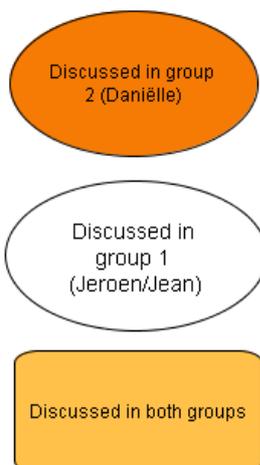
We know from earlier discussions, but also from the effort sheets, that repurposing is much easier and faster in some cases than in other cases. Some important factors have been mentioned before, but to get more grip on this issue we would like to discuss some cases that - according to the effort sheets and/or your experiences- have taken much time and effort to repurpose and some cases that have taken (relatively) little time and effort to repurpose. We expect that some factors will have had far more effect on repurposing effort than others. To get a full picture, however, we would like to try to address the influence of a wide range of factors (including discipline, content, educational level, educational scenario/curriculum approach, culture, language and VP structure). The results of our discussions will hopefully also give us insight in when it might be advisable to repurpose and when we would be better off implementing from scratch. We have chosen to use focus groups because this is a different way of collecting experiences than questionnaires. We hope to enrich our insights in your experiences in order to write a better evaluation report.

Questions

1. Select example cases, ideally cases for which both author party and repurposing party are present. Why did repurposing take (relatively) much effort and time in some cases and (relatively) little time and effort in other cases?
2. Given these discussions: in which cases would repurposing be advisable and in which cases would we be better off starting from scratch?
3. What is the future of repurposing? How much do we still believe in repurposing at the end of EVIP?

Concept map of discussion

The Figure below shows a concept map containing all the factors and relations between them that were discussed in both groups.



Legend

APPENDIX 7b

APPENDIX 8a

Appendix 8: Focus group on eViP evaluation instruments

Introduction text for the focus group

Now that we are close to the end of the EVIP project, we would like to take some time to discuss the evaluation approach that we have chosen earlier on. If we have time we would like to select some striking evaluation results (in your opinion) and discuss them into more detail.

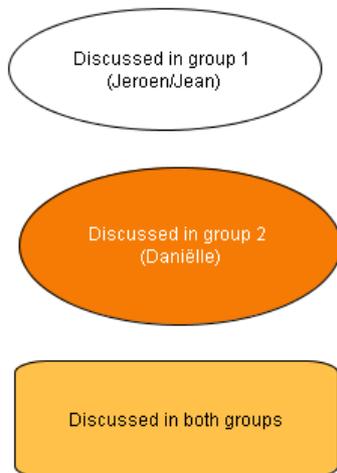
We have chosen to use focus groups because this is a different way of collecting experiences than questionnaires. We hope to enrich our insights in your experiences in order to write a better evaluation report.

Questions

1. What are our experiences with the use of the evaluation forms and database?
2. What are our ideas about evaluation of Virtual Patients and use scenarios now? Which approach would we take if we were to start again?
3. Are there any unexpected or important results of the evaluations in your own institutes that you would like to share and discuss?

Concept map of discussion

The Figure below shows a concept map containing all the factors and relations between them that were discussed in both groups.



Legend

APPENDIX 8b

